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## Level of Satisfaction of Pre-Service Teachers in their Off-Campus Practice Teaching Experiences



Ferdinand I. Alcantara

**ABSTRACT:** The study attempted to determine the extent of satisfaction of the student with regards to the services given by the student teaching office of the Bulacan State University Hagonoy Campus and their experience in their off-campus practice teaching during the academic year 2017-2018. The study made use of descriptive-survey method for the sample of 56. A questionnaire with a Fivepoint Likert scale was asked for the student teachers for them to complete; the data gathered were analyzed and treated statistically. Weighted mean was computed and determined the significant relationship of the level of satisfaction of the students to the services given by the student teaching office and the level of satisfaction in their internship experiences using the Pearson R correlation. Both the level of level of satisfaction to the services given by the student teaching office and the level of satisfaction to their internship experiences both registered a very much satisfaction on the part of the respondents. There is a very weak linear relationship between the level of level of satisfaction to the services given by the student teaching office and the level of satisfaction to their internship experiences both registered a very much satisfaction on the part of the respondents with a computed t-value of 0.218.

**KEYWORDS:** Internship, Off-campus Practice Teaching, Cooperating School/Teacher

### INTRODUCTION

The institution of Higher Learning requires the college degree and student's internship are important requirements for the new graduates' employment. As defined by Hergert (2009) internship as an important part any business school curriculum. He also stated that it plays a crucial role in aiding the students to connect their traditional coursework and the actual workplace. Internship, as defined by YIU (2015) is the advantage mechanism for the students to develop their skills. While Simons et al., (2012) stated that internship can be synonymously related to experiential learning as it enhances student' individual, civic, and professional growth.

In the Philippine setting, internship is commonly incorporated to the curriculum of the college students as mandated by the Commission on Higher Education (CHED). It is an opportunity to practice the actual setting in the school where they will undergo their practice teaching. The CHED promulgate a list of guidelines for students' internship program. As the objectives were stated in the CHED Memorandum Order No. 23, series of 2009, the internship program aims to offer college students enrolled in Higher Educational Institutions (HEIs) in the country the chance to obtain practical knowledge and skills, as well as positive attitudes and values from reputable establishments in the country. A recent study concluded that one of the two most effective experiential learning experiences is through internships (Green et al., 2012), the other one is through live-case projects.

Every Higher Education Institution in the Philippines have developed their own career and internship office services to assist the students in the placement for their internship site or better known as "cooperating school". The Bulacan State University – as one of the institution that caters education students had established its own student teaching or internship office. The office as stipulated in the CHED Memo is aimed at developing strong partnerships with the various schools situated along or near the vicinity of the university not limited for the purpose of internship but also to probable employment of the graduates. In the study conducted by Yiu (2012), he stated that it is deemed necessary to establish an internship coordinator in order to facilitate communication and assist the students and the cooperating school with the information and guidelines and to, intervene when different issues arise. According to Chi (2008) the requirements in order to attain the success of the internship office are mentoring and preparing students for the interview process, reputation and a high quality of education program, internship experience and quality of students' education curriculum and the course taught in the Education Department of the school. All of which are believed to be addressed by the internship of the HEI stated.

## Level of Satisfaction of Pre-Service Teachers in their Off-Campus Practice Teaching Experiences

Studies exploring the internship programs are highly essential (Koc et al., 2014). According to the study of Yiu (2012) about the Hospitality and Tourism internships, she suggested that direct experience of working in the hospitality and tourism industry may actually cause students to feel negatively about pursuing a career in this field. It is also concluded in a related study that different types of internship experience have different effects on the students' level of satisfaction (Chen et al., 2011) Therefore, this study shall exhibit the measurement of the level of the students' satisfaction in terms of the service rendered by the Hagonoy Campus Student Teaching Office and the actual experiences at the cooperating school of the pre-service teachers. It is indeed an obligation of the researcher to determine how the students reacted on their internship experience most importantly on their level of satisfaction. The purpose of the study is to help student teaching office of the Bulacan State University Hagonoy campus Student teaching office and the cooperating school on the possible necessary adjustments to be done in assisting the pre-service teachers in their internship. The students' insights will play a vital role in guiding the institution for the improvement and sustainability of the internship program of the campus.

### Statement of the problem

The general problem of the study is "What is the level of satisfaction of the pre-service teachers in their student teaching experience? Specifically, the sought seek answer to the following questions:

1. How may the profile of the pre-service teachers be described in terms of:
  - 1.1 age.
  - 1.2 sex; 1.3 course; and
  - 1.4 major?
- 2 To what extent is the level of satisfaction of the pre-service teachers to the services given by student teaching office?
- 3 To what extent is the level of satisfaction of the pre-service teachers on their experience at the cooperating school?
- 4 Is there a significant difference between the level of satisfaction of pre-service teachers to the services given by the student teaching office and their experiences in their cooperating school?
- 5 What intervention program may be crafted after conducting this study?

### Methodology

The study utilized the descriptive-correlation research method. As cited by Sevilla, et.al. (1992), the descriptive method of research is designed for the researcher to gather information about the present existing condition. Hari-Bernabe (2012) in relation with the study of Fox (1960) it cited that the descriptive correlation research helps in determining the extent of which different variables may be related to each other. The study attempted to describe measure and analyzed the data to find out the significant difference between the level of satisfaction of pre-service teachers to the services given by the student teaching office and their experiences in their cooperating school.

The main respondents of the study are the students of the Bulacan State University Hagonoy Campus for the calendar year 2017-2018. Included in the study are fourth year students who finished their pre-service internship program in their respective cooperating school namely: Bachelor in Elementary Education, the Bachelor in Secondary Education major in Mathematics and English.

A locally made constructed questionnaire was developed by the researcher in order to gather data.

The questionnaire constructed by the researcher used the CHED Memorandum Circular no. 23, series of 2009, or the set of guidelines for the institutions of higher learning for the internship program of the students. The draft of the questionnaire was submitted for critiquing and validation of some experts for the enhancement of the research questions.

After the final draft has been validated the researcher do the final print out and personally administered the questionnaire to the respondents. The respondents were given an ample time to answer the two-part questionnaire. The first part is the level of satisfaction of pre-service teachers to the services given by the student teaching office and the second part is the level of satisfaction of pre service teacher in their experiences to their cooperating school.

In order to administer the questionnaire, the researcher seek permission to the Dean of the campus to administer the survey. Upon the approval of the dean, the research personally administered the survey and waited for the respondent to answer the two-tart questionnaire independently.

After the respondent finished answering the survey, the researcher collected and tabulated the data.

The data collected to the respondent were tabulated and manually computed by the researcher with the help of a statistician. The profile of the respondents was treated using the frequency and percentage count.

The level of satisfaction of pre service teacher given by the student teaching office and the level of satisfaction of pre service teacher in their experiences to their cooperating school were treated using frequency counts as well as mean.

## Level of Satisfaction of Pre-Service Teachers in their Off-Campus Practice Teaching Experiences

The relationship between the level of satisfaction of pre-service teachers to the services given by the student teaching office and their experiences in their cooperating school were treated using Z-test or test of two sets of mean.

A z-test is a statistical test used to determine whether two population means are different when the variances are known and the sample size is large. The test statistic is assumed to have a [normal distribution](#), and nuisance parameters such as [standard deviation](#) should be known in order for an accurate z-test to be performed ( Salkind, 2010)

Results and discussions

Table one presents the demographic profile of the respondents according to their major of specialization.

**Table 1. Demographic Profile of the Respondents by Gender**

Course	Gender				Total Frequency	Total %
	Male	%	Female	%		
BEED	4	19.05	17	80.95	21	100
BSED Math	4	26.67	11	73.33	15	100
BSED English	6	30.00	14	70.00	20	100
Total	14	25.00	42	75.00	56	100

As further glean in the table, it shows that out of 21 BEED respondent, four respondents are male which occupying some 19.05 percent and the 17 female respondents are occupying the 80.95 percent.

For BSED Math respondents which comprises of 15 respondents in total, four respondents are male and 11 are female which has 26.67 and 73.33 percent respectively.

BSED English majors having 6 male and 14 female respondents has its percentage of 30 and 70 percent with a total of 20 respondents.

In summary, 14 male respondents or 25 percent and 42 out 56 or 75 percent are occupying the whole 100 percent of the total population.

This only mean that majority of the respondents are female which only proved that the education courses are manipulated and chosen mostly by female.

Table number two presents the demographic profile of the respondents according to their age.

**Table 2. Demographic Profile of the Respondents by Age**

Age	BEED	Math	English	Total	%
19-20	8	11	10	29	51.79
21-22	8	2	8	18	32.14
23-24	3	2	2	7	12.50
25-26	0	0	0	0	0.00
27-28	0	0	0	0	0.00
29-30	2	0	0	2	3.58
Total	21	15	20	56	100.00

As shown in the table, 51.79 percent of the total respondents has an age range of 19-20 years of age. Among them are the eight respondents from the BEED, 11 from the BSED Math, and 10 from the BSED English.

It also shows in the table that some eight respondents from BEED, two respondents from BSED Math, and eight respondents from BSED English occupies the 32.14 percent of the total population whose age ranges from 21-22 years of age. As further glean in the table, only 3.58 percent or two respondent from the BEED occupies the lowest age range of 29-30 years among the 56 total student respondents.

The table only shows that the highest age range of 19-20 years of age stated that majority of the respondents are in the average age in the tertiary level.

Table number three presents the summary on the level of satisfaction of the students on the services given by the student teaching office.



## Level of Satisfaction of Pre-Service Teachers in their Off-Campus Practice Teaching Experiences

**Table 3. Summary on the Level of Satisfaction of Students on the Services Given by Student Teaching Office**

Indicator	5	4	3	2	1	WA	VI
1. Orient students teachers regarding the policies of the Student Teaching Program of the University	32	24	0	1	0	4.50	VMS
2. Time allotment given to the students in preparing the necessary documents needed for the deployment	27	27	2	0	0	4.45	VMS
3. Assistance given to the students during the deployment in their cooperating school	25	23	8	0	0	4.30	VMS
4. Monitor students during the period of student teaching program	25	23	4	4	0	4.16	VMS
5. Update the students regarding the current issues and development in the program	28	23	4	1	0	4.38	VMS
6. Conduct meeting for the discussion of problems and concerns of the students	35	15	4	2	0	4.45	VMS
7. Assist students in solving the problems and issues encountered by them during the program	34	15	7	0	0	4.52	VMS
8. Coordinate with the cooperating school/teacher regarding the performance of the students	32	17	5	2	0	4.38	VMS
9. Assist students in preparing for their final demonstration teaching	31	23	2	0	0	4.52	VMS
10. Provides feedback to the students regarding the comments and observations of the cooperating school/teachers	36	16	4	0	0	4.57	VMS
Overall weighted average						4.42	VMS

**Note: VMS-Very much satisfied WA-weighted average VI-verbal interpretation**

As further presented in the table, it shows that it posted an overall weighted mean of 4.42 with a verbal interpretation of very much satisfied the respondents are, to the services given by the student teaching office. Moreover, indicator number 10 (provides feedback to the students regarding the comments and observations of the cooperating school/teacher) registered the highest weighted average of 4.57 which means that the respondents are very much satisfied, followed by indicator number seven (assists student teachers in solving the problems and issues encountered by the students) and nine (assists the students in preparing for their final demonstration teaching) which registered a weighted average of 4.52 in which the students are very much satisfied to the services they have received from the office.

Likewise, indicator number four (monitor student teachers during the period of student teaching program) registered the lowest weighted average of 4.16 but still there is a very much satisfaction of the part of the students to what they have received to the services given by the student teaching office.

In general, there is a very much satisfaction perceived by the students to the services given to them by the student teaching office of the Bulacan State University Hagonoy Campus.

Posted in Table number four is the summary on the level of satisfaction of the students to their internship experiences.

**Table 4. Summary on the Level of Satisfaction of Students in their Internship Experiences**

Indicator	5	4	3	2	1	WA	VI
1. Quality of directions received from the cooperating school/teacher when assign to a certain work	28	22	5	1	0	4.38	VMS
2. Implementation of internship plans in partnership in the Higher Educational Institutions	20	25	10	1	0	4.14	VMS
3. Encourage the students to develop their personality and professionalism as a teacher	37	15	3	1	0	4.57	VMS

## Level of Satisfaction of Pre-Service Teachers in their Off-Campus Practice Teaching Experiences

4. Orientation of the teachers on the rules and regulations of the cooperating school	26	22	5	3	0	4.27	VMS
5. Provide practical training of work experiences in accordance with agreed internship plan and schedule of activities	27	18	7	4	0	4.21	VMS
6. Ensure that the students do and perform the task and duties of a student teacher	36	15	3	2	0	4.52	VMS
7. Coordinate with the student teaching supervisor the performance of the student teacher	32	15	6	2	1	4.34	VMS
8. Assisting the students in preparing the given task, eg., demonstration teaching	30	21	5	0	0	4.45	VMS
9. Monitor the progress of the student during internship	26	25	3	2	0	4.34	VMS
10. Amount of treatment of the other teachers/personnel in the cooperating school.	25	23	7	1	0	4.29	VMS
Overall weighted average						4.35	VMS

**Note: VMS-Very much satisfied WA-weighted average VI-verbal interpretation**

As shown in the table, an overall weighted average of 4.35 with a verbal interpretation of very much satisfied is perceived by the respondents showing of their satisfaction on the experiences they have got from their off-campus practice teaching. As further glean in the table, indicator number three (encourages the students to develop their personality and professionalism as a teacher) display the highest weighted average of 4.57 which means that the respondents are very much satisfied to the activity they have got from internship. It was followed by indicator number six (ensures that the students do and perform the task and duties of a student teacher) with a registered weighted average of 4.52 with a verbal interpretation of very much satisfied.

Likewise, indicator number two (implementation of internship plans in partnership with the higher educational institutions) registered the lowest weighted average of 4.14 but still there is a very much satisfaction among the student respondents.

In totality, the students of the Bulacan State University Hagonoy campus is very much satisfied to what they have learned and experienced during their stay in their cooperating school.

Presented in table number five is the computation of Pearson R correlation between the level of satisfaction of the students to the services given by the student teaching office and the level of satisfaction of students during their internship experiences.

**Table 5. Computed Pearson R Correlation**

Computed value	Decision	Verbal Interpretation
-0.09319	Reject the alternative hypothesis	There is no significant relationship.

The table shows that that there is no significant relationship in the level of satisfaction of the students given by the student teaching office and the level of satisfaction of the students in their internship experiences.

The table prove this claim as shown in the table which the computed value of -0.09319, therefore it rejects the alternative hypothesis that there is a significant relationship in the level of satisfaction of the students to the services given to them by the student teaching office and the level of satisfaction of the students in their internship experiences.

Findings of the study revealed that the student are very much satisfied with the services given by the student teaching office of the Bulacan State University Hagonoy Campus. The findings also revealed that the students are very much satisfied with their experiences in their off-campus practice teaching or internship.

In conclusion, the student teaching office of the school are delivering and gives a satisfactory performance in their services given to the students. Feedback from the students stated that what they have experienced and learned from their cooperating school/teacher will surely a big help to them in the near future and prepare them in becoming the classroom teacher in the near future.

Feedback from the cooperating schools that the student teaching office must closely monitor the student teacher during their off-campus practice teaching to immediately respond to the concern both of the student teacher and the cooperating school/teacher.

## Level of Satisfaction of Pre-Service Teachers in their Off-Campus Practice Teaching Experiences

### Conclusion/implication

Since that the study shows a weak linear correlation between the level of satisfaction of the pre-service teachers to the services given by the student teaching office and their experiences to their cooperating school, the office of the of the student teaching must closely monitor the things happening to the students during their off-campus practice teacher for possible immediate actions to the problems encountered by the pre-service teachers.

Furthermore, strengthening the partnership with the cooperating schools and teachers must be considered in order to enhance the performance of the students.

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## The Impact of Choice Criteria on Investors' Financial Satisfaction: Examining the Mediating Effect of Financial Behaviour



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**ABSTRACT:** Financial satisfaction is the subjective measure of financial well-being, and it indicates the level of satisfaction perceived by the individuals with regard to various aspects of their financial situations and investment decisions. Financial behaviour is the fundamental component which enhances investors' financial satisfaction which is a subjective measure of financial well-being. Investors' choice criteria for selecting stocks determines investors' financial behaviour. This study examined the potential effects of investors' choice criteria on their financial behaviour. Simple Regression analysis was performed using SPSS for analysing the data collected from 200 individual investors. The statistical results indicated that choice criteria and financial behaviour positively influence investors' financial satisfaction. This study adds to the existing body of literature by providing insight into the influence of choice criteria on financial behaviour among investors in Indian equity market.

### INTRODUCTION

The rapid spread of financially complex products is increasingly requiring people to decide how much to save and where to invest and, during retirement, to take on responsibility for careful disbursement so as not to outlive their assets while meeting their needs (Chu et al., 2017). Investment decision making is an essential part in strategic decision making and the quality of investment decision making is affected by large number of factors. Those factors considered by a potential investor before making an investment decision, for evaluating various investment products and selecting an efficient asset mix for making an investment significantly influences a person's financial behaviour and their financial well-being. These choice criteria's influences the quality of investment decisions. Prior researches indicates that investors' financial behaviour was influenced by the criteria's they choose to select stocks to invest in. The financial literacy level contributes to investors financial behaviour which is an essential element required to examining various source of information. Investors objectives decides their choice criteria and based on the choice criteria, investors' financial investment behaviour varies from one person to other. Choice criteria refers all those factors considered by a potential investor before making an investment decision, for evaluating various investment products and selecting an efficient asset mix for making an investment. In other words all those criteria's influences the quality of investment decision can better be termed as choice criteria. All those criteria used by the investor to evaluate and select various investments available. The factors which have influence on investment decision making involves - Risk, Return, Source of information, safety, Liquidity, past performance etc. The behaviour of an individual, dealing with his/her financial affairs, which enhances financial capability as well as financial satisfaction that improves the overall financial wellbeing. Those financial activities includes-budgeting, saving, investment, expense management, balance control, credit management, debt management, compulsive buying etc. Financial satisfaction is satisfaction with one's present financial situation. In other words, it is the satisfaction with present standard of living, emergency savings, past investments and savings and general financial situation. It refers to the satisfaction attained by an investor by way of exhibiting an efficient financial behaviour. In other words, it is the satisfaction obtained by an investor from the outcome of their saving and investment decisions. The present study intended to examine the influence of investor's choice criteria on their financial behaviour.

### REVIEW OF LITERATURE

Financial satisfaction can be conceptualized as contentment with one's financial situation (Zimmerman, 1995; Arifin, 2018; Ali et al., 2015). Financial satisfaction can include individual assessments of debt, income, savings, and long-term goal achievement (Hira & Mugenda, 1999; Joo & Grable, 2004). Of the various domains of life satisfaction for an individual, financial satisfaction is certainly

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a very important one. Financial satisfaction is satisfaction with personal finance. Porter (1990) defined perceived attributes as "an individual's subjective evaluation of his/her own financial situation." This study observed financial satisfaction as satisfaction with income, level of living, net worth, general financial management, cash management, credit management, risk management, capital accumulation, and retirement/estate management for perceived indicators of financial well-being. Hira (1986) studied financial satisfaction level and the domains established for her study were satisfaction with money management practices, level of living, level of saving, ability to stay out of debt, ability to pay back money owed, level of assets, willingness to discuss money matters, and ability to meet large emergency expenses. Prior researches elaborates that financial well-being was heavily influenced by economic outcomes" (Zurlo, 2009; Sahi, 2013)

Financial stress levels, financial behaviours, financial risk tolerance and financial knowledge are found to be the predictors of financial satisfaction. It was determined that education, financial knowledge, financial risk tolerance, financial solvency, financial behaviours and financial stress level had a direct effect on financial satisfaction. Xiao et al. (2009) in their study found that "positive financial behaviours contribute to financial satisfaction and financial satisfaction in turn contributes to life satisfaction". From the perspective of a bottom-up model of subjective wellbeing (Diener, 1984), income is probably associated most highly with levels of satisfaction in the financial domain. The literature also suggests that financial behaviours can affect financial satisfaction (Godwin & Carroll, 1986; Mugenda et al., 1990). Hira & Mueller (1987) observed that satisfaction with money management practices, level of living, level of saving, ability to stay out of debt, ability to pay back money owed, level of assets, willingness to discuss money matters, and ability to meet large emergency expenses.

Financial behaviours were found to be significant factor to experience high level of financial satisfaction and financial well-being especially in the investment context Investors who practiced better behaviours tended to have higher levels of financial satisfaction. This finding supports an assertion made by O'Neill et al (2000) who indicated that if consumers receive education in the basic personal finance content areas they may be in a better position to manage their financial behaviours, resulting in improved financial satisfaction. Grable et al. (1998) and Roszkowski (1999) concluded independently that there appears to be a common psychological profile among risk tolerant individuals and those with more financial knowledge that allows them to make different financial decisions, which may ultimately lead to greater attained levels of financial satisfaction. Research also indicates that a relationship between financial satisfaction and financial knowledge may exist (Joo & Grable, 2004). Specifically, higher levels of financial knowledge and solvency, and the practice of better financial behaviours led to higher levels of financial satisfaction. The positive relationships between a person's solvency, financial behaviours, and financial satisfaction support previous research findings (Mugenda et al., 1990). The literature also suggests that financial behaviours can affect financial satisfaction (Godwin, 1994; Falahati et al., 2012; Godwin & Carroll, 1986; Joo, 1998; Mugenda et al., 1990). The major element noted in earlier researches, while making an investment decision is that the choice criteria applies in evaluating and choosing investment avenues. It refers to all those factors considered by a potential investor before making an investment decision, for evaluating various investment products and selecting an efficient asset mix for making an investment. The financial literacy level of investors influences their choosing criteria which influences financial behaviour and ultimately leads to financial satisfaction. Based on the above facts from the previous researches, it is evident that, there exists linkages among Investors choice criteria and financial behaviour

## OBJECTIVES OF THE STUDY

The objectives of present study are to examine the level of influence of choice criteria considered by the individual investors' to invest in financial products, on their financial satisfaction and to examine the mediating role of financial behaviour on the influence of independent variable choice criteria on the dependent variable namely financial satisfaction.

## Hypotheses

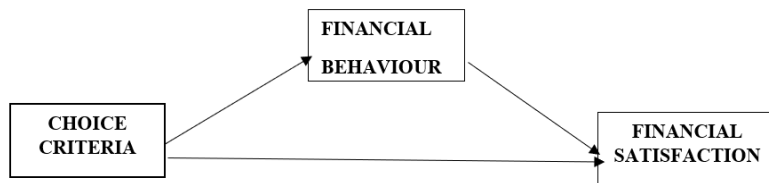
- There exists a positive relationship between choice criteria and financial satisfaction of individual investors'.
- Financial behaviour mediates the relationship between choice criteria and financial satisfaction.

## RESEARCH METHODOLOGY

The present study is explanatory in nature. In this study, the primary data required were collected using a structured questionnaire from a group of active stock market individual investors in the Indian stock market. The population of the study covers individual investors who have a minimum of two years of trading experience in the Indian stock market. Judgemental sampling, a non-probability method, was used to identify sample respondents for primary data. The number of participants who participated in this study was predetermined to be 200 in total.

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## CONCEPTUAL MODEL



## PROFILE OF RESPONDENTS

Out of the total respondents, 64 percent (128) are male and 36 percent (72) are female. Among the sample of 200 respondents, 34 percent are in the age group of 20-30, 30 percent are included in 30-40, 20 percent are included in 40-50, and the rest, 16 percent, are included in the age group of 50 years and above. In the selected sample, 46.7 percent of the respondents are post-graduates, 34.7 percent are graduates, 14 percent are professional, and only 4.6 percent of the respondents are SSLC/HSC. Majority (48.7 percent) of the sample respondents have income level under the less than Rs. 25,000, 36.7 percent having an income in a range of Rs. 25,000-50,000, 8.7 percent of the respondents belong to the Rs. 50,000-75,000 income group, 3.3 percent of the respondents having an income level of Rs. 75,000-1, 00,000, and only 2.6 percent of the respondents having an income of more than Rs.1, 00,000.

## DATA ANALYSIS RESULTS AND DISCUSSION

The reliability of the scale used in the study was verified by computing Cronbach's alpha ( $\alpha$ ) value for each of the four variables. The computed values of Cronbach's alpha for the constructs used in the study namely choice criteria (19 items) 0.743; financial behaviour (23 items) 0.851; and financial satisfaction (3 items) 0.835.

### Relationship Between Choice Criteria and Financial Satisfaction

Hypothesis formulated based on the first objective of the study proposes a positive relationship between choice criteria and financial satisfaction. To test the hypothesis  $H_1$ , correlation analysis was done using SPSS 21. The results of the analysis show that there is a positive relationship between choice criteria and financial satisfaction ( $r = 0.477, p < 0.05$ ). The descriptive statistics and correlation value of choice criteria and financial satisfaction are presented in the following table:

**Table 1. Descriptive statistics of choice criteria and financial satisfaction**

Variable	Mean	Standard deviation
Choice criteria	3.796	0.4535
Financial satisfaction	3.678	0.8429

The table 4.20 shows the mean scores given by the respondents for choice criteria and financial satisfaction out of the maximum score of 5. The results shows that choice criteria have a mean score of 3.796 and standard deviation of 0.4535 and financial satisfaction have a mean score of 3.678 and a standard deviation of 0.8429, which can be considered as fair. It indicates that in the present study sample respondents possess a moderate level of financial satisfaction and choice criteria selection.

The results of the correlation between choice criteria and financial satisfaction are presented in the following table.

**Table 2. Correlation between choice criteria and financial satisfaction**

Choice criteria	Financial satisfaction	
	Pearson Correlation	0.477**
	Sig.	.000
	N	150

**\*\* Correlation is significant at the 0.01 level**

From table 1, it can be inferred that the choice criteria and financial satisfaction are positively correlated with each other (0.447\*\*). It indicates the extent to which two variables are linearly related. The probability value associated with the correlation is less than 0.01. The above analysis indicated the positive relationship between the choice criteria and financial satisfaction. Hence, the hypothesis



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(H2), there exists a positive relation between choice criteria and financial satisfaction of individual investors' is accepted.

### Testing the mediating role of financial behaviour on the relationship between choice criteria and financial satisfaction

To test the mediating effect of financial behaviour in the relationship between choice criteria and financial satisfaction, on the basis of Baron and Kenny approach four steps that must be taken to establish that a mediated relationship exists. Here in this case,

- Step 1: Choice criteria significantly predicts financial satisfaction
- Step 2: Choice criteria significantly predicts financial behaviour
- Step 3: Financial behaviour significantly predicts financial satisfaction, when controlling for choice criteria

To find out whether choice criteria significantly predicts financial satisfaction a simple regression was done. Financial satisfaction was regressed on choice criteria. The results also shows that choice criteria is positively and significantly predicted financial satisfaction ( $\beta = 0.477$ ,  $P < 0.05$ ). The regression results are presented in the table – 3.

**Table 3. Simple regression analysis results for choice criteria with financial satisfaction**

Variables	B	Beta value	Sig	R <sup>2</sup>	Adjusted R <sup>2</sup>	Durbin Watson
Choice criteria	0.886	0.477	0.000	0.227	0.222	2.002

**Dependent variable:** Financial satisfaction

From the table 2, it is seen out that, since,  $p < 0.01$ , this model is significant and the R<sup>2</sup> value of 0.227, shows that model has accounted for 22.7% of the variance in the financial satisfaction. The beta regression coefficient ( $\beta = 0.477$ ) assess the strength of the relationship between choice criteria and financial satisfaction

To find out whether choice criteria significantly predicts financial behaviour a simple regression was done. Financial behaviour was regressed on choice criteria. The results also shows that choice criteria is positively and significantly predicted financial behaviour ( $\beta = 0.663$ ,  $P < 0.05$ ). The regression results are presented in the table 4:

**Table 4. Simple regression analysis results for choice criteria with financial behaviour**

Variables	B	Beta value	Sig	R <sup>2</sup>	Adjusted R <sup>2</sup>	Durbin Watson
choice criteria	0.740	0.663	.000	0.439	0.435	1.989

**Dependent variable:** Financial behaviour

From the table 3 it is clear that, the regression effect is statistically significant ( $P < 0.05$ ). Furthermore, the model has accounted for 43.5 percent of the variance in the financial behaviour. The closer to 2 that the value is, the better, and for this model the value is 1.989 which is so close to 2 that the assumption has almost certainly met. The results implied that the choice criteria significantly contributes to financial behaviour.

Next, to find out whether financial behaviour significantly predicts financial satisfaction, when controlling for choice criteria a multiple regression was carried out using choice criteria and financial behaviour as predictors and financial satisfaction as outcome. The results of the analysis is presented in the following table:

**Table 5. Multiple regression analysis results for choice criteria and financial behaviour with financial satisfaction**

Variables	Beta value	Sig	R <sup>2</sup>	Adjusted R <sup>2</sup>	Collinearity Statistics		Durbin Watson
					Tolerance	VIF	
Choice criteria	0.423	0.000	0.328	0.318	0.561	1.783	1.911
Financial behaviour	0.197	0.031			0.561	1.783	

**Dependent variable:** Financial satisfaction

The table 4 reports the results of multiple regression analysis, which point out that the weighted combination of the choice criteria and financial behaviour explained approximately 31.8 percent of the variance of financial satisfaction. So, from the above results it is inferred that financial behaviour have a partial mediation role in the relationship between choice criteria and financial

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satisfaction. The summary of the above results proving mediation role of financial behaviour on the relationship between choice criteria and financial satisfaction is clearly understand with the help of the table 6.

**Table 6. Mediating effect of financial behaviour between choice criteria and financial satisfaction**

DV	IV → M	M → DV	IV → DV	IV → DV Mediator controlled
Financial satisfaction	$\beta = 0.663^{**}$	$\beta = 0.921^{**}$	$\beta = 0.477^{**}$	$\beta = 0.423^{**}$
			$R^2 = 0.227$	$R^2 = 0.318$

**\*\* P < 0.05**

DV - Dependent variable (Financial satisfaction)

IV - Independent variable (Choice criteria)

M - Mediating variable (Financial behaviour)

From the above Table 5 it is seen out that all the conditions for testing the mediation are satisfied here. Financial satisfaction was regressed on choice criteria and financial behaviour. Choice criteria ( $\beta = 0.4677$ ,  $p < 0.05$ ) and financial behaviour ( $\beta = 0.663$ ,  $p < 0.05$ ) was found to be a significant predictor of financial satisfaction. It can be observed that the strength of the relationship between choice criteria and financial satisfaction was reduced from  $\beta = 0.477$  to  $0.423$ , when controlled for financial behaviour. Also  $R^2$  value increased from  $0.227$  to  $0.318$  i.e. the weighted combination of choice criteria and financial behaviour explained more variance of financial satisfaction. Therefore we can conclude that financial behaviour partially mediated the relationship between choice criteria and financial satisfaction. From the results it can be inferred that investors criteria for choosing stocks significantly impacts their financial satisfaction through the positive financial behaviour which reflects as their saving and investment behaviour. Investors have financial satisfaction from their investment only when they set the stock selection criteria's in the best way and manage their saving and investments efficiently.

### CONCLUSION

The advancement of an economy is based on the savings and proper allocation of capital for the developmental activities of the country. The reduction of disposable income or increase in per-capita income significantly contribute to savings. This leads to the increase in the allocation of funds to various investment avenues. The investors' preference to stock investments are based on the saving and investment behaviour which derives from the choice criteria's, they prefer to choose stocks. These preferences vary from person to person based on their investment objectives and personality traits. Thus, the present study implied that human behaviour that is pertinent to financial and investment decision-making and money management are based on the attitude towards various choice criteria's such as risk, return, source of information, safety, performance of stock.

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## The Essence of the Game in the National Holidays of Uzbekistan is the Embodiment of Pedagogical and Aesthetic Components



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**ABSTRACT:** This article reveals the essence of the game from several angles, namely from the pedagogical and aesthetic components that form one whole concept. Since ancient times, games have been used for various purposes: educational, training, entertaining, managerial, educational. The game model, simple and clear, always becomes entertaining and interesting. With the help of the game, the basics of upbringing and education are comprehended, traditions accumulated over the centuries are transmitted. Games act as stimulants, developing creative thinking, initiative, the ability to act together, subordinate their interests to collective ones, and perform tasks to achieve common goals. In Uzbekistan, great importance is attached to the competent implementation of game elements during mass celebrations. This is the embodiment of a competent policy of the state, in the transfer of knowledge to the younger generation, through game elements. Spectacular mass performances are particularly charming due to the combination of folklore elements with modern musical means, which allow creating a truly deep, national flavor and filling them with relevant modern sound. The musical and artistic traditions of creating a patriotic song are rooted in folk art. In the history of mankind, they will remain one of the enduring, eternal components of being. Folk holidays cannot be created artificially: they have been formed over thousands of years, incorporating rich traditions, cultural values, and humanistic principles.

**KEYWORDS:** game, pedagogical components, directing, educational technologies, upbringing, education, philosophy, pedagogy, thinking.

### INTRODUCTION

The game not only replenishes the treasury of human knowledge, but also aims each participant to be actively involved in the acquisition of knowledge and skills, assimilation of new concepts. It gives you the opportunity to become a direct participant in discoveries, a creator of works of art and culture. "... We need to use the mechanism of shaping people's consciousness on the basis of history, folk traditions, customs and rituals ..." [11]. In Uzbekistan, the task of forming in children and youth a love for art, world and Uzbek musical and gaming culture is especially relevant: "Increasing the interest of young people in music, arts, literature, theater and other arts" [10].

The origins of many mass folk holidays date back to the distant past. "Uzbek performing arts is distinguished by the richness of national traditions, forms and phenomena, reflecting various eras in the development of artistic culture" [8, P. 129]. From the first day of the existence of mass holidays, they used the rites and rituals of the country as a basis, reflecting the centuries-old traditions of the peoples. Naturally, the state holidays that arose much later became, as it were, a continuation of these first mass folk spectacles.

The modern process of revival of traditional forms of culture could not but affect folk games. The growing interest in such folk holidays as Navruz, Mekhrjon and others, also meant the holding of various games and competitions, contributed to the revival of undeservedly forgotten games. The main part of the mass holidays of Uzbekistan was of a ritual nature and in its spiritual and moral basis it was closely connected with the essence of a particular rite, reflecting the culture of the people, their customs and traditions.

An important role among other game elements used to enrich the celebrations was played by competitions, in which not only inter-racial, but also inter-communal unity was manifested: the spirit of the game did not separate, but united the audience.

As prominent Uzbek art historians Mukhsin Kadyrov and Sarvinoz Kadyrova rightly point out, dozens of ceremonies are associated with the celebration of Navruz (Old New Year), such as "... going to a stream or river, bathing," the pot is full ",

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beating eggs, climbing hills, cooking sumalak, remembering the dead, visiting shrines, hospitality, are also accompanied by dramatic and theatrical elements" [3,P.17]. Folk games are perfectly preserved and exist, as a rule, in all corners of the Republic, especially in villages, the population of which leads a traditional way of life.

"The special role of festivals as folk entertainment, bringing joy, performances and demonstrations held every New Year on Navruz" [3, p.21], M. Kadirov and S. Kadirova note. Today, the need for the revival of forgotten folk games is very high, since new modern sports are not able to fill the niche in the life of the people that was previously occupied by folk games. Their prohibition and ignoring led to an increase in the number of spiritually unbalanced and physically weak people. From time immemorial, folk games have contributed to the self-expression of people, helped them to "splash out" accumulated negative emotions, made life meaningful and healthy.

### MATERIALS AND METHODS

We have considered the necessary steps to further popularize the best folk games. In order to revive, develop and popularize folk games, it is necessary:

- selection of the best, in terms of education and cognitive potential, games.
- involvement of experts, scientists, aksakals in events on the use of the best traditions and the most acceptable forms of folk games.
- creation of a council for folk games under the Ministry of Culture with the involvement of masters of folk games, cultural workers, sports organizations, coaches, physical education teachers, etc.
- taking into account public opinion based on the results of a questionnaire, oral survey, conversation.
- promotion and popularization of folk games among the population during various mass entertainment events.

"In recent years, few of their young researchers have specialized in this area, while today, more than ever, the issue of state heritage is acute as the most important factor determining the originality of national art" [7, P.40].

It is no coincidence that at one time M. Kadirov tirelessly complained about this, saying how important it is to study the performing arts and holidays, to develop and promote artistic traditions, which has both spiritual, moral and moral meanings for the younger generation, called upon to preserve the heritage of centuries, connecting different eras, different generations of people with a spiritual thread.

### RESULTS

Currently, there is a revival of interest in folk games and thanks to the media. So, the following games have been developed on television: "Funny starts", "Come on, girls (boys)!", KVN intellectual game, etc. These games involve folk elements: "Shatranj" (chess), "Nard", "Kuvmok", "Uylab top", tongue twisters ("tez aytish"), riddle games ("topishmok top"), "Yaku-yak", "Um-ufu", "Bushama", "Kichkina", "Yurmana-Yurman", "Sidircha", "Yozi-kal", "Botmon-botmon". At the same time, the folk game itself is being modernized, its form is being improved and its content is deepening, being filled with the realities of the time. It should be noted that in the development and improvement of folk games, an important role is played by the involvement of people of all ages in solving these problems, but the experience and skill, knowledge of the older generation is predominant. Considering the problems of the folk game, U. Karabaev states: "In the process of creating amateur art groups focused on the oral genres of folk art, it is important to skillfully combine the best traditions of the folk school with modern structures that have now become national amateur clubs and associations of interest. In their organization, the main attention should be paid to the democratic principles of self-government, self-organization and self-education. In the future, on the basis of various genres of oral art, new amateur groups similar to the askiyaboz clubs, bakhshi associations, etc. may emerge. In connection with the growing interest of people in folk legends, fairy tales, legends and anecdotes, in the near future there may appear teams united in clubs of lovers of anecdotes, folk aphorisms, storytellers, Mushoira admirers, folklore researchers, etc." [2,P.65].

The customs of the Uzbek people have been formed over the centuries, they also formed the national holidays. As you know, the Uzbek ethnic group is one of the most ancient that previously existed on earth. It should be noted that this is one of the most numerous ethnic groups in Central Asia. In the process of developing the game as a way to convey the original and original culture of the people of Uzbekistan, this type of activity stands out as a unique one inherent in the Uzbek national art, rooted in folk art. There is a new in content and form attraction of the game as a way of reflecting the original culture of Uzbekistan.

The game has always been one of the main activities in folk art. According to scientists, the psychological mechanisms of gaming activity are based both on the fundamental needs of the individual and on the needs for self-expression, self-affirmation, self-determination, self-regulation and self-realization.

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Great pedagogical value has made traditional national games a special form of public education. They contributed to the education in a person of nobility, mercy, humanism, collectivism, friendliness, mutual support and mutual assistance. The cordiality and hospitality of the Uzbeks is a distinctive feature of our people, and these features were instilled largely thanks to traditional folk games and holidays.

### DISCUSSIONS

National games and fun have always been an indispensable part of the culture of the peoples of Uzbekistan. Competitions in strength and dexterity, speed and ingenuity were inherent in folk festivals held on significant dates, celebrations, festivities.

In modern conditions, folk games in Uzbekistan acquire a new breath. Let's name the most popular of them: kurash wrestling, ulak-kupkari, which entered the world arena and are considered as separate sports.

Analyzing the features of the game, attention should be paid to the use of gaming technologies, as a result of which the activity of all participants is activated and intensified.

Prominent scientist P.I. Pidkasty characterizes the game as "... a space for the internal socialization of the individual, a means of assimilating social attitudes" [4,P.159].

From a psychological standpoint, A.N. Leontiev considers the game "... as the freedom of the individual in the imagination, an" illusory "realization of unrealizable interests"[5, P.55]. Psychologists often believe that the ability to get involved in the game is not related to the age of a person, but at each age the game has its own characteristics. This circumstance allows the game to be the most active element in staging mass holidays and in folk art.

In fact, gaming activity is designed to perform certain very essential functions. These include:

- diagnostic.
- communicative.
- function of socialization.
- function of self-realization.
- entertaining.
- therapeutic.

Scientists have developed various features of games: among the main patterns of the game, they distinguish: the free developing activity of the game, the creative nature, the emotional component.

As a rule, games are accompanied by emotional uplift of their participants. It is caused by rivalry, the spirit of competitiveness and competition.

Each game has its own specific components: the presence of rules, the content of the game, the logical sequence and time frame for its implementation and possible further development.

In theoretical terms, the game is considered by various researchers as an activity, as a process, as a method of introducing knowledge. As a special type of activity, it includes the following stages: setting a goal, drawing up a plan, implementing the goal, detailed analysis of the results. Motivation of gaming activity comes from the voluntary nature of the game, competitive elements, satisfaction of the need for self-affirmation and self-realization.

In addition to folk art, the game is also actively used in pedagogical activities, transferring knowledge through a special game form, which contributes to easy and lasting assimilation of the material. It is organized as knowledge or part of it.

The educational impact of national holidays and games can hardly be overestimated: legends, games, songs, spectacles, traditions and rituals formed the original national culture that is inherent in our people today.

Usually games are divided into didactic, educational, developing and socializing.

The first type of game - didactic - is most often used in the educational field, because its goal is to expand horizons, activate knowledge, apply it everywhere, inculcate certain skills and abilities, and therefore in practical activities.

The educational potential of the game is great. Its goals involve self-education, the inculcation of certain volitional qualities, as well as the formation of clear moral, ethical and moral ideas, aesthetic and worldview attitudes, contribute to the comprehensive development of the individual and the ability to cooperate.

The third type of game, which is special in its content, is developing. These games predetermine the widespread development of creativity, imagination, attention, associative memory of fantasy, competent, logical, correct speech, logical thinking.

The fourth socializing type of game includes those games that introduce people to the universal norms and values of society. These games are aimed at adapting to environmental conditions, to the formation of a stress resistance mechanism, to self-regulation.

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In the new pedagogical literature, there is the concept of “pedagogical game” and “game pedagogical technologies”.

Game activity is a type of activity that has historically emerged, consisting in reproducing the actions of people and the relationships between them and aimed at orientation and knowledge of objective and social activity.

Psychologists and teachers have established that, first of all, the ability to imagine, imaginative thinking develops in the game. This happens due to the fact that the game recreates broad areas of environmental activity that go beyond the limits of one’s own practical activity. And this can be done only with the help of conditional actions. The use of game and musical elements accompanies a person all his/her life. In the course of gaming and musical activity, the ability to operate with images of reality is laid, which, in turn, creates the basis for a further transition to complex forms of creative activity. In addition, the development of the imagination is important in itself, because without it no, even the simplest human activity is possible.

Musical possibilities in displaying reality are great. An active, dynamic character in music is especially important for decorating holidays. The intonational nature of music itself: narrative, exclamatory or interrogative, plays an important role in providing conditions for rhythmic contrast in the development of mass action.

Recitative - declamatory singing - is a very productive way to decorate any scenario of a mass holiday, its use gives a certain clarity and clarity in the development of the action. A song-type melody is used less often, but in certain cases it is necessary to convey the lyrical aspects of a mass holiday, for example, Navruz.

Playful and musical activities have a great influence on the development of children's and adults' ability to interact with other people. In addition to the fact that the child, reproducing the interactions and relationships of adults in the game, masters the rules, methods of this interaction in a joint game with peers, he gains the experience of mutual understanding, learns to explain his actions and intentions, coordinate them with other children.

Gorokhova I.V., emphasizes the importance of the game as an educational element: “... at present it is very important to revive the continuity of generations, to give children moral principles, patriotic sentiments that are alive in people of the older generation. The ruthless chopping off of one’s roots from the nationality in the educational process leads to lack of spirituality” [1, P.613].

The key to mastering the culture of our people is the Uzbek folk music and game, which form always relevant, important human qualities, such as: ingenuity, dexterity, mental flexibility, ingenuity, desire for victory, collectivity. National games beloved by Uzbeks include: “Kurash wrestling”, “sheep fights”, “ulak-kupkari” (goat-fighting), “cockfights”. They were often the most important components of mass national holidays.

Mass holidays in Uzbekistan have always been held with the use of elements of the game, which evoke feelings of admiration among the participants, familiarization with their people, which in turn forms the moral and ethical baggage of the individual.

Mass games and their manifestation in everyday life, as well as in folk holidays, are the most serious means of education, sometimes education, and always an excellent school of life. It should be noted that this is the most natural way of education, which does not require special equipment, but has great potential in the development of a harmonious personality.

In the spiritual heritage of the Uzbek people an important place is occupied by various holidays, mass entertainment, seasonal and professional ceremonies of great social importance. Holidays and ceremonies represent a certain cycle, covering all aspects of a person’s public and personal life, manifested in various forms in interpersonal relations and preserved in the form of traditions and rituals, a set of moral principles and historically established legal norms.

The essential features and features of these norms and principles are their constancy and mass character, repetition in their development, duration and continuity.

Folk rituals that have become traditional create the moral and ethical foundations for the comprehensive development of the individual.

“One of the most common and attractive folk festivities among Uzbeks, which have become national, are seasonal holidays. According to some researchers, Uzbek seasonal celebrations should be classified as follows:

- 1) Winter parties or circles (gap-gashtak, yasa-yusun);
- 2) spring holidays - Navruz and shohmoys (harness of bulls in a plow, i.e. the beginning of plowing), holidays of tulips (lola) and roses (kizil gul), loy tutish (supply of clay, i.e. the beginning of building a house), a ceremony calling rain (sust hotin), etc.;
- 3) Among the summer celebrations, “kovun sayli” (melon festival), “choi momo”, etc. are popular;
- 4) Autumn holidays associated with the harvest - Mekhrjon, oblabaraka, shamol chakirish, “uzum sayli” (grape festival) and others” [2, P.45].

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All these holidays are accompanied by numerous game elements, which not only decorated the festival itself, but also contributed to their entertaining and educational value. This is the permanent pedagogical and aesthetic power of mass holidays as the greatest educator of the best national character traits and the custodian of traditions. In addition to traditions, the festive and gaming culture is moving to a new level of audiovisualization of the embodied image "Thanks to the unusual, new ability to capture an artistic image, a new ability of artists to create audiovisually was born. In addition to the changing tools for artists of all directions, the perception of the viewer also changed. It has transformed into a new ability to see images, hear them and perceive them, both in the theater and in screen forms of creativity, and in multimedia space" [9, P.11].

It should be noted that mass holidays can and do carry both an ideological and ideological function, and a function of leisure, recreation, i.e. acquires a pronounced entertaining character.

Games and competitions in the open air, in our opinion, have a spiritual, emotional and inspiring essence, therefore they are an integral part of every large mass holiday related to the history and culture of our country.

Prominent theater critic Y. V. Ratner accurately defines the specific feature of entertainment as a certain "deployment to the viewer" [6,P.8], while clarifying knowledge about the methods of the so-called colorful-dynamic phenomena that involve the viewer in action. These methods are of a certain nature, and their knowledge provides the creators of the holiday, the game with the active participation of the audience, which in itself indicates the effectiveness of these spectacles.

The pedagogy of the holiday and the game is considered as a way to the socialization of the individual and the socio-cultural modernization of society. With a comprehensive solution of socio-pedagogical problems, the integration potential contained in the mass spectacle, the holiday and in the entire festive and gaming culture as a whole is important. In the education system of Uzbekistan, a large place is given to the conditions and principles of socialization of the younger generation in favorable conditions for spiritual growth.

The harmonious synthesis of the holiday, the game and the socialization of the individual is reflected in the systemic pedagogical vision of the complex and controversial problems of the festive and game world of modern society. One of the connecting moments in the field of understanding artistic and pedagogical tasks in the field of mastering the festive and gaming culture was the research of scientists on the problems of organizing modern mass holidays, as well as on the features of including game elements in mass holidays.

The processes of education and broadening of horizons in the course of leisure activities are considered by scientists in close interdependence.

This is the position expressed by scientists who have conducted and are conducting scientific research on this topic. In their unanimous opinion, it is necessary to systematize and intensify the educational orientation of mass holidays.

For this purpose, it is necessary:

- 1) Give mass holidays a lively informal character.
- 2) To develop the existing traditional forms of mass holidays, including innovative performing elements in them.
- 3) Use new folklore and other sources in updating the content and form of public holidays.
- 4) Find original combinations of collective and individual beginnings in the reflection of traditional and new mass holidays.
- 5) To expand the use of intercultural samples and game elements of various national ethnic groups in mass holidays.
- 6) To improve scenarios, artistic programs and the structure of holding mass holidays, taking into account modern possibilities.
- 7) to introduce into the system of organization and preparation of mass holidays modern achievements in hardware support of the latest audio, media, video materials.

The significance and recurrence of holidays in the culture of society is based on the fact that a holiday as a major form of leisure has such essential features as:

- 1) Eventfulness, formalized by the corresponding ritual-game actions of the participants of the holiday, providing through traditional elements the integration of the celebrating community.
- 2) The spiritual and mythological basis of the holiday reveals its connection with the sacred and mental values of the national culture and the transfer of this connection to new generations;
- 3) Moral - ethical, patriotic and symbolic side of the holiday, which is manifested not only in its content, but also in the form of holding.

Scientists emphasize that recreation during mass spectacles and holidays should be carried out on the basis of the sacred core of the national culture, the spiritual and mental values of the people, which is expressed in the ritual side of the holiday.

The communicative, organizational and educational functions of the holiday are no less important than its main - entertaining, leisure. The solution to the problem of increasing the culture of festive leisure on the basis of holding mass holidays was the following types of work:



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- 1) Formulation of the preliminary concept of the holiday.
  - 2) Problem definition and socio-demographic characteristics of the audience.
  - 3) The idea and pedagogical goals of the mass holiday,
  - 4) Means of visual and sound design.
  - 5) Preparation of the scenario in accordance with the intended means and the existing concept.
  - 6) The place of the celebration (in the city or outside the city);
  - 7) Organization of a festive game action and its analysis.
  - 8) Organizational and pedagogical results (positive and negative) of the holiday.
- All these types of work are the basis for the algorithm for organizing and holding a mass holiday.

### CONCLUSION

Summarizing the above, it is worth highlighting the following important points:

1. Holidays have been and remain the most important form of manifestation of the way of life of a certain state. The holidays most clearly reflect the work of the people, their way of life and traditions, their originality and uniqueness, national artistic culture, the spirit and imprint of the time; they are not immutable, their content is filled with new realities that reflect life.

2. Mass spectacular holidays in Uzbekistan reflect the dynamic growth of all spheres of life and, first of all, the leisure sphere. Among the varieties of theatrical and spectacular forms of folk art, three traditional directions stand out (theatrical and spectacular, sports and circus, performances of kugirchokboz), which differ from each other in formal and content features, targeted orientation and are characterized by constant interest from both participants and spectators.

3. The system of spectacles and celebrations in Uzbekistan should be divided into three types:

1) The first is the system of performing arts (traditional theater, dance and folk circus), which is based on types, categories, forms (genres) of art;

2) The second is a system of field competitions, games, theatrical performances and ceremonies. In this case, the artists will demonstrate their skills with racers, wrestlers, snipers, players;

3) The third - the system of holidays, that is, seasonal, official, regional, national family and other holidays throughout the year, which include celebrations, festivals, performances, theater ceremonies, performances, form a unique system.

4. The mass holiday was and remains a reflection of the original culture of the people who created it. This is an important occasion and opportunity to celebrate values, destroy everyday monotony and create a joyful atmosphere that allows you to create new traditions and reflect the realities of the time, show its dynamism and real content, changing in accordance with the changes of the time itself.

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## Empirical Review of Entrepreneurial Youth Empowerment Initiatives in South-Western Nigeria



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**ABSTRACT:** Youth empowerment prepares candidates for new venture initiation by transferring knowledge and developing relevant skills that improve the self-efficacy and effectiveness of the potential entrepreneur. Entrepreneurial opportunity recognition is a relevant vehicle for economic development contributing to youth employment worldwide. Over a 50-year period, the Federal, State Government and Private Institutions have established many initiatives with the aim of promoting entrepreneurship. Examples of these Federal youth empowerment initiatives are N-power, Youth Enterprise with Innovation in Nigeria (YouWin), Youth Empowering People (YEP), Graduate Internship Scheme (GIS), African Youth Empowerment Nigeria (AYEN), TraderMoni, Youth Initiative for Sustainable Agriculture in Nigeria (YISAN) and Presidential Youth Entrepreneurship Support (P-YES). The entrepreneurial components of the youth empowerment programmes of the state government are merely underplayed. Youth empowerment coordinators have not been able to engage empowerment beneficiaries to create and connect entrepreneurial components into an interactive and sustainable business start-up. The study adopts empirical study explored the entrepreneurial youth empowerment initiatives of youths to become self-employed after their initiatives from various empowerment schemes. Qualitative research is concerned with gaining an in-depth understanding of human issues. Findings show that business opportunity recognition influences business sustainability of small-scale businesses. This implies that impact of identifying business opportunities, entrepreneurial knowledge, spotting a particular business industry, transforming business ideas into reality and empowerment initiatives structures influence business sustainability of youth empowerment candidates. The study concludes that entrepreneurial empowerment initiatives have to prepare candidates for new venture opportunities by transferring knowledge and developing relevant skills. The study recommended that state government and private organizations (empowerment organizers) need to create an environment where youth empowerment beneficiaries can identify business opportunities. This will improve the performance by improving business sustainability.

**KEYWORDS:** Business Opportunity Recognition, Business Sustainability, Empowerment Initiatives, Entrepreneurship and Nigerian Youth

### INTRODUCTION

Youth that are untrained and alienated become agents of anti-social activities such as political thuggery, communal crisis (conflicts), vandalization of oil pipelines, raping, drug abuse, human trafficking, syndicates impersonation, document racketeering, cyber-crime, and other social vices. Therefore, empowering the youth in any given economy particularly Nigeria can reduce the rate of crime and poverty in the society. Youth empowerment prepares candidates for new venture initiation by transferring knowledge and developing relevant skills that improve the self-efficacy and effectiveness of the potential entrepreneur. Business opportunity recognition involves identifying business areas and establishing start-ups which will lead to sustainability of the small-scale businesses. The pathetic state of Nigeria's economy has no doubt led to widespread poverty and youth employment becoming the most daunting development challenges hindering the Nation from achieving sustainable development goals, (Segun-Alalade, Ibitoye, Alalade, Adeshina & Elisha Nissi, 2021). However, Nigerian youths have not been able to identify business opportunities through the empowerment programmes. Entrepreneurial opportunity recognition is a relevant vehicle for economic development contributing to youth employment worldwide. Opportunity recognition inspires youth to be creative in setting up



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Their business through good education, leadership skills and planning for financial independence. It explores youth talent through business direction and developing their pathways to become an entrepreneur.

Over a 50-year period, the Federal, State Government and Private Institutions have established many initiatives with the aim of promoting entrepreneurship. According to Walter, Offiong & Udoka, (2021), Examples of these federal youth empowerment initiatives are N-power, Youth Enterprise with Innovation in Nigeria (YouWin), Youth Empowering People (YEP), Graduate Internship Scheme (GIS), African Youth Empowerment Nigeria (AYEN), TraderMoni, Youth Initiative for Sustainable Agriculture in Nigeria (YISAN) and Presidential Youth Entrepreneurship Support (P-YES). While the various examples of state youth empowerment initiatives are Lagos State Employment Trust Fund (LSETF), Ogun State Youth Empowerment Scheme (Ogun-YES), Osun State Youth Empowerment Scheme (O-YES) and Youth Empowerment Scheme Oyo State (YES-O), Ijebu Development Initiatives for Poverty Reduction (IDIPR), Agric-YES Programmes on Fish and Poultry (A-PFP) Epe, Lagos State. The examples of private youth empowerment initiatives are Tony Elumelu Empowerment Foundation, International Institute for Tropical Agriculture (IITA)

Agric-preneurs.

There is a need for an investigation to reassess the empirical review of entrepreneurial youth empowerment initiatives in South-Western Nigeria. The requirement therefore arises to determine whether the Youth Empowerment Schemes have the capacity to produce beneficiaries to establish small-scale businesses. Therefore, it is against this background that this study made an in-depth and critical analysis of entrepreneurial business opportunity recognition. Sequence to the forgoing, this study conceptualized the view of knowing its influence on the business sustainability of start-ups in Nigeria.

### **STATEMENT OF THE PROBLEM**

The entrepreneurial components of the youth empowerment programmes of the state government are merely underplayed. What we have is business as usual. Youth empowerment coordinators have not been able to engage empowerment beneficiaries to create and connect entrepreneurial components into an interactive and sustainable system to business start-ups, (Wood, 2021). The participants are not trained to be entrepreneurial but to start small-scale businesses without entrepreneurial contents. To be entrepreneurial, there's need to be highly skilled in business opportunity recognition, there is a general absence or near complete absence of how to recognize and exploit entrepreneurial opportunity in these empowerment programmes. Participants come up with poorly conceived business structures and politicians count the number of such business to gain a point. Majority of these business enter an already congested industry and find it difficult to compete at onset. They cannot be sustained due to the crowded environment where they are competing. Empowerment initiative has not been able to prepare youth to identify entrepreneurial opportunities to establish a small-scale business after their empowerment programme.

There are no quality empowerment platforms designed for Nigerian youths to identify lucrative opportunities to set-up, manage and sustain their business. The youth have not been branded in business opportunity recognition areas where they can learn to manage business successfully. According to Forbes, 90% of the start-ups fail, all we need to know about is what is different with

the other 10%, (Ren, Raghupathi & Raghupathi, 2021). Majority of the youth empowerment candidates are not qualified to be entrepreneurs who can sustain business prospects. There is not enough capacity to develop and implement empowerment strategies to channel Nigerian youth into identifying entrepreneurial business establishments. These factors have resulted to majority of Nigerian youths experiencing diminished self-esteem, frustration, social exclusion, and life of crime.

### **LITERATURE REVIEW**

#### **Entrepreneurship**

Entrepreneurship has been seen as vision of progress, innovations, developmental pillar of nation's capacity building and a key to a robust economy. Entrepreneurship shows the skills to supervise or monitor the business environment, identify opportunities, assume economic risk and initiate change, based on recent realities. Ossai (2018) posits entrepreneurship as the process of creating some new or different values by developing the necessary time, assuming the accompanying financial, psychic, and social risks, and receiving the resulting rewards of most personal satisfaction. Entrepreneurship is a lifelong learning process, starting as early as elementary school and progressing through all levels of education, including adult education. Barba-Sanches and Atienza-Sahuguillo (2016) encouraged the teaching of entrepreneurship in schools to have better insights and perspectives. In this way, youths will have progressively more challenging entrepreneurial activities; experiences that will enable them to develop the insight needed to discover and create entrepreneurial opportunities; and the expertise to successfully start and manage their own

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businesses to take advantage of these opportunities. Olowu and Aliyu (2015) echoed that the success or failure of entrepreneurship depends on capacity and competence.

### **Business Opportunity Recognition**

Entrepreneurial empowerment initiatives have become a strategy in economic transformation of developing economies given the successes recorded in the developed economy. The opportunity-recognition is critical in new investment creation. In the field of entrepreneurship, opportunity lies at the heart of the theory of entrepreneurship (Salamzadeh & Roshandel Arbatani, 2020). Entrepreneurship initiatives that include ethical mindset prevalent in a locality and the learning trajectories would emphasize the promotion of entrepreneurship and enterprising characteristics. Entrepreneurial empowerment initiatives as an emerging field of study and as an area of human endeavour, has received increasing interest of researchers, academicians, and policy makers' the world over. Recent review studies on entrepreneurship revolve around the concept of opportunity, and they have also increased in number (Healey, Bleda, & Querbes 2021). They contend that there is no entrepreneurship without opportunity; to them, a potential entrepreneur who is creative and hardworking cannot start an entrepreneurial activity if he does not aim for a certain opportunity.

### **Business Sustainability**

Youth empowerment involves different ways through which the youths could be empowered to achieve self-sustained national development instead of depending on government for provision of empowerment opportunities. Firms that survive and reach sustainability are products of the pursuit of opportunity rather than necessity (Gohmann & Fernandez, 2014). It is believed that training through skill acquisition scheme will enhance the business sustainability of the youths in different fields of trade. In advanced economies, development has been successfully sustained over a long period of time but has proved difficult in developing economies. Though different strategies to empower youths have been put in place in Nigeria, the resulting effects are not sustaining their business with the rate of poverty and unemployment still on the high side. Thus, there is the need to review the application of sustainable of empowerment concepts and its practicability in Nigeria. The situation where the graduates wait for assistance from friends and relatives to enable them to embark on their own businesses is not healthy for the sustainability for entrepreneurial initiatives

### **Entrepreneurial Empowerment Initiatives in Nigeria**

Emerging nations with increased entrepreneurial resourcefulness tend to have experienced greater decrease in unemployment rates as well as recorded sustained increase in standard of living. Timmons, Eisenman and O'Conno (2015) postulated that propagators of entrepreneurial policies and practices would adapt to the local needs of the society. Entrepreneurial empowerment initiatives are a development that emerges out of people's desire to create wealth, create employment, and reduce social vices, (Godwin & Simon, 2021). Entrepreneurial empowerment initiatives are always of benefit to entrepreneurs and a country at large. People exposed to entrepreneurial initiatives express that they have more opportunity to exercise creative freedoms, higher self-esteem, and an overall greater sense of control over their own lives. Edoho (2015) advocated for a paradigm shift from entrepreneurial initiatives of necessity to entrepreneurship, which is more innovative and enhances productivity. Nigeria needs to implement its entrepreneurial policies, practices, initiatives to conform to global best practices (Abimbola, Olowu & Paul, 2016). Entrepreneurial empowerment initiatives have been conceived by successive government as a programme of activities to enhance the knowledge, skill, behavior and attitudes of individuals or group who seek to assume the role of an entrepreneur.

### **Empowering Nigerian Youth**

Empowering Nigerian youths will energize their determination and enlightened position to disseminate information. The importance of youth entrepreneurship lies in its role in the process of economic development and economic growth (Ćočkaló, Đorđević, Nikolić, Stanisavljev, Terek, & Bakator, 2019). There is a need to create political awareness and consciousness against evil and selfish political machination. Failing to meet this need is a waste of human potential and economic power necessary to make changes in developing a nation. Ifaturóti (2016) remarked that "unemployment compounds the problems the youths are facing in Nigeria: by being idle, they are prone to such vices as prostitution, armed robbery, and rape.

Osun Youth Empowerment Scheme (OYES) is aimed at addressing the endemic incidence of joblessness, as well as providing laudable solution to the challenge of unemployment among the youth in Nigeria. OYES is grassroots driven youth empowerment scheme that seeks to direct the bursting energy of this army of unemployed youth towards the good of the society. The scheme was inaugurated on 7th December 2010 by former Governor of Osun State Rauf Aregbesola where he declared to engage 20,000 youths across the state in a blend of community service and social welfare models. Osun Youth Empowerment Scheme (OYES) is strategic youth's management for social support operation in public work fare - source ([www.osunstate.gov.ng](http://www.osunstate.gov.ng)).

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It aims at empowering youths by equipping them with positive work ethics and culture, thus making them employable or employers of labour, with respect for the environment. It is designed to develop youths with Character, Innovation and Competence (CIC), infusing them with honour and integrity in life (Ifaturoti, 2016). The OYES scheme also runs a community service in the state. Community service is the core of the empowerment scheme. Through various work cadres such as, The Green Gang, The Sanitation Czars, The Paramedics, The Traffic Marshalls, The Sheriffs, The Teachers Corp and the Public works gang, the volunteers render selfless services to their communities (Ifaturoti, 2016). The scheme also has an effective empowerment policies and concise skills development component, to arm the volunteers with the functional skills to prosecute a productive life once they exit the scheme.

### **THEORETICAL REVIEW**

#### **The Empowerment Theory (TET)**

Empowerment theory was developed by Rappaport (1987) who anchored his developments of the empowerment theory on individual business strength. In his study, Rappaport argued that empowerment theory was rooted in the notion that people gained power from having a sense of their personal influence. Empowerment theory is a construct that links individual strengths and competencies, natural helping systems, and proactive behaviors. Empowerment theory also addressed chances leadership roles for the youth to participate in (Chinman and Linney, 1998), which have supported the development of valuable leadership skills amongst the youth. The empowerment theory confers that empowerment will not be possible where lack of awareness to the invisible and visible processes and structures in social institutions are not taken care of fully. The youth should be supported by business leader to attain self-dependent, which is important for youth empowerment (Jennings, 2008).

Empowerment-oriented interventions enhance wellness while they also aim to ameliorate problems, provide opportunities for participants to develop business knowledge and skills, and engage professionals. Therefore, without the capability of the youth to address the social values, structures, processes, and practices of the issues at hand, then they are not justly empowered. Empowerment theory could be understood that creating and implementing empowerment initiatives regarding entrepreneurial initiatives would enhance youth development and raise their entrepreneurial skills, assets, and motivate them to effectively apply the skills and knowledge so acquired to become positive agents of change in their communities and country at large (Ledford, Lucas, Diavaghi & Ravel, 2013). This would make Nigerian youths to utilize and recognize business opportunities through their entrepreneurial activities and as such engage in start-ups that lead to speedy growth and development of the Nigerian economy.

#### **Empirical Review**

Tatiana and Zrc (2021) conducted a study on conceptualizing youth empowerment entrepreneurship in European Union policy discourse. The study examined the formation of young entrepreneurs as subjects in European Union policy and the roles that they have been accorded in policy discourse. The analysis traces the critical lines of policy thinking through select policy documents that portray the evolution of the European Union particular conceptualizations of youth entrepreneurship as well as young entrepreneurs as policy subjects focusing primarily on the overlapping policy arenas of entrepreneurship and youth. The discussion also examines the normative connotations ascribed to youth entrepreneurship in European Union policy discourse, focusing on the links made between youth entrepreneurship and the economic crisis in European Union policy. The study concluded that the evolving European Union policy framework is both political and legalistic in nature, based on precedents set by previous documents that are, in turn, laid out in most subsequent documents and serve as a framing mechanism and a tool for demonstrating each new document's relevance. The recommended the adoption of the conceptualization of youth entrepreneurship within this evolving policy network shapes culturally specific understandings of young entrepreneurs (universal concept) in policy terms.

Xavier, Manel, Pere and Jaume, (2020) investigated a study titled exploring the conceptualization and research of empowerment in the field of youth entrepreneurship. The concept of empowerment has become increasingly widespread in recent years. Its use is still, however, somewhat controversial, and diverse, particularly when referring to young people. The study presents a systematic analysis of how empowerment has been conceptualized over the past 15 years and has been applied to young people. A systematic search of the major databases filtered by relevance provided 297 bibliographical references. The results confirm the ambiguous nature of the concept and the imprecision with which it is used, although they do link its use to three common concepts: power, participation, and education. This study has presented a systematic documentary analysis of research carried out over the past 15 years into the concept of empowerment and, particularly, its uses and applications in the field of youth. The study recommends programme formed of ideas such as leadership, self-efficacy, personal well-being

## Empirical Review of Entrepreneurial Youth Empowerment Initiatives in South-Western Nigeria

and participation. In addition, and as a defining trait when compared to the global understanding of empowerment. The study concludes that the unanimity among most authors regarding the current ambiguous, imprecise nature of the concept, the cause of its versatile use in the various disciplines in which it appears and the number of ways in which it can be applied.

Sathyamurthi, (2021) conducted a study titled entrepreneurship on youth empowerment model. In the study, the author tries to theorize 'Slum Entrepreneurship' as a Sociological concept which transcends geographical limitations. Experts view slum not as a homogenous but heterogeneous

entity depending upon the socio-ecological characteristics. The same way the concept of entrepreneurship has been viewed not as generic concept but varies according to the unique characteristics of slums. Taking this as a basis premise an attempt is made here to theorize the 'Slum Entrepreneurship'. A 'Slum Entrepreneurship' scale to measure the entrepreneurship traits was constructed and validated for the specific purpose of the study. Field investigations were carried out to study the relationship between the slum types such as the central city, industrial and

residential slums in Chennai and the level of slum entrepreneurship. Based on the field data, the study developed youth entrepreneurship model for youth empowerment. The study concludes that

age of the slum entrepreneurs is associated with the level of slum entrepreneurship. Also, the study recommends that the start-up capital should be provided for slum entrepreneurship in India.

Brimah, Olanipekun, Wahid, Abu, and Awe, (2021) explored a study on evaluation of youth employment and social support operation programme on unemployment reduction in Ilorin Metropolis. The study emphasized on the need for vocational and entrepreneurship training schemes is one of the pivot measures of reducing the rapid increase in the rate of unemployment. Data for the study were obtained from primary sources with the aid of a structured questionnaire.

The study in its descriptive nature adopted a survey design. Pearson Product Moment Correlation Coefficient was used to test the hypothesis at 5% level of significance. The findings revealed that

there is significant relationship between YESSO Skills for Jobs programmes and employment generation, economic well-being of beneficiaries and skill job enhancement. The correlation coefficients were all found to be higher than 0.70 hence signifying a strong positive relationship between YESSO and employment generation. Based on the findings, the study concluded that Youth Employment and Social Support Operation Programme significantly impacted on Unemployment Reduction in Ilorin Metropolis. The study recommended a continuous and holistic review of the YESSO scheme in terms of the implementation template, structure and funding strategies to guarantee sustainable employment generation.

Isiaka, Kadiri, Salman and Alabi, (2017) explored a study on effect of entrepreneurial practices in managing small-scale business or sustainable development in Nigeria, their study was based on empirical evidence. Problems, prospects, and significance of entrepreneurship business in Nigeria were analysed. The study used secondary data, some which are previous research and analyses of scholars, and related journal articles. Findings shown that most SMEs particularly in Nigeria liquidated within their first five years of their operations due to contributing factors such as insufficient capital, lack of focus, inadequate market research, over-concentration on one or two markets for finished products, and lack of succession plan. It is concluded that, the secret behind the success of self-reliant strategy is mainly in peoples' positive attitudes to enterprise, and in the extent to which the right incentive, adequate to make risk worth taking rather than in any political philosophy. Therefore, it is recommended that for government to attain sustainable development through entrepreneurial practices in managing small scale business.

### Gaps in Literature

Many studies have been conducted in developed countries on entrepreneurial empowerment initiatives and role of youth in economic development but unfortunately, only very few studies are available in developing countries like Nigeria. All the studies reviewed showed that there are not enough literatures on entrepreneurial youth empowerment initiatives contents in South-western States (Lagos, Osun, Oyo, Ekiti, Ondo and Ogun State). To the best of our knowledge, studies that have adequate empirical investigation on entrepreneurial empowerment initiatives in South-western Nigeria are very few.

### METHODOLOGY

The study adopts empirical study explored the entrepreneurial youth empowerment initiatives of youths to become self-employed after their initiatives from various empowerment schemes. Qualitative research is concerned with gaining an in-depth understanding of human issues. The qualitative exploratory case study method was suitable for this study, the design allows a researcher to explore the concept of human understanding through an empirical investigation (Davidson, Paulus, & Jackson, 2016).

### DISCUSSION OF FINDINGS

Business opportunity recognition has no significant effect with business sustainability of small-scale businesses. Findings show that business opportunity recognition influences business sustainability of small-scale businesses. This implies that impact of

## Empirical Review of Entrepreneurial Youth Empowerment Initiatives in South-Western Nigeria

identifying business opportunities, entrepreneurial knowledge, spotting a particular business industry, transforming business ideas into reality and empowerment initiatives structures influence business sustainability of youth empowerment candidates. In corroboration to the study, Su & Zarea, (2020) research in entrepreneurship has mainly focused on entrepreneurs and how they go through the process of developing a new business, in recent years, the attention of researchers has shifted toward the role of opportunity. However, the empowerment organizers need to create an environment where they can identify business opportunities. They can achieve this by providing entrepreneurial knowledge for candidates to recognize start-up opportunities.

The empowerment candidates have resources to transform their business ideas into reality. The empowerment initiatives are putting up structures to help them establish small-scale business. The empirical review reveals that the empowerment scheme has not really helped them have enough business experience to sustain a business. They have not been fully trained to solve business problems and pilot the affairs of a start-up effectively through the empowerment initiatives. The empowerment structure does not have the capacity to train candidates to coordinate business activities.

### CONCLUSION

Entrepreneurial empowerment initiatives have to prepare candidates for new venture opportunities by transferring knowledge and developing relevant skills. The empowerment programmes have not adopted business opportunity recognition for youths to identify business areas and establishing start-ups. Business partnership platform is missing from the empowerment schemes for communicating and connecting with entrepreneurs for encouraging youth self-dependent. The youth need business advisory services in areas of business registration, formation, business strategies, strategic planning, and legal/tax/accounting issues.

### RECOMMENDATIONS

The state government and private organizations need (empowerment organizers) need to create an environment where youth empowerment beneficiaries can identify business opportunities. This will improve the performance by improving business sustainability. Start-up sustainability can be attributed to quick and effective decision making on business opportunity recognition. Nigerian youths need to be empowered to manage and pilot the affairs of a business successfully, this will reduce the rate of crime in Nigeria.

### CONTRIBUTIONS TO KNOWLEDGE

This study bridges the gap in the existing knowledge because most of the literature review focused on youth empowerment programme on community development. This study examined the entrepreneurial empowerment initiatives on the creation of small-scale businesses by beneficiaries. This study investigated the investment in youth entrepreneurship as turning business opportunities into business sustainability. This study also discussed the ways of instilling an entrepreneurial culture in young men and women, such that Nigerian youth can become entrepreneurs by choice rather than by chance or necessity.

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## Utilization of Concept Mapping Technique on Students' Performance in Science



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**ABSTRACT:** Determination of the effects of concept mapping technique on students' performance in Grade 9 Science of one public high school in Bukidnon, Philippines was the main objective of this study. Specifically, it aimed to (1) describe the level of students' performance in science as exposed to concept mapping technique (CMT) and those exposed to non-concept mapping technique (non-CMT); and (2) find out significant difference between student's performance in science when exposed to CMT and those exposed to non-CMT. A quasi-experimental research design was utilized involving two sections. Findings of the study revealed that students exposed to concept mapping technique "did not meet expectation" in the pretest and have "fairly satisfactory" result in the post-test while those who were exposed to non-concept mapping technique "did not meet expectation" in both pretest and post-test. Performance of students exposed to CMT were significantly higher than those exposed to non-CMT. Concept Mapping Technique may be utilized in science classes to further enhance the academic performance of students.

**KEYWORDS:** Concept Mapping, science, students' performance, pretest, post-test

### I. INTRODUCTION

Educators strive to produce morally upright, well-equipped and globally competitive graduates. To achieve this goal, there is a need to utilize varied teaching strategies and approaches that are found effective for students' learning. Teachers need to be equipped with knowledge, skills, attitudes, and values for the 21st century in order to produce students who are successful in life and at work and become productive members of the society. This is a challenge to all teachers, including the Science teachers. In science teaching, the use of different pedagogical approaches in classroom instruction has been proven to affect the academic achievement as well as the behaviour of students. Qarareh (2012) stated that teaching and learning strategies provide a wide range and advanced educational potential that will help students to enrich their information, develop their mental abilities and train them to be innovative and novel. However, this cannot be done without giving the students the opportunity to express, shape and test their ideas by providing them with appropriate sources, arousing their interests and inciting their deep thinking with the help of guided programs and various strategies and teaching methods. The K to 12 curriculum is learner-centred and problem-based which provide learners the competencies important in the field of work. It aims to develop students who will be problem solvers, responsible stewards, innovative, creative, and informed decision makers. It emphasizes the use of evidence in constructing explanation to have purposeful learning process and meaningful understanding of concepts with its application to real-life situations. In achieving these objectives of the new curriculum, the Department of Education Region 10 initiated the crafting of unified daily lesson plans which will be used in classroom instruction. This is to improve the performance of the students towards science subject where students connect and visualize information and events to avoid misconceptions and developed higher level of thinking and reasoning.

In one national high school in Bukidnon, Science teachers implement different teaching techniques to facilitate effective teaching and learning process. However, based on the National Achievements Test (NAT) results of the previous years, the school Mean Percentage Score (MPS) in science were 51.00 (SY 2013-2014), 38.3 (SY 2014-2015), and 40.00 (SY 2015-2016). Data revealed that these did not meet the national Mean Percentage Score (MPS) standard of 75%. It implies that students have difficulty in learning science concepts. While there may be several factors, traditional teaching appeared to be one of the major causes of students' low academic achievement towards learning science concepts. Thus, the need for teaching techniques that would motivate students and improve their performance. Concept mapping can be an instructional technique that can enhance

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students' performance. According to Colosimo and Fitzgibbons (2012), concept maps are graphical representations of relationships among concepts that can be an effective tool for teaching, designing, and organizing information in a variety of ways. Concept mapping can be used as a visual aid to explain complex ideas and help learners articulate their understanding of a concept. The use of concept mapping as a teaching tool provides students a more meaningful learning experience when they add information to a concept map that is based on their current knowledge. For an innovative science teacher, it is significant to discover new and effective ways of teaching to promote meaningful science learning among students.

### II. METHODS

A quasi-experimental research design was used in this study. The respondents were two intact sections of Grade 9 level. Both groups received the same lessons but varies in the implementation of the content. One group was exposed to concept mapping technique while the other group was exposed to conventional teaching utilizing lecture-discussion and the use of PowerPoint presentation. To measure the students' performance, a 50-item test was used. It was pilot tested and obtained a Cronbach's alpha coefficient of 0.821. The concept mapping technique was implemented using the 7E learning model. Descriptive statistics such as mean, frequency values, percentage and standard deviation were employed to describe the performance of students. Analysis of Covariance (ANCOVA) was used to measure significant difference on students' performance exposed to Concept Mapping Technique and non-Concept Mapping Technique using the pretest as the covariate.

### III. RESULTS AND DISCUSSION

Table 1 presents the students' performance in their pretest when exposed to concept mapping technique and those in non-concept mapping technique. As shown in the table, the pretest means of CMT and NCMT group were 21.60 and 20.25, respectively, equivalent to mean percentage score of 43.20 and 40.51 respectively which both indicate "Did Not Meet Expectation" as set by DepEd standards. This result can be attributed to students exhibiting least mastered concepts in the subject content.

**Table 1. Level of performance of students in the pretest**

	CMT n=55		NCMT n=59		Qualitative Interpretation
	Pretest		Pretest		
Range	f	(%)	f	(%)	
90%-100%	0	0	0	0	Outstanding
85%-89%	0	0	0	0	Very Satisfactory
80%-84%	0	0	0	0	Satisfactory
75%-79%	0	0	0	0	Fairly Satisfactory
74%-Below	55	100	59	100	Did Not Meet Expectation
MEAN	21.60		20.25		
MPS	43.20		40.51		

These findings are in consonance with the results in the study of Pagtulon-an and Tan (2018) that found out the low pretest scores are expected due to insufficient knowledge on the concept or they do not have foundation of the concepts.

Table 2 shows the students' posttest results between students in concept mapping technique and those in non-concept mapping technique.

**Table 2. Level of performance of students in the posttest**

	CMT n=55		NCMT n=59		Qualitative Interpretation
	Posttest		Posttest		
Range	f	(%)	f	(%)	
90%-100%	6	10.9	0	0	Outstanding
85%-89%	6	10.9	2	3.39	Very Satisfactory
80%-84%	9	16.36	5	8.47	Satisfactory



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<b>75%-79%</b>	12	21.82	4	6.78	Fairly Satisfactory
<b>74%-Below</b>	22	40	48	81.36	Did Not Meet Expectation
<b>MEAN</b>		38.13		30.26	
<b>MPS</b>	76.25		60.52		

Based on the results, the CMT group has posttest' mean of 38.13 equivalent to percentage mean score of 76.25 indicates "fairly satisfactory" while NCMT group obtained mean of 30.26 equivalent to 60.52 that indicates "Did Not Meet Expectation". Based on the result after the intervention in the CMT group: six (6) or (10.9%) of the students achieved an outstanding performance; six (6) or (10.9%) had a very satisfactory performance; nine (9) or (16.36%) had achieved satisfactory performance; twelve (12) or (21.82%) had a fairly satisfactory performance; and twenty-two (22) or (40%) of the students "Did Not Meet Expectation. On the other hand, in the NCMT group, none of the students achieved an outstanding performance; two (2) or (3.39%) had a very satisfactory performance; five (5) or (8.47%) achieved satisfactory performance; four (4) or (6.78%) had fairly satisfactory performance; and forty-eight (48) or (81.36%) of the students did not meet expectation.

The result is supported by the findings of Stoica, Moraru, and Miron, (2010) that students exposed to concept mapping technique achieved a higher learning on the subject content.

Table 3 presents the analysis of Covariance (ANCOVA) of posttest treatments.

**Table 3. Analysis of Covariance (ANCOVA) of students' academic performance in CMT and NCMT**

Group	N	MPS	SD
CMT	55	76.26	10.24
NCMT	59	60.48	13.57
Total	SS 114	Df 68.09	MS 14.40
Model	536685.91	3	178528.64
Group	29673.33	2	14836.67
Pretest (covariate)	535585.91	1	178528.64
Error	16346.09	111	147.26
Total	551932.00	114	

As shown in the table, the mean percentage score under CMT is 76.26 (SD=10.24) while non-CMT group had a mean percentage score of 60.48 (SD=13.57). The students exposed to concept mapping technique obtained significantly higher scores than students under non-concept mapping technique with an F value of 100.75 ( $p < 0.01$ ).

This indicates that concept mapping technique is an effective tool in delivering classroom instruction in science where students learn to retrieve prior knowledge, organize ideas, and process new concepts. In this way, students learn critically in a meaningful learning experience. This is consistent with the study of Bera and Mohalik (2016) reported that students taught using concept mapping technique achieved better than those exposed to the traditional teaching method. Similar research finding was noted on the study of Sakiyo and Waziri (2015) on the use of the concept mapping teaching method on secondary school students' academic achievement in biology.

The results revealed that concept mapping method enhanced students' academic achievement in biology. Moreover, Otor and Eriba (2013) found that concept mapping technique is effective strategy in classroom instruction. These results are also in accordance with the study of Zmen, Demircio and Coll (2007) that students perform better when they are exposed to Concept mapping technique. This is because the technique helps students to link concepts and reduces their alternative conceptions while enjoying laboratory activities.

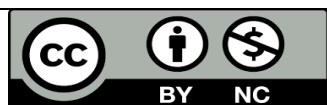
## IV. CONCLUSIONS

There was an improvement on both groups' level of academic performance from the pretest and posttest. However, students' performance under concept mapping technique is numerically higher than those exposed to non-concept mapping technique. Hence, CMT can be utilized in other topics in the Science across grade levels to contribute to positive learning outcome. A significant difference was found in the performance between students in CMT and non-CMT class. The students exposed to CMT performed better than students taught using non-CMT.

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## The Effect of Red Ginger Extract on Tnf- $\alpha$ and Malondialdehyde Serum Level



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**ABSTRACT:** *Pseudomonas aeruginosa* is the main pathogen causing nosocomial infections in hospitals, also can infect open wounds, combustio and necrotizing pneumonia. Several plant studies show the presence of antioxidants, one of them is red ginger. Research shows that red ginger extract contains the bioactive components gingerol and shogaol which have antioxidant and antimicrobial properties. The purpose of this research is to determine the effect of red ginger extract on TNF- $\alpha$  and serum malondialdehyde levels in rats infected with *Pseudomonas aeruginosa* bacteria. This study uses an experimental research design with Post Test Only Control Group Design. The research subjects were 30 wistar rats which were randomly divided into 5 groups. K (-) group of mice without *P.aeruginosa* infection. K(+) group of rats infected with *P. aeruginosa* 108 CFU per head without red ginger extract. P1, P2 and P3 were infected with *P.aeruginosa* and were given red ginger extract at a dose of 20mg, 40mg and 80mg/KgBB/day for 7 days. Day 8 examination of TNF- $\alpha$  and MDA levels. The results of the One Way Anova test showed a significant difference in TNF- levels and MDA levels with p value = 0.000. The mean levels of TNF- in groups K(-), K(+), P1, P2, P3 were 5.76, 17.89, 12.29, 9.03, 7.07 and the mean MDA levels were 1.33, 11.10, 5.09, 3.87, 3.00. Tukey's test results showed TNF- $\alpha$  levels between groups had a significant difference in all groups (p=0.000) and a significant difference also in MDA levels (P=0.000). Red ginger extract had an effect on decreasing TNF- $\alpha$  and serum MDA levels in rats infected with *Pseudomonas aeruginosa*.

**KEYWORDS:** Red ginger, *Pseudomonas aeruginosa*, TNF- $\alpha$ , MDA

### I. INTRODUCTION

*Pseudomonas aeruginosa* is the main pathogen causing nosocomial infections in hospitals.<sup>1</sup> The increased incidence of nosocomial infection by *Pseudomonas aeruginosa* in patients at the hospital was followed by an increase in the incidence of resistance to various antibiotics such as  $\beta$ -lactam, ciprofloxacin, tobramycin and colistin (Ervina et al., 2017). Resistance to antibiotics can lead to a long healing time, increase the risk of death, increase carriers in the community, increase the number of resistant bacteria and extend the hospital stay (Utami, 2012). High ROS will cause conditions of excessive oxidative stress characterized by the presence of Malondialdehyde (MDA) which is formed from the process of lipid peroxidation. Tumor Necrosis Factor (TNF- $\alpha$ ) is the main cytokine in the acute inflammatory response (Bara et al., 2020). Severe infections can trigger the production of TNF- $\alpha$  in large quantities and cause systemic reactions (Ali et al., 2020).

Red ginger is widely used as a raw material for medicine because it has a higher content of oleoresin and essential oils compared to other gingers (Sadikim et al., 2018). Red ginger extract contains the bioactive components gingerol and shogaol which are antioxidants and antimicrobial (Prastiti et al., 2015). The content in red ginger is able to provide pharmacological activities, such as anti-inflammatory and antioxidant (Sitompul et al., 2020). Shogaols and gingerols is a phenolic compound that can suppress anti-inflammatory activity by suppressing proinflammatory cytokines, namely TNF- $\alpha$  and IL-1 $\beta$  (Diapati et al., 2020). In addition, gingerol is able to inhibit ROS by inhibiting xanthine oxidase mechanism so that free radicals are not formed. Reducing free radicals inhibits lipid peroxidation thereby reducing serum MDA levels (Diapati et al., 2020). Therefore it is necessary to prove the effect of antioxidants from red ginger extract on the healing of *Pseudomonas aearuginosa* by looking at serum levels of MDA and TNF $\alpha$ .

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### II. MATERIAL AND METHODS

Research using experimental research design with the Post Test Only Control Group Design research design. This study used a sample of 30 male wistar rats which were divided into 5 groups of 6 rats each. The control group (K-) was not given treatment for *P.aeruginosa* and red ginger extract, the control group (K+) rats were infected *P.aeruginosa* 108 CFU/ml per head without being given red ginger extract. The treatment group (P1) was infected with *P.aeruginosa* 108 CFU/ml per head and given red ginger extract 20 mg/head/day for 7 days orally using a gastric tube. The treatment group (P2) was infected with *P.aeruginosa* 108 CFU/ml per head and given red ginger extract 40 mg/head/day for 7 days, the treatment group (P3) was infected with *P.aeruginosa* 108 CFU/ml per head and given ginger extract red 80 mg/head/day for 7 days. On the 8th day, TNF- $\alpha$  and MDA levels were examined. This study used male Wistar rats because they have many similarities with humans in terms of physiology, anatomy and conditions and symptoms in humans that can be applied to mice. Then the data is tested with SPSS. The data normality test was performed using Shapiro Wilk, the data homogeneity test was carried out with the Levene test, followed by the One Way Anova.

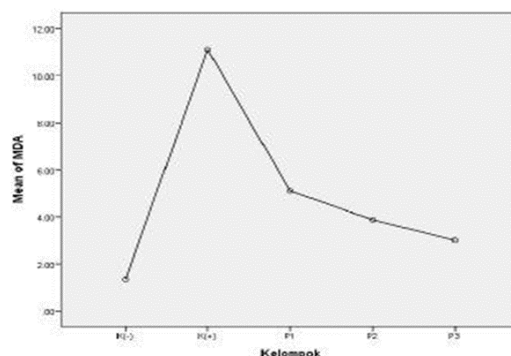
### III. RESULT

The study of giving red ginger extract to TNF- $\alpha$  and serum MDA levels in male Wistar rats infected with *Pseudomonas aeruginosa* was carried out for 7 days. The results of the study are listed in table 1.

**Table 1. Analysis of mean levels of TNF- $\alpha$  and serum MDA**

Variable	Group					Sig. (p)
	K (-) N=5 Mean	K (+) N=5 Mean	P1 N=5 Mean	P2 N=5 Mean	P3 N=5 Mean	
<b>Levels of TNF-<math>\alpha</math></b>	5.76	17.89	12.29	9.03	7.07	
<b>Std. deviation</b>	.282	.393	.316	.736	.398	Shapiro
<b>Wilk</b>	.506*	.883*	.570*	.349*	.849*	
<b>Levene Test</b>						.070**
<b>One Way Anova</b>						.000***
<b>MDA</b>	1.33	11.10	5.09	3.8733	3.00	
<b>Std . deviation</b>	.172	.451	.242	.334	.239	.954
<b>Shapiro Wilk</b>	*	.561*	.534*	.577*	.667*	
<b>Levene Test</b>						.147**
<b>One Way Anova</b>						.000***
<b>Description: *Normal P&gt;0, 05 **Homogeneous p&gt;0.05 ***Significant p&lt;0.05</b>						

Figure 1 showed that the average TNF- $\alpha$  was in the control group K(-), then successively followed by the third treatment group (P3), the second treatment group (P2), the first treatment group (P1), and the K control group (+). The treatment group (P3) got an average TNF- $\alpha$  lowest. Based on the Shapiro Wilk test, all groups of TNF- $\alpha$  indicates that the data is normally distributed ( $P > 0.05$ ) and the homogeneity test using the Levene Test results are homogeneous ( $p > 0.05$ ) so the data analysis uses the One Way Anova test. One Way Anova showed significant differences between groups ( $p = 0.000$ ).



**Figure 1. Mean of MDA serum levels**

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Figure 1 showed that the lowest mean MDA level was in the control group K(-), then followed successively by the third treatment group (P3), the second treatment group (P2), the first treatment group (P1), and the K control group (+). The treatment group (P3) got an average TNF- lowest  $\alpha$ . Based on the Shapiro Wilk test, all TNF- $\alpha$  levels showed normal distribution of data ( $P > 0.05$ ) and the homogeneity test using the Levene Test yielded homogeneous results ( $p = 0.147$ ). Data analysis used OneWay Anova and showed significant differences between groups ( $p = 0.000$ ). To find out which group is significant, a post hoc with the Tukey as presented in Table 2.

**Table 2. Differences in TNF- $\alpha$  levels between the 2 groups using the Tukey**

	group	Sig
K (-)	K (+)	.000*
	P1	.000*
	P2	.000*
	P3	.000*
K (+)	K (-)	.000*
	P1	.000*
	P2	.000*
	P3	.000*
P1	K(-)	.000*
	K(+)	.000*
	P2	.000*
	P3	.000*
P2	K(-)	.000*
	K(+)	.000*
	P1	.000*
	P3	.000*
P3	K(-)	.000*
	K(+)	.000*
	P1	.000*
	P2	.000*

Table 2. showed that MDA levels between groups had significant differences in all groups ( $p=0.000$ ). Based on the data above, it can be concluded that administration of red ginger extract at a dose of 20 mg/head/day, 40 mg/head/day, 80 mg/head/day significantly affected the decrease in MDA levels in male Wistar rats injected with *Pseudomonas aeruginosa* so that the hypothesis statement can be accepted.

### IV. DISCUSSION

The results obtained from the research can be seen in table 5.1. which showed the levels of TNF- $\alpha$  and MDA in the negative control group were 5.7650 for TNF- $\alpha$  and 1.333 for MDA. Meanwhile, there was an increase in the levels of TNF- $\alpha$  and MDA in the positive control group (after the mice were infected with the bacterium *Pseudomonas aeruginosa*), namely 17.8983 at TNF- $\alpha$  levels and 11.1017 at MDA levels. The difference in TNF- $\alpha$  and MDA levels in the negative control group and the positive control group is thought to be due to the treatment of mice infected with the bacterium *Pseudomonas aeruginosa*. This study is in line with research conducted by Tjahjani (2015), but in mice infected with *Staphylococcus aureus*, 24 hours later there was an increase in TNF- $\alpha$  levels compared to mice not infected with *Staphylococcus aureus*. Al-Husseini et al (2020) in a study of mice infected with the *Pseudomonas aeruginosa* gave results in the form of significantly increased levels of TNF- $\alpha$  and MCP-1 in plasma and organ tissue compared to the negative control group (Hasson Al-Husseini et al., 2020).

Infection *Pseudomonas aeruginosa* will secrete ETA toxin (exotoxin A) which can inhibit T cell activation protein synthesis to produce TNF- $\alpha$ , in line with this study that by inoculation of *P.aeruginosa* to mice, there is an increase in TNF- $\alpha$  levels. The increase in TNF- $\alpha$  is also associated with the activity of the transcription factor nuclear-kappa B (NF-kB) and inhibition of PPAR- $\gamma$

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expression (Moser et al., 2021). Infection *Pseudomonas aeruginosa* will stimulate macrophages to release IL-12 either directly or indirectly. Interleukin-12 plays a role in the formation of Th1 cells. Furthermore, in cooperation with IL-1 and TNF- $\alpha$  stimulate T cells and NK cells to produce IFN- $\gamma$  (Elemam et al., 2021). Interferon- $\gamma$  will activate alveolar macrophages to produce various substances, including Reactive Oxygen Species (ROS) and trigger damage to cell membranes and then interfere with lipid peroxidation in cell membranes which will produce Malondialdehyde (MDA). Increased MDA is used as a marker of oxidative stress (Barrera, 2012).

The results of test observations in table 5.1. showed that the levels of TNF- $\alpha$  in the P1, P2 and P3 treatment groups infected with *P.aeruginosa* were lower than the positive control group. Previous research on red ginger extract proved to be able to reduce inflammatory cells including TNF- $\alpha$  in alloxan-induced pancreatic histopathological features of white rats (Salaramoli et al., 2022). This is in accordance with the theory that red ginger extract has active ingredients, namely shogaol and gingerol. Shogaol inhibits TNF- $\alpha$  because it has a function as an agonist of the Peroxisome Proliferator Activator Receptor (PPAR $\gamma$ ) agonist, while gingerol inhibits TNF- $\alpha$  through the mechanism of inhibition of the c-Jun NH2-terminal kinase (JNK) pathway (Mao et al., 2019). Shogaol and gingerol can reduce  $\alpha$  intreatment groups P1, P2, and P3. Group P3 at a dose of 80 mg/KgBW/day even reduced TNF- $\alpha$  levels close to the levels of group K (-). Red ginger (*Zingiber officinale var rubrum*) contains phenolic compounds, namely shogaol and 6- gingerol, this substance can inhibit TNF- $\alpha$  directly or inhibit the increase in nuclear factor kappa B (NF-KB) which is associated with the formation of proinflammatory cytokines (Mashhadi et al., 2013).

Red ginger extract was proven in research conducted by Dewi (2019) to have a significant effect on the bacterial inhibition zone and red ginger extract had the highest inhibition area against *Pseudomonas aeruginosa*. This study is in line with previous studies which used a combination of red ginger and reed extracts at doses of 18+40 mg and 36+40 mg to reduce serum MDA levels of OA rats. In accordance with the theory that shogaol will act as an antioxidant through the nuclear factor erythroid 2-related factor 2 (Nrf2) signaling pathway, induces the expression of several cells in the Nrf2 pathway such as MT1, HO-1 and GCLC so that it can suppress lipid peroxidation and reduce MDA levels (Axis et al., 2022). The results of the MDA examination that the researchers conducted showed a decrease in MDA levels in rats infected with *P.aeruginosa* and given red ginger extract for 7 days. The test data showed that MDA levels in the P1, P2 and P3 treatment groups infected with *P.aeruginosa* and given red ginger extract were lower than the positive control group. Red ginger extract has an antioxidant effect and reduces ROS production and lipid peroxidation. Lipid peroxidase itself will produce a substance called Malondialdehyde (MDA) (Ratriantari & Probandari, 2019).

Based on the research results obtained and the theoretical studies that have been described by the researchers above, the hypothesis that giving red ginger extract can reduce levels of MDA and TNF- $\alpha$  in rats infected with the bacterium *P.aeruginosa* has been proven.

## V. CONCLUSION

Red ginger extract at a dose of 20 mg/head/day, 40 mg/head/day, 80 mg/head/day had an effect on decreasing TNF- $\alpha$  and serum MDA levels in rats infected with the bacterium *Pseudomonas aeruginosa*. Further research is needed to determine the toxic dose that can arise from red ginger extract so that a therapeutic dose range is obtained for infections caused by the bacterium *P.aeruginosa*.

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## The Effect of Customer Online Experiences and Online Review on Perceived Risk to Build Intention to using the Brimo Application in Pt. Indonesian People's Bank Branch Denpasar Renon



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**ABSTRACT:** This study aims to determine the effect of online customer experiences and online reviews on perceived risk to build intentions to use the Brimo Application at PT. Bank Rakyat Indonesia Denpasar Renon Branch. The population used in this study cannot be determined with certainty (infinite), the sample in this study amounted to 75 customers who were users of the Brimo application. The data analysis technique used is Partial Least Square (PLS) using Smart PLS software. The results of this study indicate that online customers have a direct positive and significant effect on perceived risk. Online review has a positive and significant effect on perceived risk. Online customers have no effect on intention to use. Online review has a positive and significant effect on intention to use. Perceived risk has a positive and significant effect on intention to use. Perceived risk is not able to mediate the influence of online customers on intention to use. Perceived risk is able to partially mediate the effect of online review on intention to use. Therefore, it is recommended that companies continue to maintain the stability of the Brimo application system so that customers are comfortable in using the application, as well as provide a responsive response to any input or complaint regarding the Brimo application and always maintain the security of the Brimo application as one of the considerations in increasing the use of the Brimo application. Perceived risk is able to partially mediate the effect of online review on intention to use. Therefore, it is recommended that companies continue to maintain the stability of the Brimo application system so that customers are comfortable in using the application, as well as provide a responsive response to any input or complaint regarding the Brimo application and always maintain the security of the Brimo application as one of the considerations in increasing the use of the Brimo application. Perceived risk is able to partially mediate the effect of online review on intention to use. Therefore, it is suggested that the company can continue to maintain the stability of the Brimo application system so that customers are comfortable in using the application, as well as provide a responsive response to any input or complaint regarding the Brimo application and always maintain the security of the Brimo application as one of the considerations in increasing the use of the Brimo application.

**KEYWORDS:** online customer experiences, online review, perceived risk and intention to use

### 1. INTRODUCTION

Brimo is an application that combines the functions of mobile banking, internet banking and electronic money in one application. As for the features possessed by Brimo, the first Brimo feature is mobile banking. Previously, Bank BRI had already had BRI mobile technology. However, Brimo is more sophisticated because it combines the functions of mobile banking with electronic money (bank) and internet banking in one application at once. Complete with an interface or display that is more attractive and more complete. Brimo can be used to transfer money, pay electricity bills, to buy goods online [bri.co.id](http://bri.co.id) (2020).

The customer's intention to use the Brimo application involves the customer's belief in a product so that they feel confident about the correctness of the actions taken. In the current era of technological advancements, customers are of course using the Brimo application from combining internet banking, mobile banking and electronic money applications and considering factors that influence their intention to use. So that researchers are interested in analyzing the factors that drive the intention to use the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch. Factors the are online customer experiences, online reviews, and perceived risk obtained from the conclusions of previous research. The highest number of users of the Brimo application is only 1.29%, while the target set by PT Bank Rakyat Indonesia Denpasar Renon Branch is 3%. This shows good performance in the midst of sluggish economic conditions in recent years, the phenomenon that occurs regarding the number of transactions on the Brimo application that is not achieved is caused by online customers *experience*, where customers have not



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felt the benefits of the Brimo application, customers do not have confidence in the Brimo application and customers have not thought about making non-cash transactions using the Brimo application because of the lack of attractive promos or discounts from the Brimo application which has an impact on the failure of transactions for Brimo application users. It can be explained that 3.6% of users of the Brimo application gave a one-star rating to the Brimo application, this was due to the lack of response from the admin of the Brimo application at Bank Rakyat Indonesia regarding the problems experienced by application users and where there was a lack of consumer knowledge of the Brimo application in terms of money transfers. , top up pulse,

The purpose of this study is to analyze and explain the influence of online customer *experience* to perceived risk. To analyze and explain the effect of online review on perceived risk. To analyze and explain the influence of online customer *experience* on intention to use. To analyze and explain the effect of online review on intention to use. To analyze and explain the effect of perceived risk on intention to use.

## **2. LITERATURE REVIEW**

### **A. Intention to Use**

According to Jogiyanto (2017: 116), behavioral intention is a person's desire (interest) to perform a certain behavior. This means that a person's intention to perform a behavior is predicted by his attitude towards his behavior and how he thinks others will judge him if he performs the behavior. Suharsimi Arikunto (2016), intention is a person's awareness of an object, a matter or situation that has something to do with him.

### **B. Online customer experiences**

*Online customer experiences* stems from a set of interactions between the customer and the product, company, or part of the organization, that elicits a reaction. This experience is truly personal and implies customer involvement at different levels (rational, emotional, sensory, physical, and spiritual) Pramudita and Japarianto (2014). Hijjah and Ardiansari (2015: 282) say that in order to create extraordinary customer online experiences, there are two things that must be done to create extraordinary customer online experiences. deliver the reality of online customer experiences as promised.

### **C. Online reviews**

*Online reviews* used as a means for consumers to seek and obtain information that will later influence purchasing decisions. Online review also has a function as a decision-making tool, a mechanism for feedback given by consumers, and a recommendation system on the online shopping platform Almana and Mirza (2013: 23). In addition, according to Sutanto and Apriansih (2016: 218) online review is a form of electronic word of mouth and can be regarded as a new marketing communication and can influence and play a role in the purchasing decision process. Information obtained from online consumer reviews can be used to identify and evaluate products that consumers need.

### **D. Perceived Risk**

*Perceived risk* (perceived risk) is defined by Putra (2014) as the consumer's perception of uncertainty and the negative consequences that may be received for the purchase of a product or service. Meanwhile, Assael (2018) states that the perception of risk is one of the important components in information processing carried out by consumers. Consumers are increasingly compelled to seek additional information when faced with purchasing high-risk products.

### **The Influence of Customer Online Experiences on Perceived Risk**

To create extraordinary customer online experiences, there are two things that must be done to create extraordinary customer online experiences, there are two things that must be considered, firstly making an attractive experience promise proposition so that customers want to come and secondly presenting reality customer online experiences according to Hijjah and Ardiansari's promise. (2015:282). Consumers who have more online shopping experiences have a greater ability to assess the benefits and risks (Soopramanien, 2011). On the other hand, consumers who have little or no shopping experience on online media will show more risk-aware behaviors such as unauthorized use of their credit cards, leaked personal information, unsatisfactory purchases, or web page errors (Wen-Chin et al. al, 2016). This condition is confirmed by an empirical study of online shoppers who have more experience with the Internet and feel less financial risk than those with less online experience (Miyazaki and Fernandez, 2001). Based on this analysis, the development of hypotheses in this study can be formulated as follows:

H1 : Customers online *experience* negative effect on perceived risk.

### **The Effect of Online Reviews on Perceived Risk**

*Online reviews* used as a means for consumers to seek and obtain information that will later influence purchasing decisions. Online review also has a function as a decision-making tool, a mechanism for feedback given by consumers, and a recommendation

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system on the online shopping platform Almana and Mirza (2013: 23). Mclaughlin, et al (2017) say online review has a negative effect on perceived risk, where in suppressing perceived risk it is necessary to held increasing good online reviews so that the perception of risk is lower. Gursoy (2017) said that online reviews have a negative effect on perceived risk, where the better the online review, the better the risk perception will decrease. Based on this analysis, the development of hypotheses in this study can be formulated as follows:

H2: Online review has a negative effect on perceived risk.

### The Influence of Customer Online Experiences on Intention to Use

*Online customers experiences* as a result of consumer interaction with products, companies or other parts of the organization, which causes reactions Chandra, (2014). Babaev (2018) says customer online *experience* has a positive effect on intention to use, where in increasing intention to use it is necessary to have a good consumer experience in using a product. Rodrigues and Borges (2015) say online customers *experience* has a positive effect on intention to use, where the better online customers *experiences* This has an impact on increasing consumer desire to use a product. Rather (2018) says customer online *experience* positive effect on intention to use where the more positive online customers *experiences* What happens to the company will have an impact on increasing consumer desires in use a product. Based on this analysis, the development of hypotheses in this study can be formulated as follows:

H3: Customer online experience has a positive effect on intention to use.

### The Effect of Online Reviews on Intention to Use

*Online consumer reviews* can be understood as a medium for consumers to see reviews from other consumers on a product, company service and about how a company produces Khammash (2018:79). Thomas (2019) said online reviews have a positive effect on intention to use, where it is necessary to increase good online reviews so that intention to use increases. Qiwang, et al (2017) say online reviews have a positive effect on intention to use, where the better online reviews lead to positive input, the impact on increasing intention to use for the better. Based on this analysis, the development of hypotheses in this study can be formulated as follows:

H4: Online review has a positive effect on intention to use.

### Influence of Perceived Risk on Intention to Use

Risk perception is one of the important components in the information processing carried out by consumers. Consumers are increasingly compelled to seek additional information when faced with purchasing high-risk products Assael (2018). The results of the empirical study show that there is an influence negative consumers' perceived risk of online shopping intentions (Dai et al., 2014; Jordan et al., 2018; Tangmanee and Rawsena, 2016; Shu-Hao et al., 2016; Featherman & Pavlou, 2003; Pavlou, 2003; Crespo et al., 2009, Li & Huang, 2009; Hernandez et al., 2010). The greater the consumer's perception of the risks faced in online transactions, the lower the intention consumer to buy products through online transactions. Based on this analysis, the development of hypotheses in this study can be formulated as follows:

H5: Perceived risk has a negative effect on intention to use.

## 3. RESEARCH METHODS

The research design is a flow of research activities to provide solutions using a quantitative approach (Margono, 2010). Based on the hypothesis, there are four variables determined in this study, namely customer online experiences, online reviews, perceived risk and intention to use. These variables become the basis for the preparation of research instruments. After the sample is determined, it is continued with data collection through the questionnaire method using the instruments that have been prepared. The data obtained before being analyzed were tested with validity and reliability tests using confirmatory factor analysis techniques to confirm the accuracy of the instrument, then interpreted and followed by concluding and providing suggestions.

## 4. ANALYSIS AND DISCUSSION

Hypothesis testing can be divided into testing the direct effect and testing the indirect effect or testing the mediating variable. Based on the data processing, it was found that the results of hypothesis testing are presented in Table 1 as follows:

Table 1. Direct Effect Hypothesis Testing Results

	Original	T statistic	P-Value	Information
<i>online customer experience</i> (X1) -> <i>Perceived risk</i> (Y1)	0.332	2,956	0.003	H1 Accepted

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Online reviews (X2) -> Perceived risk (Y1)	0.450	4.606	0.000	H2 Accepted
online customer experience (X1) -> Intention to use the Brimo application (Y2)	-0.156	0.698	0.485	H3 Rejected
Online reviews (X2)-> Intention to use the Brimo application (Y2)	0.384	2.012	0.045	H4 Accepted
Perceived risk(Y1)-> Intention to use the Brimo application (Y2)	0.498	3.002	0.003	H5Accepted

Source: The results of the analysis in research

1. *online customer experience* positive and significant effect on *perceived risk*. This result is indicated by the positive path coefficient of 0.332 with a t-statistic of 2.956 (t-statistic > 1.96) with a P value of 0.003 < 0.05. The results obtained can be interpreted as the better the online customer experience felt by the customer, the more impact on the customer's perceived risk on the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch.
2. *Online reviews* positive and significant effect on *perceived risk*. This result is indicated by a positive path coefficient of 0.450 with a t-statistic of 4.606 (t-statistic > 1.96) with a P value of 0.000 < 0.05. The results obtained can be interpreted that the better the online reviews given by customers using the Brimo application, the better the perceived risk of customers using the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch.
3. *online customer experience* has no effect on intention to use the Brimo application. This result is indicated by a negative path coefficient of -0.156 with a t-statistic of 0.698 (t-statistic < 1.96) with a P value of 0.485 > 0.05. The results obtained can be interpreted as the worse the online customer experience, the intention to use the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch will decrease.
4. *Online reviews* positive and significant effect on intention to use the Brimo application. This result is indicated by a positive path coefficient of 0.384 with a t-statistic of 2.012 (t-statistic > 1.96) with a P value of 0.045 < 0.05. The results obtained can be interpreted as the better online reviews from customers, the intention to use the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch will increase.
5. *Perceived risk* positive and significant effect on intention to use the Brimo application. This result is indicated by a positive path coefficient of 0.498 with a t-statistic of 3.002 (t-statistic > 1.96) with a P value of 0.003 < 0.05. The results obtained can be interpreted the better the customer's perceived risk in using the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch will increase.

**Mediation Variable Check**

To facilitate the testing of mediating variables and to determine the indirect effect in this study, the following analysis was carried out on the mediation test model presented in Table 2 as follows:

**Table 2. Recapitulation of Mediation Variable Test Results**

No	Variable Mediation Perceived risk (Y1), Intention to use the Brimo Application (Y2) On:	Effect				Information
		(a)	(b)	(c)	(d)	
1	<i>online customer experience</i> (X1) → Intention to use the Brimo application (Y2) through Mediation of Perceived risk (Y1)	0.332 (sig)	0.056 (sig)	-0.156 (no sig)	0.498 (sig)	<i>No Mediation</i>
2	<i>Online reviews</i> (X2) → Intention to use the Brimo application (Y2) through Mediation of Perceived risk (Y1)	0.459 (sig)	0.597 (sig)	0.384 (sig)	0.498 (sig)	<i>Partial Mediation</i>

Source: The results of the analysis in research

1. The magnitude of the VAF value in the relationship between online review and intention to use the Brimo application with perceived risk mediation is:

$$VAF = \frac{\text{Indirect effect}}{\text{Total influence}} \times 100\%$$

$$VAF = \frac{0.056}{-0.540} \times 100\%$$

$$VAF = -10.37\%$$

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The value of the VAF is -10.37%, which is below 20 percent, so it can be categorized as non-mediating. So in this relationship, perceived risk is not a mediator between online customer experience and intention to use the Brimo application. These results state that customer online experience has a positive influence on perceived risk and will also not have an impact on increasing intention to use the Brimo application, but in this case, perceived risk is not a determining factor for the influence of online customer experience on intentions to use the Brimo application.

2. The magnitude of the VAF value in the relationship between online review and intention to use the Brimo application with perceived risk mediation is:

$$\text{VAF} = \frac{\text{Indirect effect} \times 100\%}{\text{Total influence}}$$

$$\text{VAF} = \frac{0.597 \times 100\%}{0.981}$$

$$\text{VAF} = 60.85\%$$

$$\text{VAF} = 60.85\%$$

The value of VAF is 60.85%, which is between 20 percent - 80 percent, so it can be categorized as partial mediation. So in this relationship, perceived risk is a partial mediation between *online review* on the intention to use the Brimo application. This result states that *online review* has a positive influence on perceived risk which will also have an impact on increasing intention to use the Brimo application, but in this case, perceived risk is not a determining factor *online review* on the intention to use the Brimo application.

## DISCUSSION

### The Influence of Online Customer Experience on Perceived Risk

The results of hypothesis testing state that online customer experience has an effect on perceived risk. This means that the better the online customer experience, the higher the perceived risk of the Brimo application. These results provide clues for management, an important role in increasing perceived risk should pay more attention to customer online experience. To create extraordinary customer online experiences, there are two things that must be done to create extraordinary customer online experiences, there are two things that must be considered, firstly making an attractive experience promise proposition so that customers want to come and secondly presenting reality customer online experiences according to Hijjah and Ardiansari's promise. (2015:282).in transact using the Brimo application, such as the phenomenon that occurs in the field regarding customer problems when using the application Primo where is the application Primo often have problems or disturbance This makes the customer uncomfortable using it. The results of this study are not in accordance with the research conducted by Ludwig, et al. (2017) saying that online customers *experience* has a positive effect on perceived risk, where in suppressing perceived risk it is necessary held increase online customers *experiences* so that the perception of risk increases. Research conducted by Kim and Choi (2016) said that online customers *experience* positive effect on perceived risk, where the better the online customer *experiences* This has an impact on increasing the perception of risk. Research conducted Agrawal and Singh (2018) say customers are online *experience* positive effect on perceived risk, where the more positive online customers *experiences* What happens to the company will have an impact on increasing the perception of risk that occurs, so as to increase consumer desires in make a purchase.

### The Influence of Online Reviews on Perceived Risk

The results of hypothesis testing state that online review has a positive and significant effect on perceived risk. This means that the better the online review will be able to increase the perceived risk. These results provide clues for management, an important role in perceived risk should pay more attention to online reviews. Therefore, it can provide direction for management to prioritize online reviews of the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch. Online reviews are used as a means for consumers to find and obtain information that will later influence purchasing decisions. Online review also has a function as a decision-making tool, a mechanism for consumer feedback, and a recommendation system on the online shopping platform Almana and Mirza (2013: 23). Online reviews reflect such as growing customer perceptions related to risk in using the Brimo application to grow online reviews in a positive direction related to the fast response given by the company, such as the phenomenon that occurs in the field regarding customer problems when conducting online reviews of the Brimo application where the response is not fast enough. companies related to complaints that occur through online which have an impact on increasing reputational risk experienced by companies regarding the Brimo application.

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The results of this study are not in accordance with the research conducted by Jashari and Rrustemi (2018) which stated that online reviews have a positive effect on perceived risk, Research conducted by Fu, et al (2018) said that online reviews have a positive effect on perceived risk, where the better the online review leads to positive input, the impact on increasing the perception of risk for the better.. Research conducted Zarco (2015) said that online reviews have a positive effect on perceived risk, where the more positive online reviews that occur in companies, the more they will have an impact on increasing the perception of risk that occurs, so as to increase consumer desire to make purchases.

### **The Influence of Online Customer Experience on Intentions to use the Brimo Application**

The results of hypothesis testing state that online customer experience has no effect on intentions to use the Brimo application. This means that the lower the online customer experience will not be able to increase the intention to use the Brimo application. These results provide clues for management, an important role in increasing intention to use the Brimo application should pay more attention to customer online experience. Therefore, it can provide direction for management to prioritize a good online customer experience for users of the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch. Customer online experiences as a result of consumer interactions with products, companies or other parts of the organization, which cause reactions Chandra, (2014).

The Results of study is rejects and is not in accordance with the research conducted Babayev (2018) said that online customer experience has a positive effect on intention to use, where in increasing intention to use it is necessary to have a good consumer experience in using a product. Research conducted by Rodrigues and Borges (2015) says that online customer experience has a positive effect on intention to use, where the better online customer experiences, the impact on increasing consumer desire in using a product. Research conducted Rather (2018) says that customer online experience has a positive effect on intention to use where the more positive customer online experiences that occur in the company, the more likely it will be to increase consumer desire to use a product. This research supports research conducted by Sasson and Mesch (2016). ) said that online customer experience had a negative effect on intention to use,

### **The Effect of Online Review on Intentions to Use the Brimo Application**

The results of hypothesis testing state that online review has a significant positive effect on intentions to use the Brimo application. This means that the better the online review, the better the intention to use the Brimo application. These results provide clues for management, an important role in the intention to use the Brimo application should pay more attention to online reviews. Therefore, it can provide direction for management to prioritize good online reviews in using the Brimo application at PT Bank Rakyat Indonesia Denpasar Renon Branch. Online consumer reviews can be understood as a medium for consumers to see reviews from other consumers on a product, company service and about how a company produces Khammash (2018:79).

Results This research is in accordance with research that done Thomas (2019) said online reviews have a positive effect on intention to use, where it is necessary to increase good online reviews so that intention to use increases. Research that done Soomro, et al., (2017) in the the research state Qiwang, et al (2017) say online reviews have a positive effect on intention to use, where the better online reviews lead to positive input, the impact on increasing intention to use becomes better..

### **The Effect of Perceived Risk on the Intention to Use the Brimo Application**

The results of hypothesis testing state that perceived risk has a significant positive effect on intentions to use the Brimo application. This means that the better the perceived risk, the higher the intention to use the Brimo application. These results provide clues for management, an important role in the intention to use the Brimo application should pay more attention to perceived risk. Therefore, it can provide direction for management to prioritize the perceived risk of a good Brimo application. Risk perception is one of the important components in the information processing carried out by consumers. Consumers are increasingly compelled to seek additional information when faced with purchasing high-risk products Assael (2018).

The results of this study are in accordance with the research conducted Colman, et al (2019) said that perceived risk has a positive effect on intention to use, where it is necessary to increase good online reviews so that intention to use increases.. Research thatdone Maziriri and Chucu (2017) say that perceived risk has a positive effect on intention to use, where the better perceived risk leads to positive input, the impact on increasing intention to use becomes more. Research conductedNguyen, et al (2019) said that perceived risk has a positive effect on intention to use, where the better the perceived risk that consumers feel in using a product, the impact on increasing intention to use becomes more.

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### 5. CONCLUSION

*Online customer experience* positive and significant effect on perceived risk. This means that the better the online customer experience, the better the perceived risk. *Online reviews* positive and significant effect on perceived risk. This means that the better the online review given by the user of the Brimo application, the better the perceived risk will be. *online customer experience* does not affect the intention to use the Brimo application. This means that the lower the online customer experience in using the Brimo application, the lower the intention to use the Brimo application. *Online reviews* positive and significant effect on work performance. This means that the more online reviews given by customers who use the Brimo application, the more they will increase their intention to use the Brimo application. *Perceived risk* positive and significant effect on the intention to use the Brimo application. This means that the safer the risk when using the Brimo application, the higher the intention to use the Brimo application.

### 6. RESEARCH LIMITATIONS

The limitations that can be conveyed from this research are based on the relatively short time of conducting the research. This limitation certainly has an impact on the low generalizability of the research, considering the problems faced are relatively complex and dynamic from time to time. If the model is applied at other times and conditions it is possible to obtain different results. In addition to developing more relevant indicators used in each variable, there are also many factors that determine customer retention. This is because efforts to increase customer retention are quite crucial in an increasingly dynamic and uncertain era.

### 7. SUGGESTION

In increasing the intention to use the Brimo application, management should pay attention to the customer online experience variable with the lowest indicator on the extensive online shopping experience. This means that the customer experience when using the Brimo application is not good enough, this is because the Brimo application often experiences problems or disturbances that cause customers to be uncomfortable using it, so that the intention to use the Brimo application decreases.

In increasing the intention to use the Brimo application, management should pay attention to the online review variable with the lowest indicator on the volume of online review. This means that customers who use the Brimo application are not good enough in providing comments and input regarding the Brimo application, so that the intention to use the Brimo application decreases.

In increasing the intention to use the Brimo application, management should pay attention to the perceived risk variable with the lowest indicator on the perception of privacy risk. This means that customers are worried about the problem of personal information leaking into the hands of someone who is not responsible, so that the intention to use the Brimo application decreases.

Further researchers can replicate this research model through a longitudinal approach model (from time to time) and allow it to be used in other companies. In addition, further researchers can modify the research model by adding and developing other variables in testing the intention to use such as brand image, customer satisfaction and price perception.

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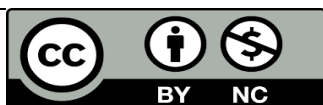
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## Evaluation of the Tennis Court Coaching Program in Selabora Tennis Club the Faculty of Sports Science, Yogyakarta State University



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**ABSTRACT:** The purpose of this study is to evaluate the coaching program at the tennis court club Selabora FIK UNY. The results of this research evaluation are expected to be one of the researchers' contributions to realize an optimal coaching program in the tennis court sports club in the Selabora of the Faculty of Sports Science (FIK) Yogyakarta State University. This research is an evaluation research with a CIPP evaluation model. The approach taken using a quantitative approach is supported by questionnaire research instruments. The questionnaire has been validated by three experts. The sampling technique used is a purposive sampling technique with the criteria of active administrators Selabora, active trainers Selabora, and students Selabora with a minimum age of 10 years. The sample of this study was 30 people consisting of 2 administrators, 8 coaches, and 20 students. The result of this study is that the coaching program for the Faculty of Medicine UNY in tennis courts is 3.16 in the medium category. The recommendations from the results of this study are, the context aspect of improving and developing, especially in terms of coaching programs, the input aspect of the coach continues to develop his coaching knowledge and attend training, the process aspect of the management can compile a long-term coaching program and the product aspect needs to be collaborated from several parties, in this case, namely administrators, coaches, students and parents of students to continue to try their best in carrying out the training process.

**KEYWORDS:** Evaluation, Coaching Program, Tennis Courts

### INTRODUCTION

The improvement of human resources or called human resources in the world of sports can be fulfilled by conducting sports coaching. If you look at the content of the National Sports System Law number 3 of 2005, the implementation of coaching and sports development includes empowering the sports community, developing regional to national sports coaching, and organizing sustainable championships or competitions.

Sports coaching has a relationship with sports achievements (Pakaya et al., 2012). The achievement of maximum sports achievements depends on how the sports coaching is carried out (Widianto et al., 2020). It is necessary to evaluate the achievement of an athlete's achievements as a result of the coaching program that has been compiled and implemented at a club. One of the sports clubs in Yogyakarta is at the Faculty of Sports Science (FIK) at Yogyakarta State University (UNY). The sports club develops sports achievement coaching through several coaching and training pathways that foster student-age athletes. The club is the School of Laboratory (SELABORA) Tennis Courts.

Preliminary studies and data collection of researchers were conducted in the field tennis branch later. Preliminary research conducted looked at the acquisition of student sports achievement. The results obtained from the initial research are that student achievement is still volatile. Another preliminary research result is several things related to the student coaching component such as coaches, namely that not all coaches have a background in sports coaching. The improvement, as well as the success of athletes, is determined by special knowledge of the sport as well as coaching from a coach (Kee et al., 2015). The quality of infrastructure and supporting aspects of handling student injuries are good. This is shown by the infrastructure as well as standard court tennis and the Health and Sports Center Therapy Clinic FIK UNY is a reference for students when they experience injuries.

Based on the results of the initial study above, an evaluation is needed so that the final results of the coaching program as long as tennis courts are more optimal. The phenomenon that exists in the Selabora of FIK UNY in the sport of tennis courts whose achievements are still volatile and the background of coaches is not all from sports coaching. Therefore, researchers are interested

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in researching "Evaluation of The Tennis Court Coaching Program in Selabora Tennis Club the Faculty of Sports Science Yogyakarta State University".

### METHOD

The evaluation model used in this study is the evaluation of the CIPP model because this model is a complex evaluation model that includes Context, Input, Process, and Product. This is in line with (Lippe & Carter, 2018) who says that several aspects as well as all aspects of CIPP can effectively guide the program evaluation process. Evaluation is a structured process used to identify related to the contribution of aspects related to sports achievement (D'Isanto et al., 2019). This research was conducted in the tennis courts of FIK UNY, the time of the study in May 2022. The population is the determination of objects or subjects by researchers based on certain qualities and characteristics (Sugiyono, 2016).

The sampling technique uses a purposive sampling technique. Purposive sampling criteria include that the sample is a coaching administrator and an active student of the Tennis Court Branch. Based on these criteria, a sample of 30 people was obtained with details of 2 administrators, 8 coaches, and 20 students. This research was conducted by testing the instrument first. Instrument testing is carried out to ensure that when questionnaires are distributed to research samples, the contents of the questionnaire can be used as a valid measuring instrument and produce valid data. Validity tests are carried out with expert validation and reliability tests using the help of the SPSS 25 program as well as Microsoft Excel. This research questionnaire obtained results in the form of being suitable for use as a research instrument based on the assessment of 3 validators with details of 2 court tennis experts and 1 evaluation expert. The research data analysis technique uses the Norm Reference Assessment (PAN) analysis technique from the book by Sulistiyono which uses the mean and standard deviation as the compiler of the calculation formula. The normal curve used for the reference assessment of norms amounts to 6 Standard Deviations (Sulistiyono, 2017).

**Table 1. Score Interpretation Criteria1**

No.	Interval	Criterion
1.	$X < M - 1,8SD$	Very Less
2.	$M - 1.8SD < X < M - 0.6SD$	Less
3.	$M - 0,6SD < X < M + 0,6SD$	Keep
4.	$M + 0,6SD < X < M + 1,8SD$	Good
5.	$M + 1,8SD < X$	Excellent

### RESULT AND DISCUSSION

The results of the evaluation research will later produce a recommendation from the point of view of sports management about the coaching program as Selabora as FIK UNY tennis courts and submitted to the manager. This is because the Selabora management has the authority to make changes to the program as long as the tennis court branch has been held. The following is presented a table of score criteria and research results that have been obtained.

**Table 2. Score Criteria Results2**

No.	Interval	Criterion
1.	$X < 3.05$	Very Less
2.	$3,05 < X < 3,12$	Less
3.	$3,12 < X < 3,20$	Keep
4.	$3,20 < X < M + 3,27$	Good
5.	$3.27 < X$	Excellent

**Table 3. Managing and Student Results3**

No.	Aspects	Value	Criterion
1.	Manager	3,16	Keep
2.	Student	3,16	Keep
<b>Average Manager and Student</b>		<b>3,16</b>	<b>Keep</b>

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Based on the table data above, the results of the quantitative evaluation of the evaluation aspects of the coaching program for the FIK UNY field tennis branch are included in the moderate criteria, but the data results provide important notes, especially on three aspects of the CIPP, namely the input, process, and product aspects. The results of this quantitative evaluation will be discussed in the discussion section which will later produce recommendations for managers in the Selabora coaching program.

### DISCUSSION

#### Context Aspects

The context aspect has a focus on the big picture or grand design of a program or activity. The initial discussion will certainly lead to the background of the program. Furthermore, the subject of discussion studied was the purpose of the program. A compiled program has an end goal. Broadly speaking, the ultimate goal will lead to the vision and mission of the program. The existence of a vision and mission in a program or activity has an important role. This is so that the entire series of programs continue to run as it should while still paying attention and is still within the scope of the vision and mission of the program.

**Table 4. Results of Context Aspects of Managers and Trainers<sup>4</sup>**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Program Background	Management	3,33	3,29	3,18	Keep
		Student Coaching Strategies	3,25			
2.	Objectives of the Coaching Program	Vision & Mission	3,15	3,18		
		Target	3,20			
3.	Coaching Program	Talent Coaching and Guiding	3,15	3,08		
		Achievement Coaching	3,00			

Evaluating aspects of context will help create program objectives, identify needs and make decisions (Bukit et al., 2019). The background of the program Selabora FIK UNY branch of tennis courts already has a valid legal basis so this program can be declared a legal program. The background of the program Selabora FIK UNY has a complete explanation both from the management side and from the trainer side. background Selabora FIK UNY has services, namely based on the appointment by the Rector of Yogyakarta State University, namely Rector 257 / KEP / 2021.

Based on the indicators of the coaching program of 3.16 medium categories, sports coaching should be carried out as early as possible. This is because is to the statement (Prasetya & Irawan, 2020) that the age category phase that is very important for child development or can be called the golden age is the early age phase. Taking into account the existing sports coaching systems and pathways, the concentration of sports coaching must be carried out fundamentally, systematically, efficiently, and integrated starting early, and directed to one goal. Sports coaching is inseparable from a structured system. That is a system that is interrelated between one component and another. A system is a unit of several parts and components of the program that are interrelated and work together with each other to achieve the goals that have been set in the system.

The recommendation on the context aspect is that improvements are still being made to the development of the context aspect, especially in terms of coaching programs in the Selabora FIK UNY Tennis Court Branch so that the results obtained are included in the excellent category.

#### Input Aspects

Evaluation of inputs also involves collecting information to make assessments about the resources and strategies necessary to achieve program objectives, and goals and define constraints. With this input evaluation, there is also the availability of data and information to determine how to use sources that can be used to achieve program objectives. The observation of the input aspect in this study is what parts are owned by Selabora in carrying out the Selabora coaching program. This includes the source of funds, the ability of managers to carry out programs, the ability of students, and the infrastructure owned by Selabora to support the smooth running and success of the program.

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**Table 5. Results of Input Aspects of Managers and Trainers5**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Human Resources	Coach	3,05	3,08	3,16	Keep
		Student	3,10			
2.	Trainer Program	Exercise Program	3,13	3,13		
3.	Funding	Student Development	3,10	3,20		
		Administration	3,30			
4.	Infrastructure	Completeness	3,35	3,23		
		Standards of completeness	3,10			
5.	Parent Support	Organization	3,15	3,15		
		Student	3,15			

**Table 6. Results of Student Input Aspects6**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Human Resources	Coach	3,30	3,08	3,14	Keep
		Student	2,85			
2.	Trainer Program	Exercise Program	3,17	3,17		
3.	Funding	Student Development	3,13	3,19		
		Administration	3,25			
4.	Infrastructure	Completeness	3,33	3,21		
		Standards of completeness	3,10			
5.	Parent Support	Organization	2,95	3,05		
		Student	3,15			

Funding is the most important supporting factor in the effort to make a sporting achievement coaching program a success. Various alternative sources of funds need to be explored to meet the need for funds for the development of achievement sports. (Wani, 2018) coaching is difficult to lead toward maximum achievement coaching when it is not supported by the availability of funds. Various needs needed in sports coaching and development can be realized such as procurement of sports facilities and infrastructure, maintenance and repair of sports facilities and infrastructure, funding for coaching and student development ranging from recruitment to concentrating training and participating in championship events, the welfare of student coaches and organizational administrators.

Based on human resource indicators of 3.10 medium categories. (Abidin & Yuwono, 2021) talent identification or talent identification continued talent development are steps that can be taken in the context of breeding. Identification of an athlete's talents can be done or seen at an early age or at a mature age, just as a student must have talent in sports from an early age. A good personality must be possessed by a student that can be used as a determinant of achievement for sports and can be used for each individual to help according to a certain type of sport. Sports psychology, especially the emotional mentality of good athletes, is also an increasingly decisive contributor in the process of coaching and improving student performance. Finding a specific individual and encouraging them to pursue their talents to the fullest is a challenge. Students must implement to be successful in developing their abilities to a higher level.

Based on the trainer program indicators of 3.05 categories less. Selabora FIK UNY also has several coaches who still do not have a coaching certificate. The recruitment process of athletes and coaches, infrastructure, budget, and program schedule are some of the factors that affect the coaching program (Gelu, 2019). This is important considering that the function and role of a coach are not only related to technical matters but also must understand the nontechnical side of his students as a reference in more mature mental development for students.

Caring is one of the coaching skills that in recent years has received scientific attention (Dohsten et al., 2020). Sports coaching, in addition to being largely determined by the professionalism of HR, is also determined by the support of facilities, policies, funds,

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and the operationalization of sports professional coaching management. Every coach must always be aware, caring, and understanding of the goals to be achieved and the ultimate goal of an exercise to improve achievements and get victory in the match wherever possible. The presence of a coach is fundamental as a provision of sports experience (Pill et al., 2016).

Based on facilities and infrastructure indicators of 3.10 medium categories. The achievements achieved by a sports club will not be separated from the factor of facilities and infrastructure or facilities. According to (Hoekman et al., 2016) in the 1980s the growth of sports facilities in the Netherlands managed to increase sports participation until it reached the threshold of participation. This shows that sports facilities are an important aspect of the success of a sport. Training facilities that comply with the prescribed standards of such parent organizations should not be ignored. This is because according to (Kumar et al., 2018) the availability of sports facilities and infrastructure is something that cannot be ignored in an exercise program. With adequate facilities and infrastructure, the training program will have a greater possibility of being able to run according to what is expected, and also vice versa if the training facilities and infrastructure are lacking or inadequate, then the training program cannot run optimally as expected.

The recommendation for the input aspect based on the results of the discussion above is that the coach should continue to develop his coaching knowledge by meeting the ideal requirements as a coach and attending training, to create outstanding students. This is to the statement from (Cortela et al., 2017) which states that a program for coaches to be able to understand various competencies in a particular field will help education as well as improve the coach's strategy in dealing with problems in the real world of sports coaching. Another supporting statement in HR development is according to (Rodriguez & Walters, 2017) that interpersonal skills are one of the investments in the field of employee training and development. The investment is certainly to improve the quality of human resources so that the output produced becomes more optimal.

### Process Aspects

Process evaluation is directed to assess the implementation that has been carried out against the prepared plan that is useful for the implementer in carrying out activities and helps other groups know the performance of the program and predict the results. Implemented. Process evaluation is used to detect or predict the draft procedure or implementation design during the implementation stage, providing information for program decisions and as a recording or archive of procedures that have occurred. Process evaluation includes a collection of assessment data that has been determined and applied in the practice of implementing the program. Basically, evaluate the process to find out to what extent the plan has been implemented and what components need to be improved.

Process evaluation involves what aspects the activity is, who is in charge of the program, and when the activity is completed. The evaluation of the process aspects in this study observes how the implementation of the Selabora coaching program in conducting the achievement program Selabora of the student tennis court branch has a role as a clarification of the program that has been carried out by the manager. This is because (Iskandar et al., 2017) suggest that not all planning can be implemented.

**Table 7. Process Management and Trainer Aspects Results7**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Program Background	Trainer Program	3,15	3,15	3,13	Keep
		Management	3,00			
2.	Objectives of the Coaching Program	Coach	3,25	3,12		
		Parents of Students	3,10			

**Table 8. Student Process Aspect Results8**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Program Background	Trainer Program	3,12	3,12	3,18	Keep
2.	Objectives of the Coaching Program	Coach	3,25	3,25		
		Student	3,25			

Based on table 7 and table 8 of the process aspect evaluation results, the sample of managers and trainers are included in the medium criteria and students are in the medium criteria. The manager said that the Selabora has a plan or discourse to include

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students in the class that has been provided specifically for achievement classes to improve better results when filling out questionnaires accompanied by researchers.

The results showed that the evaluation of the coaching program was in the moderate category. Some things that must be studied from the evaluation of the process of a program include planned activities, explanations related to program implementation, and assessment of responses from each staff regarding the plan and implementation of the program in the field (Han et al., 2017).

Evaluation of the process related to the activities of implementing the program plan with *the inputs* that have been provided. (Pawestri et al., 2019) evaluation of the process is necessary because the evaluation of the process can provide *feedback* for parties who have a responsibility in the implementation of a program. Process evaluation is carried out to learn whether the implementation of the program is to the plan.

Based on coordination indicators of 3.15 medium categories. Coordination is a strap in organization and management that connects the roles of actors in organization and management to achieve organizational and management goals. The role of coordination in the organization is to make a combination of organizational resources to achieve goals (Darmawati & Susilo, 2019). Building sports achievements is a complicated and complex work system because the achievements of an athlete are determined by a system of various interrelated parties, so coordination, synchronization, and synergy between various existing stakeholders are needed.

Recommendations for the *process* aspect, namely coaches and administrators, can compile a long-term coaching program for all students so that the coaching that runs in the field tennis branch of FIK UNY can run optimally.

### Product Aspects

Product evaluation is an assessment carried out to see the achievement/success of a program in achieving predetermined goals. The evaluation of products or outputs is related to the evaluation of the results achieved from a program. Product evaluation is used to answer questions: how far are the program objectives achieved, what programs are achieved with high and low ratings, what is the level of satisfaction of the people who are subjected to the program implementation goals, whether the program is achieved on time, whether the positive and negative impacts of the program, whether the program needs to be continued, continued with revision, or not continued. *Product* evaluation includes determining the extent to which program objectives have been achieved.

**Table 9. Results of Product Aspects of Managers and Trainers<sup>9</sup>**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Achievement	Effort	3,30	3,18	3,18	Keep
		Result	3,15			
		Student	3,10			

**Table 10. Student Product Aspect Results<sup>10</sup>**

No.	Aspects	Value	Mean	Total Mean per Indicator	Mean Aspects of Context	Criterion
1.	Achievement	Effort	3,25	3,15	3,15	Keep
		Result	3,10			
		Student	3,09			

The evaluation of products or outputs is related to the evaluation of the results achieved from a program. (Putri et al., 2021) the meaning of product evaluation is an evaluation used to see the success rate of achievement of a goal. At the product evaluation stage, information is collected at the end of the program regarding the output or product, and the product obtained is compared with expectations.

Product evaluation will provide feedback or replies related to the level of achievement of program goals and consumer needs that can be met (Esgaiar & Foster, 2019). Product evaluation will assess the quality of the results of a program which will later lead to a question about whether the program needs to be repeated or continued (Erdoğan & Mede, 2021). The purpose of product evaluation is to measure and assist in subsequent decisions, what has been achieved and what has been done after the program



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runs. Feedback on achievements is very important, both during the program cycle and at its conclusion. Product evaluation is also often extended to assess long-term effects.

Based on achievement indicators of 3.15 medium categories. (Diatmika et al., 2020) in their research entitled "Evaluation of the Badminton Achievement Development Program at the Badminton Association (PB) Anugerah Denpasar with the Context, Input, Process, Product (CIPP) Method" said that sports achievement is an aspect that is assessed when evaluating CIPP, especially the product aspect. Sports achievements cannot be obtained easily and instantly. Achieving achievements in sports requires maximum effort from various related parties and a long time. Efforts to achieve optimal achievement are influenced by the quality of exercise, while the quality of exercise is determined by various supporting factors including the ability and personality of the coach, facilities and equipment, research results, competitions, and athlete abilities which include talent and motivation, as well as the fulfillment of nutrition and student lifestyle.

Recommendations for the product aspect are that it is necessary to collaborate with several parties, in this case, namely administrators, coaches, students, and parents of students to continue to try their best in carrying out the training process, so that they can produce outstanding students as a result of the coaching program that has been prepared by the management and coaches

### **Overall Aspects**

Based on the evaluation results of table 3. it is written that the results of the evaluation of the overall coaching program Selabora FIK UNY tennis court branch entered the medium criteria with a value of 3.16, several important notes are fundamental and important to be considered by the Selabora party to determine the sustainability of the program in the future based on the results of observations. This is in line with (Ishak et al., 2017) that the four dimensions in the CIPP evaluation model are studied so that these dimensions can complement each other in the evaluation process as well as continuous improvement. Suggestions from the aspects of context, input, process, and product if connected one by one lead to the quality of HR input and HR output.

A program leader is required to manage the human resources they have because the HR itself will affect the performance and final results of the program series. It is also stated by (Ahmad, 2015) that HR management activities are important management activities because HR is a valuable asset in an organization. Some recommendations will be presented after the recommendations section.

### **CONCLUSION**

Based on the results of the study and the results of the data that have been carried out, it was concluded that the evaluation of the field tennis coaching program Selabora FIK UNY of 3.16 is in the moderate category. The conclusions based on each of the evaluation components are as follows:

1. The context of the evaluation of the coaching program is Selabora, 3.18 is in the moderate category.
2. Input evaluation of the coaching program for the sport of tennis courts labor FIK UNY from the aspect of Input managers and coaches of 3.16 is in the medium category. Based on the aspect of student input of 3.14 is in the medium category.
3. The evaluation process of the field tennis coaching program Selabora FIK UNY from the aspect of the process of managers and coaches of 3.13 is in the moderate category. Based on the aspect of the student process, 3.18 is in the moderate category.
4. Product evaluation of the field tennis coaching program Selabora FIK UNY from the aspect of product managers and coaches of 3.18 is in the medium category. Based on the product aspect, 3.18 students are in the medium category.

### **RECOMMENDATIONS**

Based on the results of research on the evaluation of the tennis court coaching program Selabora FIK UNY, suggestions can be given as follows.

1. In the context aspect, considering that the results obtained are moderate, it is hoped that improvements will still be made to the development of the context aspect, especially in terms of coaching programs in the Selabora so that the results obtained are included in the very good category.
2. In the input aspect, the coach should continue to develop his coaching knowledge by fulfilling the ideal requirements as a coach and attending training, to create outstanding students.
3. In the process aspect, coaches and administrators should be able to compile a long-term coaching program for all students so that the coaching that runs in the Selabora can run optimally
4. In the product aspect, it is necessary to collaborate with several parties, in this case, namely administrators, coaches, students, and parents of students to continue to try their best in carrying out the training process, so that they can produce outstanding students as a result of the coaching program that has been prepared by the management and coaches



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## Impacts of Digital Transformation Capacity on Task Performance of Public Servant: A Case Study in Vietnam Ministry of Home Affairs



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**ABSTRACTS:** Digital transformation has been effectively applied in the public sector in Vietnam, especially the ministries. This fact has received significant attention from scientists. Therefore, to supplement the evidence of previous studies and enrich the research literature, this study examines the impact of factors of the digital transformation capacity of public servant of Vietnam Ministry of Home Affairs (Moha) on their task performance. This study was conducted through a cross-sectional survey using an intentional sampling technique (n=200). A multivariate linear regression analysis technique was applied to prove the hypotheses. Research results show that all three factors, digital technology capabilities, digital transformation ethics, and digital transformation leadership, have a positive and meaningful impact on the task performance of Moha public servant. Among them, the most substantial impact belongs to digital technology capabilities. Therefore, this study implies that the Vietnamese government and the Moha need to pay attention to formulating policies to improve the digital transformation capacity of public servant in digital transformation.

**KEYWORDS:** digital technology capabilities; digital transformation ethics; task performance; public servant, Vietnam Ministry of Home Affairs; digital transformation.

### INTRODUCTION

The Communist Party of Vietnam is the only political party leading the state and society in this country. To implement digital transformation in the public sector, the Politburo of the Communist Party of Vietnam has developed Resolution No. 52-NQ/TW dated September 27, 2019, on several guidelines and policies to participate in the meeting actively. In addition, the Industrial Revolution 4.0 has highlighted the urgent need to accelerate digital transformation (Politburo, 2019); The Prime Minister of Vietnam has issued Decision No. 749/QĐ-TTĐ approving the "National Digital Transformation Program to 2025, with orientation to 2030" (Prime Minister of Vietnam, 2020). Nhiều nghiên cứu cho thấy, chuyển đổi số ở quốc gia này tuy mới diễn ra trong vài năm nhưng đã có tác động sâu rộng, bao trùm mọi ngành nghề, lĩnh vực kinh tế - xã hội, góp phần tăng năng suất lao động, chuyển đổi mô hình hoạt động, kinh doanh theo hướng đổi mới sáng tạo, từ đó nâng cao năng lực cạnh tranh của đất nước (Lan Anh, 2022). Therefore, the Prime Minister of Vietnam issued Decision No. 505/QĐ-TTĐ on National Digital Transformation Day (Prime Minister of Vietnam, 2022). Accordingly, October 10 every year is National Digital Transformation Day.

Moha is an agency under the Government of Vietnam, performing the state management function in the following sectors and fields: Administrative organization, state non-business; local government, administrative boundaries; officials and public servant; training and fostering public servant, associations and non-governmental organizations; emulation and reward; religion; clerical and archival; youth working and state management of public services by the law. To implement the digital transformation plan, the Minister of Moha issued Decision No. 151/QĐ-BNV dated February 25, 2021, approving the Digital Transformation Plan of Moha to 2025, with an orientation to 2020. 2030, and simultaneously developing programs and implementation plans for each year (Moha Minister, 2021). The pillars of digital transformation at the Moha include 1. Transformation raises awareness. 2. Improve the legal environment. 3. Development of digital infrastructure and digital platforms. 4. Digital data development. 5. Ensure network safety and security. 6. Human resource development, and 7. International cooperation, research, development, and innovation in the digital environment (Anh Cao, 2022).

In general, digital transformation is "a process of total and comprehensive change of individuals and organizations in the way of living, working and production methods based on digital technologies" or more briefly: "Digital transformation is the transformation of operating models based on digital technology and digital data" (MIC, 2021). In essence, digital transformation

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is the next development step of information technology application: Normally, the application of information technology does not change existing processes or existing models; when the application of information technology at a high level leads to changes in procedures or operating models, it is called digital transformation (MIC, 2021). There is a difference between the application of information technology and digital transformation. Accordingly, “the application of information technology is to digitize existing processes, according to existing operating models, to provide existing services, while digital transformation is the digitization of an entire organization, a change in a new process, a new organizational model, a service delivery method or a new service delivery” (MIC, 2021). For example, with the form of dealing with work in state agencies: 1) public servant handle work on paper and communicate directly (traditional method); 2) public servant handle work by drafting documents, printing, signing and issuing documents, and exchanging directly (using information technology); 3) public servant handle work by drafting, editing, and signing online in the Office system; an online exchange in the environment using digital technology (digital transformation). In this case, digital transformation has created a new way of handling work - online- replacing the traditional form of solving state agencies' work.

In the public sector, digital transformation aims to create a common place for the public and private sectors to work together and drive initiatives across the country by providing business support and matching, such as through popular promotional activities (Katada, 2020; Shirakawa, 2021). Digital transformation in the public sector also affects all areas of social life. To advance the digital transformation strategy, priorities should be followed when considering existing country conditions (Eckstein, Menahem-Carmi, & Sumkin, 2021). For example, switching arguments reduce bribery, tax evasion, tax reduction, and public spending (Okunogbe & Pouliquen, 2022; Axelrad Danziger, 2021). Digital transformation to bridge the gap - delivering public and social products remotely to enable service delivery to the entire population, especially the periphery. For example, distance learning and telemedicine services (Cecchini & Scott, 2003). There is an increasingly urgent need for digital transformation in the public sector so citizens and businesses can compete adequately (Ciborra, 2005; Chien & Thanh, 2022). Creativity has become one of the latest buzzwords in the literature regarding how citizens contribute to public service delivery (Brandesen, Steen, & Verschuere, 2018). In the public sector, digital transformation also makes public governance more efficient; it fundamentally changes the way citizens and service users provide input into public services (Linders, 2012; Noveck, 2015).

Digital transformation is the changes that digital technology causes or affects all aspects of human life (Stoterman & Fors, 2004). The capacity of public servant in digital transformation is crucial for successful digital transformation in the public sector (Hague & Williamson, 2009), and Vietnam is no exception (Lan Anh, 2022). Previous studies have also found evidence of a positive and significant relationship between public servant' competence and their performance in digitally transformed countries in the booming public sector (Mergel, 2017; Clarke, 2017). The successes of digital transformation in the public sector in Vietnam have only been discovered in many qualitative studies and reports of the Vietnamese government. This fact requires that more quantitative research on digital transformation in the Vietnam public sector is needed to find statistical evidence for research results found in qualitative studies. To further confirm the results of previous studies and fill in the theoretical gaps on digital transformation in the public sector, this study aims to examine the impact of the factors of the digital transformation capacity of the public sector. Specifically, consider the effect of the digital transformation capacity on job performance in Moha. This research result also provides more scientific evidence for the governments of Vietnam and Moha to develop appropriate human resource development policies to meet digital transformation requirements in the public sector and administrative reform in the short term.

### LITERATURE REVIEWS

#### ***Digital Transformation:***

Digital transformation is now commonly understood as such use of information and communication technology, where not trivial automation is carried out but essentially creates new possibilities in business, government, business, public people's lives, and society (Allan Martin, 2008). Digital transformation is more than simply digitizing resources and leads to value and revenue generated from digital assets (McDonald & RowsellJones, 2012). Digital transformation is the deliberate and ongoing digital evolution of a company, business model, ideation process, or methodology strategically and tactically (Mazzone, 2014). Digital transformation can be defined as the modification (or adjustment) of business models resulting from the dynamic rate of technological progress and innovation that triggers changes in consumer behavior society (Kotarba, 2018) as a result of the digitization and digitalization of economies and societies (Leshner, Gierten, Attrey, Carblanc, & Ferguson, 2019), is a process in which technology digital plays a central role in creating and underpinning the disruptive changes taking place in industry (area) and society (Kozarkiewicz, 2020).

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Digital transformation is the consistent connection of all sectors of the economy and players' adjustment to the new reality of the digital economy. Decisions in networked systems include exchanging and analyzing data, calculating and evaluating options, initiating actions, and delivering consequences. Digital transformation is the use of data and digital technology to transform all aspects of our socio-economic life, reshaping how we live, work and relate to each other.

### *Digital transformation in the public sector:*

Digital transformation takes place not only in the private sector but also in the public sector. In the private sector, digital transformation is understood as using new digital technologies, such as social media, mobile phones, analytics, or embedded devices, to enable innovation. Such as enhancing customer experience, streamlining operations, or creating new business models (Fitzgerald, Kruschwitz, Bonnet & Welch, 2013). Digital transformation in the public sector is not just a process of restructuring through technology or online services but an intensive digital transformation of all workplaces that requires the early integration of digital technology into services and decision-making (Hague & Williamson, 2009).

At the heart of digital transformation efforts in the public sector is transforming the paradigm from designing and delivering public services based solely on internal logic to orienting public administration policies with external reason, openness, and co-production of public services of the same design. Previous efforts have made it difficult for public administrations to accept or even deny public services, so people have opted to use similar services instead of online ones. While these digitization efforts are intended to contribute to time and resource savings, they continuously replicate existing offline processes without rethinking mission support or redesigning services for citizens willing to accept them as a trusted alternative. In addition, new forms of agility and responsiveness in delivery services are emerging that focus on co-design and co-production approaches with the public (Mergel, 2016).

Like private sector digital transformation, public sector digital transformation is a wave of digital governance where the whole process of reviewing and modifying existing services, rather than simply digitalization. At the heart of these forms of co-creation are human-centered design approaches that focus on bringing user needs into the service design process to deliver shared value (Mergel, 2017; Sanders & Stappers, 2008). In the public sector, these co-design approaches are now being implemented as part of digital services teams' work (Mergel, 2017; Clarke, 2017).

### ***Digital transformation capacity of public servant:***

The core of digital transformation is the digitization of the repetitive activities of the complete network of all sectors of the economy and society, as well as the ability to collect relevant information and analyze and transform it—this information into action. Changes bring advantages and opportunities but create new challenges (Schweer & Sahl, 2016). Digital transformation capacity cannot be readily determined due to the variable nature of the phenomenon (Dawes, 2009). Therefore, public and private organizations must enhance the digital transformation capacity of their workforce to bring efficiency and comprehensiveness, providing borderless, transparent, personalized, user-friendly digital services, and user-friendly (Fukuyama, 2005). The importance of public servant' digital transformation capabilities stemming from digital transformation forces the empowerment of individuals, significantly increasing opportunities for collectives to collaborate in the production and allowing public services to be personalized and tailored to their needs—more demand. Therefore, digital production cooperation is expected to increase state legitimacy and trust in the state. At the same time, conflicting interests and divergent values among stakeholders, the inability of data and algorithms to reflect societal complexity, the potential for technology to spread unevenly, and other factors. Another factor that makes digital co-production one is essentially the ambiguous, open-ended and controversial process (Cardullo & Kitchin, 2019).

The digital transformation capacity of public servant is the most significant determinant of digital transformation in the public sector because of the increasing ability of governments to collect, understand and use vast amounts of data through the media. Social media, sensor networks, data analytics, and machine learning solutions can reduce the need and role of civic activism in public service (co-)production. At the same time, empirical evidence demonstrating the expected positive benefits of digital co-production remains scarce and more dependent on broad citizen participation and inter-institutional cooperation than a people-focused co-production (Steen & Tuurnas, 2018).

Effective digital transformation in the public sector demonstrates a high degree of citizen empowerment to make a difference in critical areas such as government and governance, education, the economy, jobs, and small industries and organizations, and how it can be used for national development, citizen empowerment, anti-corruption, poverty and government transformation (Trecena & Abides, 2020). The digital transformation capacity of public servant needs to be met. It is reflected in the public servant' understanding of the features of the government system, such as social web, user-generated content, distribution, and use of data—open data and network effects through greater user engagement (Boughzala, Janssen & Assar, 2015). public servant must understand technology to serve actual citizen participation well (Morrison, 2016).

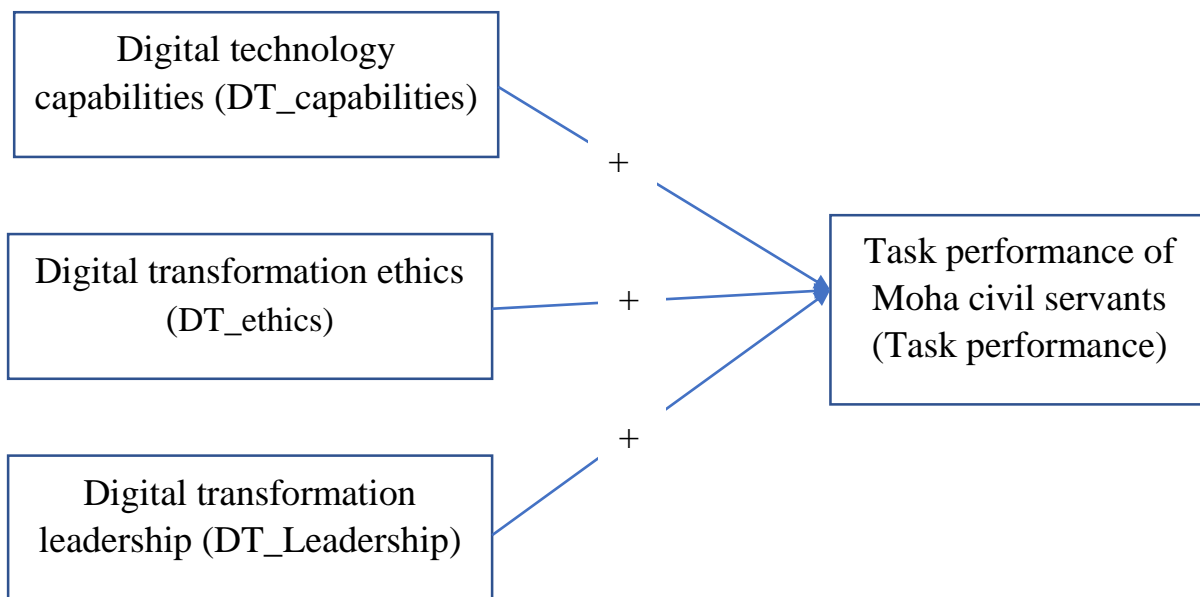


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The digital transformation capacity of public servant needs to be accompanied by specific organizational digital transformation roadmaps (Boughzala, Janssen, & Assar, 2015; Ombudsman.gov.ph, 2013). The incompetence of public servant is the most significant barrier to digital transformation in the public sector. The success of digital transformation depends on the level of understanding and digital transformation capacity of public servant. The ability of public servant to digitally transform is reflected in the awareness of existing programs and policies to facilitate digital adoption (Alampay, 2013). They understand the plan regarding the methodology used in identifying different information systems and identifying gaps in government information systems and appropriate technology solutions (Deloitte, 2020). ), and belief in digital technology as an essential tool for economic growth and development (Deloitte, 2020).

From the research overview, the authors have built a research model about what, as shown in Figure 1 below:

Figure 1. The Research Model



In the above research model, the independent variables DT\_capabilities, DT\_ethics, and DT\_Leadership affect the dependent variable Task performance to different extents. The researcher will demonstrate these relationships.

## HYPOTHESES

Based on the research model, the following hypotheses have been formed:

- H1. Digital technology capabilities have a positive and meaningful impact on the task performance of Moha public servant.
- H2. Digital transformation ethics have a positive and meaningful impact on the task performance of Moha public servant.
- H3. Digital Transformation Leadership have a positive and meaningful impact on the task performance of Moha public servant.

## RESEARCH METHOD

The study was conducted in Moha in May 2022. Participating in the survey are Moha public servant. The research team used qualitative methods through in-depth interviews with public management researchers and psychologists to build research scales and questionnaires. The questionnaire was constructed based on literature reviews and comments from 6 experts, including two senior leaders, two professors of psychology, and two professors of jurisprudence. The questionnaire consists of 2 parts. Part 1 collects demographic information of research participants, such as age, gender, ethnicity, religion, and experience. Part 2 contains research participants' knowledge of digital technology capabilities, digital transformation ethics, digital transformation leadership, and task performance of Moha public servant. The items of the task performance factor are partially inherited from the questionnaire developed by Ramos-Villagrasa et al. (2019). A language expert contributed to this version to create a final version. This final version was pre-tested on 40 demographically representative participants of age, gender, ethnicity, religion, and experience. After the initial survey data was available, the questionnaire was slightly edited to make it easier to understand. The final version was finally completed using the official survey—details of items in the questionnaire (Table 1).

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**Table 1. Items in the questionnaire**

Items	Factors
<b>DT_capabilities</b>	<b>Digital technology capabilities</b>
<i>DT_capabilities1</i>	data analysis skills
<i>DT_capabilities2</i>	digital communication skills
<i>DT_capabilities3</i>	network security skills
<i>DT_capabilities4</i>	Using software skills
<i>DT_capabilities5</i>	Creative skills in the digital environment
<b>DT_ethics</b>	<b>Digital transformation ethics</b>
<i>DT_ethics1</i>	Responsibility and ethics of information
<i>DT_ethics2</i>	Be active with multimedia social media
<i>DT_ethics3</i>	Aware of respect for privacy in debate
<i>DT_ethics4</i>	Support autonomous participation in digital society
<b>DT_Leadership</b>	<b>Digital Transformation Leadership</b>
<i>DT_Leadership1</i>	Have clear ideas about the structures and processes required for digital transformation
<i>DT_Leadership2</i>	Understanding of argument passing in the field of personal management
<i>DT_Leadership3</i>	Motivate your employees for digital transformation
<i>DT_Leadership4</i>	Updating digital transformation knowledge and skills
<b>Task performance</b>	<b>Task performance of Moha public servant</b>
<i>Task performance1</i>	I managed to plan my work so that I finished it on time
<i>Task performance2</i>	I kept in mind the work result I needed to achieve
<i>Task performance3</i>	I was able to set priorities
<i>Task performance4</i>	I was able to carry out my work efficiently
<i>Task performance5</i>	I managed my time well

The questionnaire was sent directly to the respondents using a non-random sampling method. As a result, 200 validators were obtained, achieving a response rate of 100%. The demographics of the study participants (Table 2).

**Table 2. Demographic characteristics of survey participants**

		Education					
		<i>College Bachelor</i>		<i>University Bachelor</i>		<i>Postgraduate</i>	
		N	% of N	% of N	% of N	N	% of N
Gender	Male	55	42.0%	28	21.4%	48	36.6%
	Female	33	47.8%	10	14.5%	26	37.7%
Age	< 30 years old	16	55.2%	3	10.3%	10	34.5%
	< 50 years old	15	44.1%	10	29.4%	9	26.5%
	< 30 to 40 years old	37	39.4%	21	22.3%	36	38.3%
	<40 to 50 years old	20	46.5%	4	9.3%	19	44.2%
Ethnic	Ethnic minorities	31	53.4%	8	13.8%	19	32.8%



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	Kinh people	57	40.1%	30	21.1%	55	38.7%
Religion	Buddhism	63	43.8%	30	20.8%	51	35.4%
	Catholic, Protestant	25	44.6%	8	14.3%	23	41.1%
Position	Senior manager	20	52.6%	7	18.4%	11	28.9%
	Middle managers	39	40.2%	21	21.6%	37	38.1%
	Public servant	29	44.6%	10	15.4%	26	40.0%
Experience	Dưới 5 năm	16	53.3%	6	20.0%	8	26.7%
	Trên 10 năm	38	48.7%	15	19.2%	25	32.1%
	Từ 5 đến 10 năm	34	37.0%	17	18.5%	41	44.6%

### RESEARCH RESULTS

SPSS software version 20 analyzed the scale's reliability, exploratory factor analysis, correlation analysis, and regression analysis. The analysis results suggest removing and merging some observed variables to help the scale to evaluate concepts more accurately.

#### *Analyzing the Reliability of the Scales:*

The data through Cronbach's Alpha reliability coefficient to identify and remove junk variables to avoid creating misleading factors when analyzing exploratory factor analysis. Cronbach's Alpha coefficient has a variable value in the interval [0,1]. Therefore, if a measure has a correlation coefficient of total Corrected Item - Total Correlation  $\geq 0.3$ , that variable meets the requirements (Cronbach, 1951; Taber, 2018). The verification criterion is that Cronbach's Alpha coefficient must be greater than 0.6, and the correlation coefficient of the sum variable in each scale must be greater than 0.3 (Hair, Black, Babin, & Anderson, 2010). Table 3 shows that the rankings of the factors are all standard. Therefore, all their scales are reliable and used for subsequent factor analysis.

**Table 3. Summary of Reliability and Relative Minimum Variables of Scales**

Factor	Number of variables observed	Reliability coefficients (Cronbach Alpha)	The correlation coefficient of the smallest total variable
DT_capabilities	5	0.831	0.597
DT_ethics	4	0.797	0.563
DT_Leadership	4	0.770	9.539
Task performance	5	0.791	0.522

After testing Cronbach's Alpha, the author uses exploratory factor analysis (EFA) to preliminary evaluate the scales' unidirectional, convergent, and discriminant values. EFA was used by extracting the Principal Components Analysis Factor and Varimax rotation to group the factors. With a sample size of 200, the factor loading factors of the observed variables must be greater than 0.5; variables converge on the same and are distinguished from other factors. In addition, the Kaiser-Meyer-Olkin coefficient (KMO) is an index used to consider the suitability of factor analysis to be within  $0.5 \leq KMO \leq 1$  (Cerny & Kaiser, 1977; Kaiser, 1974). The analysis results in Table 3 show that all factor loading coefficients of the observed variables are greater than 0.5, Bartlett test with Sig meaning. = 0.000 with KMO coefficient = 0.928. All 18 items in the EFA analysis were extracted into four factors with Eigenvalues  $>1$  and Cumulative variance percent = 59.8%. Thus, the research model consisting of 3 independent variables and one dependent variable is used for linear regression analysis and subsequent hypothesis testing.

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**Table 3. Exploratory factor analysis**

Rotated Component Matrix <sup>a</sup>				
	Component			
	1	2	3	4
DT_capabilities3	.754			
DT_capabilities1	.707			
DT_capabilities5	.699			
DT_capabilities4	.674			
DT_capabilities2	.654			
Task_performance4		.710		
Task_performance2		.691		
Task_performance5		.657		
Task_performance1		.621		
Task_performance3		.593		
DT_ethics2			.770	
DT_ethics4			.719	
DT_ethics3			.687	
DT_ethics1			.614	
DT_Leadership2				.759
DT_Leadership1				.726
DT_Leadership4				.697
DT_Leadership3				.504
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 7 iterations.				

### Pearson correlation analysis

The author uses Pearson correlation analysis to analyze the correlation between quantitative variables. Table 4 shows that, at the 5% significance level, the correlation coefficient indicates that the relationship between the dependents and independent variables is statistically significant (Sig. < 0.05). The magnitude of the correlation coefficients ensures that multicollinearity does not occur. Therefore, the regression analysis in the next step to check the relationship between the variables is valid.

**Table 4. Pearson correlation analysis results**

Correlations					
		Task_performa nce	DT_capabilities	DT_ethics	DT_Leadership
Task_performance	Pearson Correlation	1	.618**	.558**	.574**
	Sig. (2-tailed)		.000	.000	.000
	N	200	200	200	200
DT_capabilities	Pearson Correlation	.618**	1	.563**	.535**
	Sig. (2-tailed)	.000		.000	.000

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	N	200	200	200	200
DT_ethics	Pearson Correlation	.558**	.563**	1	.590**
	Sig. (2-tailed)	.000	.000		.000
	N	200	200	200	200
DT_Leadership	Pearson Correlation	.574**	.535**	.590**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	200	200	200	200
**. Correlation is significant at the 0.01 level (2-tailed).					

### Regression Analysis:

The results of multivariable linear regression analysis (Table 5) on the relationship between 3 independent variables, DT\_capabilities, DT\_ethics, DT\_Leadership, and 1 dependent variable Task\_performance, have statistical significance. The analysis results also give us the model's coefficient of determination ( $R^2 = 0.487$ ), proving that the linear regression model is suitable for the data set = 0.487 %. The regression analysis showed that the VIF coefficient of 3 independent variables < 0.75, the ANOVA test of the model has a significant level of 95% (p.value = 0.000), the Durbin-Watson test coefficient = 2. This result shows that the regression model is valid for interpreting study results (Hair, Black, Babin, & Anderson, 2010).

**Table 5. The results of multiple linear regression analysis**

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.595	.180		3.295	.001		
	DT_capabilities	.345	.061	.366	5.642	.000	.620	1.612
	DT_ethics	.182	.063	.198	2.911	.004	.566	1.767
	DT_Leadership	.255	.065	.261	3.930	.000	.591	1.692
a. Dependent Variable: Task_performance; $R^2 = 0.487$								

Table 5 shows that all hypotheses are accepted with 95% confidence. Specifically, the variable DT\_capabilities has the most significant impact on the Task\_performance variable with  $\beta = 0.345$ ; the second is the DT\_Leadership variable with  $\beta = 0.255$ , and the lowest is the DT\_ethics variable with  $\beta = 0.182$ . Furthermore, this result shows that if other conditions are excluded, the increase or decrease of the variables DT\_capabilities, DT\_ethics, and DT\_Leadership all affect the variable Task\_performance.

### DISCUSSION AND CONCLUSION

The firstly. Research results (table 5) show that digital technology capabilities have a positive and meaningful impact on the task performance of Moha public servant with a regression coefficient  $\beta = 0.345$  and a significance level of 95% (p.value = 0.000). With this result, hypothesis H1 is accepted. Furthermore, this result further confirms that when Vietnamese public servant are equipped with modern tools, their job satisfaction and performance will increase (Thanh, Thuy, Hoa, & Thien, 2022; Nguyen, Tran, & Tran, 2022). The results of this study are similar to those found in previous studies outside of Vietnam. Digital transformation in the public sector by applying artificial intelligence (AI), the Internet of Things (IoT), networks and sensors, and solutions to improve user interface and user experience has the effect of improving employee performance and customer satisfaction (Clain, 2018).

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Digital transformation forces public servant to improve their digital transformation skills and improve their digital transformation skills and to share expertise, coordinate policy and enhance incident response cooperation (Daron & Pascual, 2017).

*Secondly*, research results (Table 5) show that the digital transformation factor has a positive and meaningful impact on the task performance of Moha public servant with regression coefficient  $\beta = 0.182$  and a significance level of 95% (p.value = 0.004). With this result, hypothesis H2 is accepted. The results of this study further confirm that digital transformation using untethered AI to promote the development of human-centered, socially accepted, and adequately used solutions should be There must be changes in the awareness and ethics of digital transformation of employees (Clain, 2018). The aspect of ethical digital transformation, as well as the attitude towards the digital transformation of public servant, is one of the conditions for securing a database of questions that have been asked considering the main trends of the conceptual aspects. Concepts, applications, and operations are available in workplace digitization, workflow management, and process transparency (Winner, 2002).

*Thirdly*. Research results (Table 5) show that digital transformation leadership has a positive and meaningful impact on the task performance of Moha public servant with a regression coefficient  $\beta = 0.225$  and a significance level of 95% (p.value = 0.000). With this result, hypothesis H3 is accepted. The results of this study further confirm that digital transformation leadership has a positive and significant impact on digital transformation efficiency and employee performance. Digital transformation leadership supports innovations, innovations, and disruption of the media business model to digital (Bresniker, 2018) to serve economic growth, realize a better society, a human-centered society, and solve social problems (Salsberg, 2010). Digital transformation leadership determines the continuous review and enactment of digital policies and the contribution and cooperation with the international community (Clain, 2018), improving the effective working environment that technology provides (Trecena, 2019).

*Finally*. The research results show that in the Vietnamese context, particularly in the public sector, where the representative of this study is a civil servant of Moha, the digital transformation capacity of public servant has the most significant impact on their work efficiency. This result implies that the Vietnamese government needs policies to improve the digital transformation capacity of public servant. This study also shows that digital transformation leadership of public servant has the highest impact on their work performance. Meanwhile, many previous studies have proven digital transformation leadership is crucial in the digital transformation process in the public sector. Therefore, the Vietnamese government needs to improve public servant' digital transformation leadership capacity to improve its impact on digital transformation efficiency and work performance.

### LIMITATIONS

As with other empirical studies, there are limitations to this study that should be considered when discussing the results. Firstly, our survey method reflects the respondents' subjective feelings towards the survey questions. Therefore, the data obtained has inherent disadvantages that are unavoidable in the surveys (Thanh, Tung, Thu, Kien, & Nguyet, 2021). This study took place over a short period. Cross-sectional data do not allow for a dynamic assessment of changes in students' intentions and behaviors related to their university admission, which may affect their applicability (Xin, Liang, Zhanyou, & Hua, 2019). Future research should combine cross-sectional analysis and long-term studies.

The purposeful sampling method has certain limitations, not fully reflecting population characteristics (Strong et al., 2018). In addition, our survey was conducted in a Vietnamese political and cultural context and therefore required more general statements by applying the development research model and research conclusions to other countries and cultures (Sun et al., 2012; Thanh, Hiep, & Tung, 2021). Future research should follow the approach of digital transformation knowledge, skills, and attitudes of public servant to obtain more complete results. Future research should also include in the model regulatory variables such as political culture, differences in education, ethnicity, and religion. The model's coefficient of determination ( $R^2 = 0.487$ ) leads to a decrease in the significance of the model. Therefore, in further studies, it is necessary to increase the sample size to improve the model.

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### CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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## **Aqua Therapy**



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### **INTRODUCTION**

Fishes are the most attractive and relaxing species ever in the world. It gives the happiness and they are highly energetic by their fast and curious movements in the water. Watching fishes were the amusing and fun experience by young and old .It believes that fishes are the sources of positive energy flow and also helps in calm and relaxing effect .Scientifically , it proven that hypnotic effect is produced in the brain by watching fishes that swims front and back. It also helps as a natural therapeutic tool for the certain physical and mental disorders.

### **DEFINITION**

Fish pedicure therapy is the one of the animal assisted therapies, where it is interacting with the fish. It promotes the feeling of well -being and positive effect on the mental health of the person.

### **HISTORY**

The term fish aqua therapy was coined in late 1990's.In earlier days ,watching fishes were effective in the patients suffering with high blood pressure ,depression ,anxiety and Alzheimer's diseases. Recently more researches have proven that fish can produce a positive effect on person's mental health and physical health.

## Aqua Therapy



### What research says?

A research in environment and behavior journal states that people spends time in watching fish tanks and aquarium could see drastic improvements in mental and physical well-being.

A team of experts from National Marine Aquarium found that people watching aquarium or deep water displays led to reduction in heart rate and blood pressure, also viewing increased number of fishes holds the attention of the people and enhance their mood.

**Beck**, Director of the Centre of Human-Animal bond at Purdue University, states that human have the genetic disposition towards the nature and that is the preferences of seeking out the natural environment by themselves .That's how ,people naturally seek on life like processes and life on it and hence this seeking our natural environment enhances the positive effect within the mind and body.

**Cracknell & Lead** researchers conducted the study that watching fish tanks or aquarium displays are associated with calming effects in patients at some surgeries and in waiting rooms. It evidenced that doses of exposure to deep water setting or aquarium have a positive effect in people's well- being .Researchers states that aquarium were step ahead for the place of calm and relaxation .It also states that larger numbers of fishes are associated with greater effect in the mood and well-being.

Watching fishes in the tank swimming back and forth develops hypnotic effect in the brain, innately produces the calming effect and also ease the muscle tension.

A recent study states that aqua therapy was given to patients in pre-electro convulsive therapy area. The results revealed that about 12% of less anxiety was experienced by the patients in the presence of aquarium.

Edward, conducted a study that daily exposure to aqua therapy involves the nutritional status of the Alzheimer's patients. About in 16 weeks of aqua therapy, 21% more food they consume when comparing to before .

### Indications of aqua therapy:

- ✓ Elders suffering from Alzheimer's disease.
- ✓ Patients undergone surgery to reduce the pain.
- ✓ Hypertensive patients
- ✓ Stress patients
- ✓ Anxiety patients
- ✓ Children with autism
- ✓ Children with ADHD.

### What happens in brain with Aqua therapy?

Research conducted states that exposing the people to observe fish tank for 15 minutes each day is beneficial in stimulation of serotonin neuro -transmitters which leads to increased production of endorphin. Endorphin helps in body's natural feel –good chemistry .It also produces the feeling of happiness .That leads to develop the hypnotic calming effect. Hence these hormones reduce the anxiety level of the people and increased the status of well-being.

## Aqua Therapy

Edward, conducted a study with Alzheimer's patients. The study states that aqua therapy stimulates the cognitive function in the brain. It promotes about 30% of the attentiveness and also improves the short term memory in the Alzheimer's patients. It also pacifies the disruptive behavior of the Alzheimer's people.

### Benefits of Aqua Therapy:

- ✓ Reduces heart rate
- ✓ Lowers the blood pressure
- ✓ Decreases the muscle tension
- ✓ Improves mood
- ✓ Reduces chronic pain
- ✓ Increases relaxation
- ✓ Reduces stress
- ✓ Enhances calm effects
- ✓ Reduces anxiety
- ✓ Helpful for Alzheimer's people
- ✓ Improves productivity at work
- ✓ Enhances the child's learning and research skills
- ✓ Improves sleep quality
- ✓ Improves attention and creativity

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## Responsibility, Inner Leadership, and Learning Outcomes of Sports Science Students



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**ABSTRACT:** The purpose of this research was to describe inner leadership and responsibility possessed by sports science students at the Faculty of Sports Science at Cenderawasih University. A quantitative descriptive approach was chosen to achieve the goal. The instrument used in this research was a questionnaire. The questionnaire consists of the Leadership Questionnaire (AJK) which consists of 22 statement items and the Responsibility Questionnaire (ATJ) which consists of 14 statement items. A total of 78 sports science students (male = 49, female = 29) at the Faculty of Sports Science at Cenderawasih University participated in this study. The results of the study found (1) 56.41% of sports student leadership was in the medium category, 41.03% were in the high category, and only 2.56% were in the low category, (2) 52.56% of the responsibilities of sports science students were in a low category, followed by 37.18% in the medium category, and only 10.26% in the high category, (3) there was no difference between male and female sports students in terms of leadership and responsibility. In conclusion, the inner leadership of sports science students tends to be in the fairly high category, while responsibility is in the low category.

**KEYWORDS:** responsibility, inner leadership, learning outcomes, sports science students

### INTRODUCTION

Good national and social life requires leaders with leadership qualities. Additionally, the policies and rules that apply in a place are one of the determining factors for the moral level of citizens or society. Currently, society is being hit by a moral and leadership crisis, so there needs to be an effort to instill leadership in the younger generation (students) (Hasanah, 2019). Inner leadership is an attitude that can develop self-potential and be able to place oneself and think openly towards oneself and the environment (Herlina et al., 2018). Someone who has inner leadership is characterized by the ability to utilize their abilities to influence members who are led (Oktavianti et al., 2021).

Based on the view of management science, the inner leadership in a leader has a central role that is useful for leading, directing, and motivating members who are led to achieve the goals that have been set (Sarkowi, 2017). Therefore, the soul of leadership is the essence of management (Hasanah, 2019). The same thing was conveyed by a well-known figure, Roger D. Lee, who stated briefly: "leadership is vital to success" (Esomar & Sadubun, 2020). From the achievement of sports perspective, a coach who has good leadership skills can read individual characteristics, for example, perseverance, intelligence, assertiveness, and independence (Gordon, 2009). The ability to read individual characters is useful for placing someone in a position according to ability, so that team goals can be achieved. Robert House, a researcher who focuses on leadership, states that leadership will be effective when the leader has charisma, self-confidence, high morality, and can influence members (Hasanah, 2019). The inner leadership of a leader will theoretically emerge because of a sense of responsibility that is borne (Anismadiyah et al., 2020).

Responsibility is self-effort to complete the work or task assigned (Aisyah et al., 2020). In the 2003 National Education System Law number 20 it is explained that one of the goals of national education is to develop the potential of students who are responsible. This makes responsibility a variable that is considered important. A campus is a place for students to become responsible human beings (Mustapha et al., 2020). Through several programs such as increasing professionalism and self-regulation, it is hoped that responsibility will increase (Han, 2022). An attitude of responsibility is seen as an important attitude for students to have to support the quality of learning on campus (Latifah & Bariyah, 2019). Students who have an attitude of high responsibility are directly proportional to learning outcomes, and vice versa (Rahmayanti & Lubis, 2013). Responsibility is influenced by the supports and obstacles that exist in the environment (Yough et al., 2020).

## Responsibility, Inner Leadership, and Learning Outcomes of Sports Science Students

Today, "responsibility" and "leadership" in Papua are being discussed publicly. This was due to chaos when Papua hosted the 20th National Sports Week (PON) (Putra & Ita, 2019; Guntoro & Putra, 2021). PON is the biggest sporting event in Indonesia (Kogoya et al., 2022). The chaos is the cause of the two constructs above being questioned by the public. Apart from that, studies on "inner leadership," "responsibility" and "student sports science learning outcomes" in Papua have not been carried out much. Based on observations made through scientific article searches, researchers only found articles related to the responsibilities of non-Papuan sports science students (Musa et al., 2019). Other scientific articles, populations, and samples are not sports students but students in other fields (Suyidno et al., 2017; Aisyah et al., 2020; Farida & Anjani, 2019; Marditama, 2020). Research conducted in the Papua region, Indonesia, tends to discuss athletes (see for example Putra et al., 2021a; Mangolo et al., 2021; Putra & Kurdi, 2020; Sutoro et al., 2020; Putra et al., 2021b; Wandik et al., 2021; Guntoro & Putra, 2022; Putra & Guntoro, 2022) and sports events (Guntoro et al., 2022a; Guntoro et al., 2022b; Guntoro et al., 2022c).

In addition, studies conducted on sports science students, especially in Papua, are still limited. For example, research only examines sports motivation (Putra, 2020), fluid intake and sports science student achievement (Sinaga et al., 2022), learning styles, achievement motivation, locus of control, and academic self-concept (Putra, 2017), locus of control for sports science students (Putra et al., 2021), and interest in petanque sports (Samoling et al., 2022). The three constructs above "inner leadership," "responsibility" and "student sports science results" have never been studied. The three variables above are believed to be very important in the lecture process on campus. Therefore, this study aims to investigate the leadership, responsibility, and learning outcomes of sports science students in Papua, Indonesia.

### METHOD

The method used in this research is a quantitative descriptive method. This method is used to describe the variables of leadership and responsibility possessed by sports science students. The subjects involved in this study were students from semesters 1, 3, 5, 7, 9, 11, and 13. The number of students who participated was 111 subjects consisting of 33 subjects for validity and reliability tests and 78 subjects (49 male and 29 female) to test the variables of leadership and responsibility. The instrument used in this research is a questionnaire. The questionnaire used in this study consisted of two questionnaires, namely the Leadership Questionnaire (AJK) and the Responsibility Questionnaire (ATJ). AJK is a questionnaire that the researchers developed themselves, consisting of 6 factors and 28 questions. Testing the validity and reliability involved 33 students dropping 6 questions. Thus, only 22 valid and reliable questions were left. The AJK validity value is between .325 and .805 and the reliability value is between .904 and .914. These questions have 4 alternative answers in the form of a Linkert scale. The scales are (1) very inappropriate, (2) not appropriate, (3) appropriate, and (4) very appropriate. Example of a statement in AJK for item number 1: "I am active in class discussions." Item number 6: "When there are friends who are at odds, I try to reconcile them." Whereas for ATJ the author adopts Faozi (2018) which consists of 28 statement items with five alternative answers using a Likert scale, from very inappropriate (1) to very appropriate (5). However, ATJ has not been tested for validity and reliability in the field, so the researchers conducted a test. The ATS validity and reliability test involved 33 students. The results of the validity and reliability tests showed that 14 ATJ items were declared valid and reliable. The validity value of ATJ ranges from .470 to .892 and the reliability value is between .922 to .939. Data collection was carried out online by distributing the Google Form link to students via WhatsApp. This is done to comply with health protocols from the government and minimize the spread of COVID-19. The data analysis technique used is descriptive statistics and t-test. All analyzes will be assisted with the IBM SPSS v. program.

### FINDING

Based on the data analysis that has been done, the results are presented in the following table:

**Table 1. Distribution of amounts and percentages by category**

Variable	Category	Frequency	Percentage (%)
Inner leadership	High	32	41,03
	Moderate	44	56,41
	Low	2	2,56
Responsibility	High	8	10,26
	Moderate	29	37,18
	Low	41	52,56

## Responsibility, Inner Leadership, and Learning Outcomes of Sports Science Students

The results of the data analysis in table 1 show the level of leadership and responsibility based on three categories. As many as 56.41% of sports science students have inner leadership in the medium category, 41.03% are in the high category, and only 2.56% are in the low category. while the responsibility variable from the analysis showed that 52.56% of sports science students were in a low category, followed by 37.18% in the medium category, and only 10.26% had a high category.

**Table 2. Results of descriptive analysis and normality test (n = 78)**

Variable	M	SD	Min	Max	KS
Inner leadership	63.21	9.45	34	82	.090 <sup>n</sup>
Responsibility	34.69	12.07	14	70	.087 <sup>n</sup>
Study performance	3.05	4.52	2.69	3.65	.093 <sup>n</sup>

Note: M: Mean, SD = Standard deviation, Min = Minimum, Max = Maximum, KS = Kolmogorov-Smirnov, <sup>n</sup> =  $p > .05$ .

The results of the descriptive analysis and normality test in table 2 show that overall, the average value of the inner leadership for sports science students is 63.21 with a minimum score of 34 and a maximum of 82. For the responsibility variable, an average value of 34.69 is obtained with a minimum value of 14 and a maximum of 70. Results of the normality test on these two variables showed that the data were normally distributed ( $p > .05$ ).

**Table 3. T-test results and correlation (Male = 49, Female = 29)**

Variable	Gender	M	SD	t	r		
					1	2	3
(1) Inner leadership	Male	63.22	10.06	.023 <sup>n</sup>	-	.657*	.747*
	Female	63.17	8.49				
(2) Responsibility	Male	34.57	12.8	.834 <sup>n</sup>	-	.682*	-
	Female	33.21	10.77				
(3) Study performance	Male	3.13	4.12	.752 <sup>n</sup>	-	-	-
	Female	3.01	4.46				

Note: M: Mean, SD = Standard deviation, t = t-test value, r = correlation coefficient, \* =  $p < .05$ .

The results of the different tests in table 3 based on gender did not show any differences in sports science students, both in the inner leadership variable, the responsibility variable, and learning outcomes. The results of the correlation test showed that there was a relationship between leadership and responsibility ( $r = .657$ ), leadership and learning outcomes ( $r = .747$ ), and responsibility and learning outcomes ( $r = .682$ ).

## DISCUSSION

As many as 56.41% of student leadership souls are in the medium category, and 41.03% are in the high category. This indicates that in general sports students have pretty good inner leadership. Good leadership has a goal for the greater good and is created through complex and multifaceted constructions that cannot be separated (Wheeler et al., 2022). The indicators that become a reference in leadership are competence, empathy, integrity, assertiveness, and authority (Pitaloka & Ivanna, 2018). According to Farida and Anjani (2019), several things can be done to foster a sense of leadership in students, namely communication and teamwork. The inner leadership can also be fostered by various types of activities such as the traditional game of bulelang swinging (Azka et al., 2020), big puzzle games (Istiningtyas & Safitri, 2020), paskibraka activities (N. L. J. Putra, 2018), learning ((Hasanah, 2019); (Saudah, 2014), and also through leadership training ((Aprianti, 2014); (Oktavianti et al., 2021)).

Even though in general the inner leadership for sports science students is in a fairly good category, there are 2.56% who are in the low category. This happens because of several things, one of which is competence (Zhang et al., 2021). Leadership also requires good communication skills, tact, and the ability to handle change (Chen & Sriphon, 2021). In addition, research conducted by Herlina et al., (2018) believes that the inner leadership that exists in a person is a trait given by God Almighty, although it is also recognized that this can be shaped by the environment, such as the family environment or place of residence. These factors could be a factor in the low inner leadership of several sports science students.



## Responsibility, Inner Leadership, and Learning Outcomes of Sports Science Students

In the responsibility variable, it was found that 52.56% were in a low category and 37.18% were in the medium category which indicated that, in general, the responsibility of sports students was low. The results of this study are inversely proportional to research conducted by Musa (2017) which found the responsibilities of sports science students were in the good (73%) and moderate (27%) categories. The same research was conducted by Suyidno et al., (2017) which suggested that student responsibilities, in general, were in the very good category. One of these differences is due to differences in the area where data is collected. Following what was explained by Haiya (2020) that one of the factors that influence student responsibilities is the regional origin.

Responsibility is one of the important supporting factors in lectures on campus. This is because responsibility is one of the determinants of successful student learning on campus (Heriansyah & Kurniawan, 2017). In a campus environment, teachers and students have responsibilities related to assignments and obligations, students take responsibility for engaging in dialogue with instructors and fellow students, while teachers design materials and assignments (Winstone et al., 2020). Students who have high responsibility will carry out their duties well, and vice versa.

The results of this study illustrate the low level of responsibility of Uncen FIK students and are supported by quantitative data. Previously, researchers received teacher complaints regarding the low responsibility of students. Researchers also made observations by making direct observations. Based on observations made, it is known that students are less active in finding information related to lecture material. In addition, students do not open and read books if no assignments are given. Students who rarely touch books mean they are not responsible for their obligations (Heriansyah & Kurniawan, 2017).

Haiya (2020) suggests that several factors influence student responsibilities, including lecturers, regional origin, feelings, and learning methods. In addition, responsibility can also be influenced by the association in the neighborhood, electronic media, lack of self-confidence, and lack of awareness of the importance of carrying out the rights and obligations as well as the tasks assigned (Sudani et al., 2013). Thus, in general two aspects play a role in determining the attitude of student responsibility, namely those that come from within the student and those that come from outside the student. Increasing responsibility can be done in several ways. For example, through self-management techniques (Heriansyah & Kurniawan, 2017), counseling (Latifah & Bariyah, 2019), learning or lectures ((Widiyatmoko, 2016); (Andrianti, 2019); (Dadi & Setiono, 2021); (Al- Fikri & Marzuki, 2018)), and training (Aisyah et al., 2020).

The results of further research are that there is no difference in inner leadership and responsibility between male and female students. Statistically, this happens because based on the average score between male and female student leadership, there is not much difference, namely 63.22 for men and 62.17 for women. This is also because gender equality has begun to be implemented in an organization so that women have the same opportunities and responsibilities in participating, submitting opinions, and making decisions (Astuti & Afrizal, 2022). However, the implementation of leadership in the field shows the inequality between male and female leadership, marked by only a few women getting positions (Olson et al., 2022). In addition, men are considered to be more potential and responsible than women (Aini, Afifah, & M, 2021).

Furthermore, the results of the study also show a correlation between leadership and responsibility, leadership and learning outcomes, and responsibility and learning outcomes. High inner leadership is also believed to be a valuable asset in social life (Anismadiyah et al., 2020). Leaders who have good leadership are assets for community groups to build relationships and achieve group goals (Ariail et al, 2021). Good leadership inspires people emotionally, emphasizing trust and faith in people (Jankelová & Joniaková, 2021). The achievement of group goals and community trust in leaders proves that responsibilities are carried out properly. In addition, self-awareness is an important element in responsible leadership (Muff et al., 2021). Correlation also exists in the inner leadership with learning outcomes. Based on research conducted by Meirani et al (2022) explains that inner leadership is grown, one of which is through organizations, and students who are involved in organizations have good learning outcomes. This is because inner leadership is positively correlated with other variables such as motivation in students (Marditama, 2020). Therefore, inner leadership is a vital aspect of achieving success (Esomar & Sadubun, 2020). Thus, cultivating inner leadership from an early age is important so that a person can benefit himself and others (Arifin et al., 2020).

Lastly, the research results show a correlation between responsibility and learning outcomes. This is in line with research results which show that the responsibilities possessed by students are directly proportional to the learning process and learning outcomes ((Latifah & Bariyah, 2019) (Rahmayanti & Lubis, 2013)). The same thing was expressed by (Sulistyaningsih, et al., 2019) that good independence and responsibility can improve learning outcomes. One reason is that student responsibilities in the learning process are influenced by self-regulation (Pravesti et al., 2022). Improper self-regulation can affect a person's level of responsibility. For example, during the Covid-19 pandemic, internal factors such as laziness and external factors such as cell



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phones and the influence of friends can reduce one's level of responsibility (Syifa et al., 2022). Therefore, responsibility needs to be owned and increased by students to improve academic achievement (Nahariani, et al., 2022). Besides being able to improve learning outcomes, high responsibility can also improve self-image and reputation (Barbu, et al., 2021).

### CONCLUSION

Based on the results and discussion above, it can be concluded that (1) as much as 56.41% of sports science student leadership was in the moderate category, 41.03% are in the high category, and only 2.56% are in a low category, (2) as many as 52.56 % of sports science students' responsibility was in a low category, followed by 37.18% in the medium category, and only 10.26% had a high category, (3) there was no difference between male and female sports science students in terms of leadership and responsibility. In general, it can be concluded that the inner leadership in sports science students tends to be in the fairly high category, while responsibility is in a low category. An activity to increase the sense of responsibility that exists in sports science students at the Faculty of Sports Science Cenderawasih University is needed to conduct, for example providing assistance or training.

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## Purification of Crude Palm Oil (CPO) Using Cocoa Fruit Skins and Rice Straw Waste as Bioadsorbents



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**ABSTRACT:** Crude palm oil is a crude oil that contains triglyceride compounds, free fatty acids, pigments, phosphatides, partial glycerides, coloring agents, and carotene k. The aims of this research are to examine the effect of contact time and mass ratio of bioadsorbents derived from cocoa pod peels and rice straw waste on the reduction of free fatty acid levels, peroxide value, and carotene content. Waste rice straw and cacao fruit peels are carbonized before the bioadsorbents are activated. Furthermore, 100 mL of heated CPO is mixed with bioadsorbent in the following mass ratios (1:1, 1:3, 1:5, and 3:1) for 60 and 120 minutes, respectively, with a stirring speed of 500 rpm and a temperature of 110°C maintained. Then it was filtered, and the filtrate was taken. The filtrate obtained was analyzed for free fatty acid content, peroxide value and carotene content. The results of this research show the best conditions for reducing free fatty acid levels, peroxide values, and carotene content, notably 1:5 in 120 minutes, yielded 93.70%, 81.58%, and 28.94% reductions, respectively.

**KEYWORDS:** biomass, carotene, free fatty acid, peroxide, pyrolysis

### INTRODUCTION

Crude palm oil (CPO) is the primary ingredient used in the production of cooking oil (Garcia-Nunez et al., 2016). CPO contains triglyceride compounds, free fatty acids (FFA), pigments, phosphatides, partial glycerides, coloring matter, and carotene (Constant et al., 2017; Guliyev et al., 2018; Ifa et al., 2013; Onwuliri et al., 2011). Carotene compounds in oil occur as pigments (carotenoids), which could potentially cause cooking oil to turn yellow or red (F. S. Ali et al., 2014). In general, consumers prefer crude palm oil, which is yellow and clear. The pigment content of CPO can reduce clarity and accelerate damage during storage due to oxidation and hydrolysis, which can be dangerous to human health (Tian et al., 2015). The content of free fatty acids is one indicator of CPO quality (Azeman et al., 2015; De Almeida et al., 2013; Fatin et al., 2014). CPO must be purified before use to achieve the desired characteristics (Guliyev et al., 2018), (Ndé et al., 2019; Sampaio et al., 2011).

The methods commonly used for refining palm oil are physical and chemical purification (Azeman et al., 2015; Riyadi et al., 2016). Physical refining is generally preferred to avoid excessive neutral oil loss (Rossia et al., 2011). In the vegetable oil industry, the adsorption process can be used to reduce free fatty acid levels (Cren & Meirelles, 2012). Biomass-based adsorbents are commonly used (Anastopoulos et al., 2019). The majority of adsorbents are highly porous materials. Adsorbent is a substance that undergoes surface adsorption, whereas adsorbate is a substance whose molecules are adsorbed on the adsorbent's surface (Zhang, 2016). Several biomass wastes, such as coconut coir, have been reported as being used in CPO refining (Abel et al., 2020; Ifa et al., 2022), bleaching earth (Silva et al., 2014; Soetaredjo et al., 2021).

Rice straw is an agricultural byproduct made from the dried stalks and stems of cereal plants after the grains have been separated. Rice straw waste is also an agricultural waste that has not been utilized optimally, and there is quite a lot of it in the community. The majority of straw waste is only burned by farmers to prevent it from accumulating and making it difficult to cultivate the land. The use of rice straw as an adsorption material is a low-cost technology because the raw material is readily available, considering that rice production in Indonesia is increasing every year. Rice straw can also be used as an adsorbent because of its cellulose, hemicellulose, and lignin content (Bian et al., 2019; Madivoli et al., 2022; Nascimento et al., 2016).



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Cacao is a plantation commodity with a significant impact on the national economy, particularly as a source of employment, income, and foreign exchange. The seed of the cacao fruit has economic value, whereas the skin, which is a byproduct of cocoa bean processing, is discarded. Cacao peels can cause environmental pollution by being left to rot and sometimes thrown away, so the economic value is still quite low. Cacao fruit peel is also a lignocellulosic waste, with 17.27% cellulose, 52.02% lignin, and 19.56% hemicellulose (Wijaya. M et al., 2017).

Converting biomass into adsorbents has two advantages: first, agricultural waste can have economic value, and second, the use of agricultural waste will help to solve some of the CPO quality problems (Abel et al., 2020).

Biomass can be converted into bioadsorbents in two stages. The first stage is the carbonization process, which involves decomposing organic cellulose into carbon elements and removing non-carbon compounds. The second stage is the carbon activation process, which removes the hydrocarbons that coat the surface of the charcoal, increasing its porosity (Na et al., 2019; Pallarés & González-Cencerrado, Ana Arauzo, 2018).

There are two methods for activating biomass: physical activation and chemical activation. In chemical activation, the biomass feedstock is first mixed with chemical activation reagents. The type of chemical reagent influences the chemical activation method (Ayinla et al., 2019). Common activation reagents are  $H_3PO_4$ , NaOH dan  $ZnCl_2$ , HCl,  $H_2SO_4$  and others. Acid activation can significantly improve their surface properties, allowing them to be used as bioadsorbents in the refining of vegetable oils. Hydrochloric acid is the most commonly used acid in the activation process (Ndé et al., 2019; Usman et al., 2012) and  $H_2SO_4$  (Joy et al., 2007; Steudel et al., 2009; Taha et al., 2011).

The aims of this research are to examine the effect of contact time and mass ratio of bioadsorbents derived from cocoa pod peels and rice straw waste on the reduction of free fatty acid levels, peroxide value, and carotene content.

## RESEARCH METHODS

### Research Material

CPO, the main ingredient used, was obtained from PT. Astra Agro Indonesia with an FFA content of 5.67% expressed in palmitic acid (C16:0, MW = 256 g/mol). Rice straw waste was obtained from rice fields in Gowa Regency, South Sulawesi, Indonesia, and cacao fruit skin waste was obtained from Palopo, South Sulawesi, Indonesia. Some of chemicals from Intraco, Makassar are sodium hydroxide (NaOH) p.a, hydrochloric acid (HCl) p.a, ethyl alcohol ( $C_2H_5OH$ ) p.a, isopropyl alcohol ( $C_3H_8O$ ), phosphoric acid ( $H_3PO_4$ ) p.a, starch p.a, acetic acid ( $CH_3COOH$ ) p.a, chloroform ( $CHCl_3$ ) p.a, phenol phthalein p.a, potassium iodide (KI) p.a, isooctane p.a, sodium thiosulfate.p.a. The main equipment used is pyrolysis and adsorption process equipment.

### Bioadsorbent Production

The first stages involve cleaning rice straw waste and cacao fruit skins, which are then dried in direct sunlight for about a week. Dry rice straw and dried cacao fruit peels were both pyrolyzed for 2 hours at 500°C. After reaching the desired temperature, allow the material to cool in the reactor for several hours. The liquid smoke product resulting from the pyrolysis process is accommodated in the liquid smoke tank. The formed biochar is cooled to room temperature and then stored in a desiccator.

### Activation Process

After the preparation treatment, the charcoal from the pyrolysis results was ground and passed through a 200 mesh (Lee et al., 2018). Following that, a chemical activation process was carried out using an HCl solution. In a 1000-mL beaker, 120 g of sifted rice straw waste biochar and cacao rind were added to an aquadest and concentrated HCl solution and allowed to stand for 18 hours. Then filtered and washed with distilled water until the pH was neutral (pH=7). Furthermore, the biochar was dried in a 105°C oven for 2 hours. The activated bioadsorbent is kept in a desiccator until the adsorption process requires it.

### Bioadsorbent performance test

The CPO adsorption process was carried out by mixing the bioadsorbent with 100 mL of CPO in a 1000 mL beaker for 60 and 120 minutes with different mass ratios (1:1, 1:3, 1:5, 5:1, and 3:1). The mixture was heated on a hot plate to 70°C and homogenized at 270 rpm. Then the results of the adsorption process were filtered using a Buchner filter (11 mm pore size, Whatman). The filtrate is known as RPO (Refined Palm Oil) or purified CPO. CPO and RPO were characterized by levels of FFA, PV, and carotene content.

#### A. Determination of FFA Levels

FFA levels were determined by the titration method as written in the American Oil Chemists Society, AOCS (1990), with some modifications. In a beaker, weigh 2.5 g of preheated CPO or RPO oil (around 50°C) and mix with 50 mL of ethyl alcohol. The solution is neutralized by titration with 0.1026N sodium hydroxide. The percentage of FFA is calculated as palmitic acid where the molecular weight of the FFA is assumed to be 256 (as palmitic acid) based on Equation 1 (Henry,

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2011)

$$\text{FFA as palmitic acid, \%} = \frac{V \times m \times M}{10w} \times 100\% \quad 1$$

Where: V = volume (ml) of sodium hydroxide used, m = molarity of sodium hydroxide solution used, w = weight (in grams of sample) used and M = Molecular weight of FFA. Equation 1 is equivalent to equation 2 (Fatin et al., 2014; Hashim et al., 2019; La Ifa et al., 2022).

$$\text{FFA as palmitic acid, \%} = \frac{V \times N \times 25.6}{w} \times 100\% \quad 2$$

Where: V = volume of sodium hydroxide used, N = Normality of sodium hydroxide used (0.1026), w = weight (in grams of sample) used.

## B. Peroxide Value (PV) Analysis

The peroxide value of the oil samples was determined using the AOCS method, Cd 8-53 (AOCS, 2003). Weigh 5±0.05 grams of sample into a closed Erlenmeyer flask, then add an acetic acid and chloroform (3:2) solution and stir until all samples are dissolved. Add 0.5 mL of saturated potassium iodide solution, then homogenize the solution for 1 minute, and then add 30 mL of distilled water and add 1% starch. Titrate with a 0.01 N sodium thiosulfate solution until the color disappears (AOCS, 2003).

$$\text{Peroxide value (meq/kg oil)} = \frac{(S-B) \times N \times 1000}{\text{massa sample, g}} \quad 3$$

Where: B = volume of titrant, mL of blank S = volume of titrant, mL of sample N = normality of sodium thiosulfate solution

## C. Carotene β Analysis

Carotene content, expressed as β-carotene, was determined by measuring absorbance at 446 nm after homogenization and dilution in 25 mL iso-octane (Silva et al., 2014). RPO and CPO adsorption samples were weighed as much as 0.1 g into a 25 mL volumetric flask and dissolved in 25 mL of isooctane up to the miniscus line. The cuvette was filled with sample solution (adsorption-processed RPO or CPO), and the absorbance was measured at 446 nm with isooctane as a blank using a Shimadzu 1240 UV-Vis Spectrophotometer. Calculation of carotene value according to equation 4. Equation 4 is obtained from previous research conducted by (Hashim et al., 2019; Ifa et al., 2021)

$$\text{Carotene (mg/kg)} = \frac{25 \times 383 \times \text{Abs } 446}{w \times 100} \quad 4$$

Where: w = sample weight in g, and value 383 is the carotene calibration factor at a wavelength of 446 nm.

## RESULT AND DISCUSSION

The adsorbents used in this research were cacao rind and straw waste, with mass ratios of 1:1, 1:3, 1:5, 5:1, and 3:1 and stirring times of 60 and 120 minutes. The mineral composition of straw and cacao rind waste was analyzed using XRF equipment, and the results are shown in Table 1. The most abundant component in straw and cacao fruit peel waste is silica, which is the primary component of activated bleaching earth or bentonite (Abdi et al., 2021). CPO and RPO were characterized based on FFA, peroxide and carotene values, shown in (Figures 1 to 3).

**Table 1. Mineral Composition of Straw Waste, Cacao Rind, and Bentonite**

Okside (%)	(Baksh & Yang, (Ifa et al., 2021)	(Inglezakis et al.,	This Research		
	1992)	2005)	Straw Waste	Cacao Rind	
SiO <sub>2</sub>	54,72	55-80	53,72	13,76	88,79
Al <sub>2</sub> O <sub>3</sub>	15,98	5-20	19,12	3,47	0,36
MgO	1,94	0-8	3,29	17.27	1.47
Fe <sub>2</sub> O <sub>3</sub>	2,93	2-10	4,93	1,82	0,59
TiO <sub>2</sub>	0.12	-	0,16	0,014	0,03
Na <sub>2</sub> O	2,04	0-2	3,64	-0.07	0,67
CaO	0.82	0-5	5,28	22.62	3.07
K <sub>2</sub> O	0,34	0-2	0,44	18.59	4,02
P <sub>2</sub> O <sub>5</sub>	-	-	-	2.97	0.71

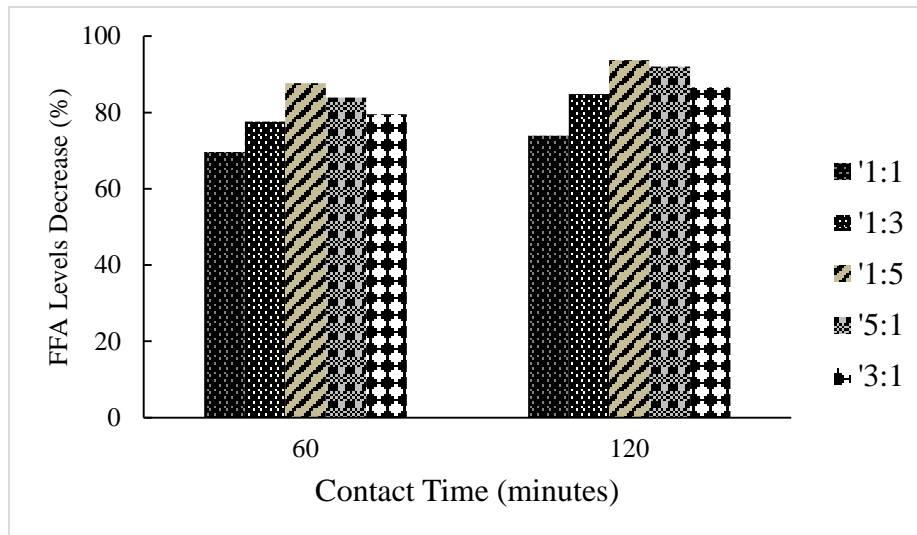


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BaO	-	-	-	0.08	0,05
SO <sub>3</sub>	-	-	-	3.33	0.55
MnO	1,94	0-8	3,29	0.85	0.07
Water (%)	-	10,68			

### 1. Effect of Contact Time and Bioadsorbent Mass Ratio on FFA Level Reduction

FFA is a product of triglyceride hydrolysis reaction and hydroperoxide decomposition reaction. This reaction causes rancidity, which produces a rancid flavor and odor in the oil. FFA levels in oil are frequently used as an indicator of oil damage. Figure 1 shows the effect of contact time on decreasing FFA levels.



**Figure 1. The Effect of Contact Time and Mass Ratio of Cocoa Peel : Straw Waste on Bioadsorbent FFA levels.**

Figure 1 shows that the best time for reducing FFA levels is 120 minutes. The decrease in FFA levels started with an additional 60 minutes of 1.57% (from 5.67 to 1.57) with a 72.31% decrease in FFA levels. Figure 1 shows that the longer the contact time between CPO and the bioadsorbent, the greater the opportunity for FFA to be adsorbed in the pores of the bioadsorbent. The percentage of decreased FAA levels tends to rise over time. According to Salman et al. (2011), the longer the interaction between the solution and the adsorbent, the greater the amount of adsorbate adsorbed on the surface of the adsorbent. (Salman et al., 2011). At 120 minutes of contact time, the FFA level decreased to 0.35% (from the initial FFA of 5.67% to 0.35% with a decrease in FFA content of 93.82%). This research agrees with what was reported by (Abel et al., 2020; Amuda et al., 2013; Anang et al., 2019; Ates & Tezcan Un, 2013; Chaudhuri & Saminal, 2011; Cowan et al., 2012; Ifa et al., 2022; Oktavian et al., 2020; Purwasasmita et al., 2015; Riyadi et al., 2016) that the decrease in FFA levels is linear with contact time. The percentage decrease in FFA levels in this research was greater than research by Riyadi et al. (2016) specifically 0.13% (Riyadi et al., 2016), research by Anang et al. (2020) using zeolite, the contact time of zeolite with core oil is 4 hours which is 89.36% (Anang et al., 2020), research by Larasati et al. (2017) FFA levels are decreased by 62.5% with NaOH activated zeolite (Putranti et al., 2017). The same result was also reported by Oktavian et al. (2020) The synthesis and performance evaluation of CC bioadsorbents for refining used cooking oil reduced FFA levels by up to 93% for 45 minutes (Oktavian et al., 2020).

The addition of rice straw waste bioadsorbent mass reduces the FFA content of CPO, as shown in Figure 1. Prior to the refinement of CPO, the free fatty acid content was 5.67%. The FFA content of CPO oil decreases after it is refined. The greatest decrease in FFA levels occurred in the cacao rind bioadsorbent: straw waste ratio of 1:5 in 120 minutes (from 5.67% to 0.35% with a reduction percentage of 93.82%).

### 2. The Effect of Contact Time and Bioadsorbent Mass Ratio on Peroxide Value Decrease

The peroxide value is the most important value in determining the degree of damage to the oil or fat. Peroxide can be used to determine the degree of oxidation of lipids, fats, and oils as well as the amount of total peroxide in a substance. The more unsaturated a fatty acid, the more vulnerable it is to oxidation (Kouba & Mourot, 2011).

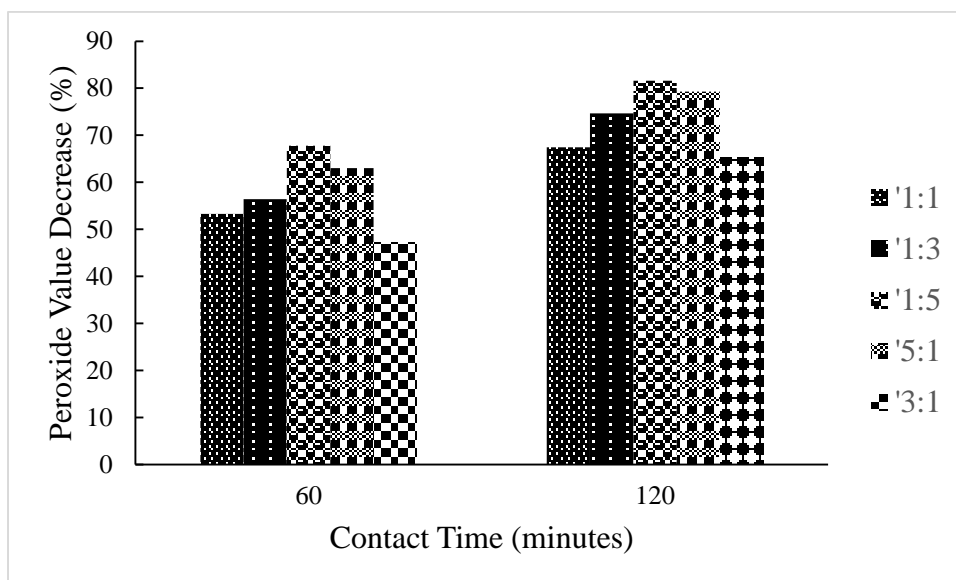


Figure 2. The Effect of Contact Time and Mass Ratio of Cocoa Peel : Straw Waste on Bioadsorbent Peroxide Value

The longer the contact period, the more adsorbate (peroxide compounds) that can be adsorbed, as shown in Figure 2. This corresponds to what has been reported by (Anang et al., 2019). Figure 2 shows that a 1:5 cacao rind: straw waste ratio at 120 minutes reduced the peroxide value. The initial value of CPO peroxide in oil was 8.63 meq/kg. The peroxide value in the oil decreased after the adsorption process, as shown by the addition of the bio-adsorbent cacao rind : rice straw waste (1:5) with a contact time of 120 minutes and 1.59 meq/kg of oil, or a percentage reduction in peroxide value of 81.58%. The application of a 5:1 bioadsorbent cacao rind:rice straw waste ratio with a contact duration of 120 minutes resulted in a 79.26% reduction in peroxide value. This difference may be due to the increased calcium content of rice straw waste compared to cocoa husk (Table 1). Peroxide value decreased with increasing ratio of cacao rind bioadsorbent: straw waste. This corresponds to what has been reported by (Abdi et al., 2021; Silva et al., 2014).

### 3. The Effect of Contact Time and Bioadsorbent Mass Ratio on $\beta$ Carotene

The longer the contact time, the total carotene decreases (Figure 3). This is due to the longer the contact period between the bioadsorbent and CPO, the more probably carotene will be adsorbed in the pores of the adsorbent, as demonstrated by the falling levels. This corresponds to what has been reported by (Ifa et al., 2021) showed that the greatest decrease in carotene levels occurred after 60 minutes, specifically 61.32%. Riyadi et al. (2016) found that total carotene reduced significantly as contact time increased after deodorizing the oil with red palm oil for 2 hours. The percentage of decreased carotene value in this research was greater than in previous research with 51.5% decrease (Riyadi et al., 2016) used red palm oil.

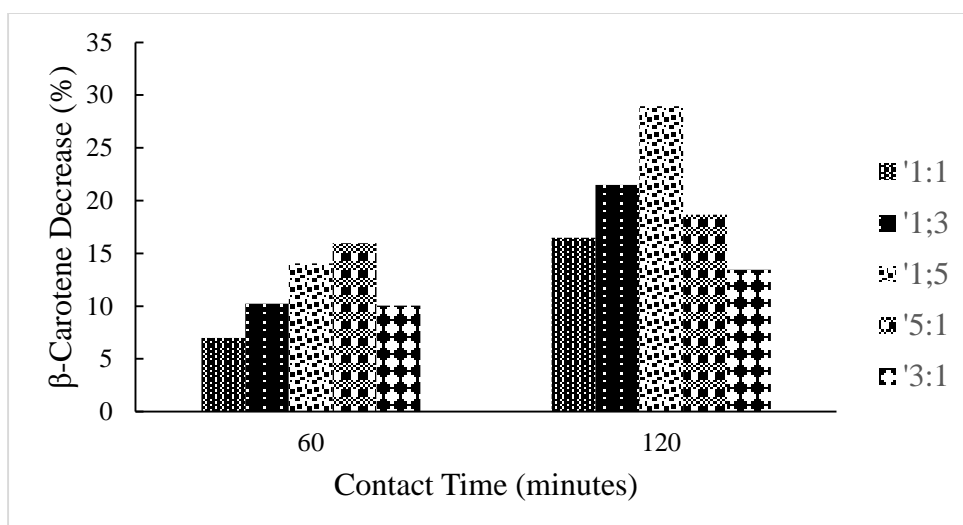


Figure 2. The Effect of Contact Time and Mass Ratio of Cocoa Peel : Straw Waste on Bioadsorbent  $\beta$ -Carotene

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The amount of carotenoids in CPO was 776 ppm, which was significantly reduced after the adsorption process using various adsorbent mass ratios, as shown in Figure 3. Reduced carotenoid content is associated with a greater adsorbent mass ratio, which could be attributed to providing more surface area for adsorption and removal of  $\beta$ -carotene (Abdi et al., 2021). The higher the mass ratio of the adsorbent, the greater the  $\beta$ -carotene adsorption from palm oil. Figure 3 shows that the greatest percentage decrease in carotene value occurs at a ratio of 1:5 for 120 minutes, which is 28.94%. More carotene is absorbed when straw waste matter is added. The research results are consistent with the research by Silva et al., (2014), Total carotene decreased with the addition of BE concentrations of 0.5, 2 and 3 (%). The percentage of decreased carotene value in this research was lower than in the prior study by (Silva et al., 2014) specifically, 97.85% (from 467 to 10 mg/kg) (Silva et al., 2014), using 3% bentonite adsorbent decreased 56.37% (Ifa et al., 2021). Abdi et al. (2021) observed that utilizing 2% eggshell ash resulted in the lowest percentage of carotene content reduction (79.05%) and the highest (83.53) using 1% acid-activated eggshell powder.

## CONCLUSION

Contact time and various mass ratios of bioadsorbent from cacao rind : rice straw waste were utilized in this research to determine the quality parameters of CPO, notably Free Fatty Acid, Peroxide Value, and  $\beta$ -carotene concentration. Increasing the adsorbent mass ratio decreased the levels of FFA, PV, and carotene concentration. The optimum conditions were 120 minutes and a mass ratio of 1:5, with decreased levels of FFA 93.70%, PV 81.58%, and carotene 28.94%. The decrease in FFA, PV, and carotene content was affected by the bioadsorbent mass ratio and contact time. This research obtained results that were able to reduce levels of FFA, PV and carotene content of CPO by bioadsorbent from cacao rind : rice straw waste.

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## Asta Tusti and Siddi: Striking A Balance for the Success of the Balinese



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**ABSTRACT:** Happiness is a decision and a freedom. It is impossible to generalize about happiness because everyone has a different standard or measure of happiness. Physical and spiritual fulfillment are both parts of happiness, which is closely tied to one's emotions and attitude. happiness for every person, in both urban and rural settings. A literature review is a writing technique that involves finding, analyzing, and summarizing happiness-related research findings. There are numerous paths to happiness. If there is harmony and consistent synergy based on *Tri Hita Karana*, happiness will be attained. For this reason, it is essential to achieve both inner and exterior success in the form of asta stuti and siddhi, which are the five different levels of happiness known as *Pancakreta*.

**KEYWORDS:** Happiness, *Bali Aga* Community, *Tri Hita Karana*, satisfaction, success

### I. INTRODUCTION

There are many different tribes, ethnicities, and traditions in Indonesia. One of the deeply established beliefs that influences a person's personality is culture. Balinese society's culture is one of them. Balinese culture must, however, be able to represent all of Bali's areas. Each district of Bali has its own distinct culture, making the island incredibly diverse and unique in its own right. The inhabitants of the island of Bali are split into Indigenous villages, which can be broadly classified into *Bali Mula/Aga* villages, *Apanaga* villages, *Bali Anyar* villages, and *Pirak* villages. Each of these villages has its own distinct culture and way of life.

The *Bali Aga* people, who lived in villages in Bali's mountains and were less exposed to Majapahit's influence, are a group of people who arrived in Bali earlier. Little distinguishes the culture of the Bali Aga people from that of the Balinese after Majapahit (the island of Bali) arrived (Reuter, 2005). Before the Majapahit civilisation arrived in Bali in 1343 AD, there was the Bali Aga culture. In order to create a culture that differs from prehistoric culture, Hindu culture, or the Balinese Majapahit culture, prehistoric culture and Hindu culture were cynically combined to create Bali Aga culture. The Bali Aga culture is distinguished by its refusal to burn the dead, acceptance of caste, consultation with Brahmin priests (pedanda), use of Sankret mantras (holy words) in worship, and selection of village chiefs without regard to intelligence (Reuter, 2005).

In terms of autonomy, Indigenous Peoples are always characterized by shared value systems based on regional and genetic factors. As a result, the autonomy of Indigenous peoples differs from one another in terms of its core. Regarding the wellbeing of Bali's indigenous population. The expansion of human interaction and the integration of modern thought into conventional (traditional) life are inextricably linked. Through this interaction, a person learns new concepts from his surroundings, which alter his understanding of customs and the social milieu he encounters on a daily basis. The individualistic and materialistic worldview that characterizes modern thought appears to have influenced Indigenous people's thinking. Swadikara and Swadharma fulfillment is regarded in Balinese society as one of the most crucial factors in the case of families.

The *Tri Hita Karana* Philosophy is the way of thought of the original inhabitants of Bali. The *Parahyangan*, *Pawongan*, and *Palemahan*—the Three Causes for the Creation of Happiness and Human Harmony—are part of the *Tri Hita Karana* philosophy. The *Tri Hita Karana* ideology, which promotes peace among all living things, has an impact on both the family unit and the indigenous community. The ideas of *Tri Hita Karana* (*parahyangan*, *pawongan*, and *pekahan*), as well as *awig-awig* and *perarem*, state that every family who belongs to an indigenous community has obligations that are always followed by inherent responsibilities. Social obligations, such as fulfilling the fathers', pepeson's, and/or uron-commitments, uron's are followed by responsibilities as part of traditional village krama (dues). The *Tri Hita Karana* philosophical idea directs village krama in completing



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the principles of balance as village krama with an absolute commitment to be a part of an indigenous community in a traditional village area.

It's crucial to emphasize the Balinese people's distinctiveness, particularly their belief in and use of the concept of happiness in their traditional order. People's happiness extends beyond urban areas and includes people living in rural areas and small towns. One of the most popular tourist attractions in the world, the province of Bali, contains a lot of lovely and distinctive villages. Few studies have examined the relationship between happiness and the customs of those who still adhere to their ancestors' cultural systems. Based on the material that has already been written, this study intends to give a more precise account of the Balinese people's satisfaction when fulfilling their traditional duties.

### II. METHOD

Literature review was the method used to write this paper. With a systematic, explicit, and reproducible method for identifying, assessing, and synthesizing research results and ideas that have been produced by researchers and practitioners in the form of explanations or discussions of theory of a finding or research topic, this article will demonstrate happiness in the Bali Aga community. A literature review is carried out, in accordance with Okoli & Schabram (2010), to offer a theoretical foundation for research that will be undertaken in an effort to explore the depth or breadth of existing research on a topic to be studied. Additionally, this method responds to pertinent queries while also understanding the results of earlier research

According to specialists, the structure of this study is founded on a qualitative paradigm and is subjective in character. Instead of relying solely on studies based on theories and concepts of happiness, this study uses theories and concepts to gain a better understanding of happiness in Balinese society or to interpret it with a balance on Asta Stuti and Siddi. By using a literature review, this study demonstrates how the daily occurrences of the Bali Aga people, with their distinctive traditions and intense devotion, are related to their satisfaction in traditional institutions that continue to employ the Bali Mula/Bali Aga system. Figure 1 shows the research's organizational structure.

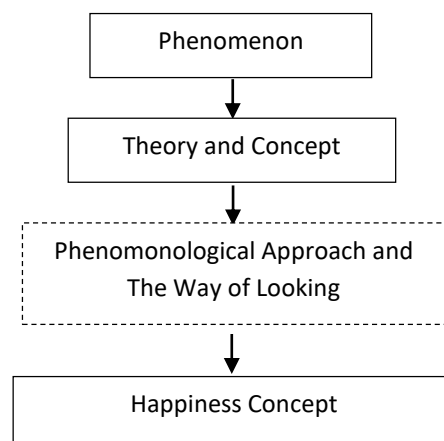


Figure 1. Framework for reasoning Asta Astuti and Sidhi Concept

### III. RESULT AND DISCUSSION

#### A. Happiness

The broad concept of happiness offers a summary of the overall objectives of positive psychology activities. In his book *Authentic Happiness: Creating Happiness With Positive Psychology*, Seligman (2005) makes this claim. The original book, *Authentic Happiness: Using the New Positive Psychology to Realize Your Potential for Lasting Fulfillment*, served as the basis for this translation. This concept includes joyful emotions like ecstasy and comfort in daily life as well as constructive tasks done with honesty and entire sincerity (such as absorption and involvement). If happiness refers to emotions and activities where there is no emotional supply, it is crucial to understand this (Seligman, 2005).

In someone's imagination, the idea of happiness for the circumstances they encounter exists. Happiness has a crucial role in the human maturation process. Nobody contests the fact that everyone longs for happiness. People are said to be happy if they can adjust well and tend to be more successful in numerous sectors, whereas people who are unhappy in life may leave traces on them that can impair how they interact with other people and interfere with their capacity to adjust personally. and social, as it affects how one interacts with others in society. Although it is a pleasant emotion, happiness is a feeling that originates within of a person and does not necessarily preclude happiness from occurring elsewhere (Seligman, 2005). When the anxiety and worry over something that is thought to not make us happy goes from oneself and is connected to one's quality of life, one might feel

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joyful. Sen (1999) says that happiness is a utility that can be appropriately incorporated into the list of various significant and pertinent functions for one's well-being in Todaro and Smith's (2011) article. When people are satisfied, pleased, like, and satisfied with all that occurs, they are happy.

A person's level of happiness is affected by a variety of variables, including economic and demographic considerations (Frey and Slutzer, 2002). Age, health, education, marital status, and gender are examples of demographic factors, although money remains the primary economic element that influences individual happiness. These two elements will have an impact on the person's level of happiness in his or her life, which in this instance can be utilized as a method to measure subjective well-being. Non-material elements that are crucial to happiness are those that connect to the social aspect of wellbeing in people (Helliwell & Putnam, 2004). Sen (1999) claims that the idea of the Human Development Index (referred to Indeks Pembangunan Manusia and abbreviated as IPM in Indonesia) was born out of dissatisfaction with the measurement of happiness. The Human Development Index states that human development is a process to increase the choices that people have, with the main focus being on how people can live long and healthy lives, acquire knowledge, and have access to the resources they need to live properly.

According to The Happiness Project, there is a recipe for happiness. Five factors that are connected to happiness have been the subject of numerous studies to support the theory. A youngster might be inspired to excel not only in terms of cognitive ability, but also in terms of resilience in dealing with life's challenges. Friendship entails that they get along well with others, the environment, and even animals. A healthy connection makes a person's feelings peaceful, complete, and of great value. A healthy relationship can contribute to greater self-happiness.

### B. The Component of Happiness

Seligman (2005) coined the term "perma" to describe the idea of happiness. Seligman's (2005) definition of happiness includes a number of components that can be attained both simultaneously and individually. There are five requirements for the element, all of which must be taken into account.

In particular, everyone in this globe desires perfect happiness in his or her life, which is something that everyone in the world genuinely wants. Since happiness is one of the most essential qualities that everyone should possess, as we all know.

The presence of a psychological situation that can elevate a person's emotional level from a positive level to a much higher level, resulting in a much lower emotional level, is what is meant by happiness. However, it is terrible that bliss is just fleeting. Because happiness is a fleeting state that cannot remain permanently. This time around, finding true happiness is extremely necessary. According to Seligman, developing a fundamental strength and doing an examination of oneself can lead to what is known as true happiness.

### C. Measurement of Happiness

The level of enjoyment that each person experiences varies greatly from person to person. There are times when people define happiness in terms of material possessions, but there are also people who believe that happiness can also refer to feelings associated to comprehension of life's events. In addition, some people believe that Aristotle's definition of pleasure involves having good fortune, virtue, good looks, good luck, a good reputation, good friends, and money (in Rusydi, 2007).

According to Seligman et al. (2005) categorized positive human characters in human life to attain happiness into 24 character strengths in six (6) virtues, namely: about wisdom and knowledge, having courage, high sense of humanity, having a sense of justice, live in simplicity, and have advantages. The 24 character strengths listed below can be used to measure the six virtues: having integrity, having excellent vitality, having a high sense of compassion, having a good spirit, having intelligence in society, citizenship, having openness in thinking, having a high love and enthusiasm for learning, having a positive perspective, having physical and spiritual intelligence, having a persistent soul.

### D. Happiness Concept Based on Tri Hita Karana Philosophy

Balinese people get happiness in many ways, depending on the individual. Seligman (2005) asserts that the existence of good emotions with past, present, and future orientations constitutes the process of achieving happiness. Feelings of contentment, pride, and composure in daily life are examples of past-oriented emotions, whereas optimism, hope, trust, confidence, and self-assurance are future-oriented feelings. The virtues of wisdom and knowledge, courage (passion and passion), love and humanity, fairness (feeling of justice), and transcendence are all elements of Seligman's view of happiness. There needs to be a technique for measuring happiness in order to determine whether or not someone is considered to be happy. In order to establish prosperity and happiness in *Pancakreta*—the five degrees of welfare and collective happiness of the Bal people—there must be a stable harmony of synergy based on *Tri Hita Karana*. These levels are *Kreta Angga*, *Kreta warga*, *Kreta Desa*, *Kreta Negara* dan *Kreta Bhuwana*.

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*Tri Hita Karana* is a way of life that emphasizes harmony and consistency in order to create balance and happiness. Happiness does not equate to living a happy life since behind every happy moment there is a sad one. Humans are driven by a desire for fulfillment and a desire for achievement in their lives. The greatest use of human potential on earth is the desire to feel successful and satisfied in life. According to the *Tri Hita Karana* philosophy, happiness should be pursued as a secondary goal to achieving success and contentment in daily life. Humans can experience sadness if they make even one mistake while looking for fulfillment and achievement. When accepting the joys and sufferings of this life, one can achieve happiness by remaining steady, equal, and balanced at all times.

*Tri Hita Karana* is another name for the phrase "three things that can make you happy." *The Bhagawad Gita III.10 sloka*, which indicates that there are three elements that are stated to be mutually exclusive in *Tri Hita Karana*, namely *Prajapati*, *Praja*, and *Kamadhuk*, provides the conceptual underpinning for understanding *Tri Hita Karana*. The principles of *Tri Hita Karana* are put into practice through the aspects of *Parahyangan*, *Pawongan*, and *Palemahan*. *Tri Hita Karana* is a way of thinking that helps people develop a stable, balanced mindset that leads to peace and happiness. Living joyfully does not necessarily entail living happily, as there is suffering concealed beneath that pleasure (Wiana, 2007). This is the dynamic reality of human life, where people look for fulfillment and expect achievement. When the components of *Tri Hita Karana* are integrated into human beings, our views become broad and this existence is always "*Tusta*" *Tusta* or *Tusti* is a common name for satisfaction in *Wrhaspati Tattwa*. There are two categories of life satisfaction: *Wahya Tusti*, or the satisfaction of the worldly life, and *Adhyatmika Tusti*, or the satisfaction of the spiritual life. The *Wrhaspati Tattwa* ni book refers to these eight satisfactions as *Asta Tusti*. When success and contentment are attained, happiness follows.

### 1. *Asta Stuti*

The two Satisfactions are divided into, namely *Wahya Tusti* and *Adhyatmika Tusti*. *Wahya Tusti* includes *Arjana*, *Raksana*, *Sangga*, *Himsa* and *Ksaya*. While *Adhyatmika Tusti* includes *Bhagya*, *Kala*, and *Atma*. *Dhyayana*, *Tarka Jnana*, and *Dana* are the three pillars of the first *Wahya Siddhi*, the path to achieving both spiritual and material happiness. The second is *Adhyatmika Siddhi*, which consists of *Adibautika Duhka*, *Adhyatmika Duhka*, and *Adi Dewika Duhka* and has the traits of a successful life both physically and spiritually, namely humor, hope, love, and religion. The five levels of happiness known as *Pancakreta*, which include *Kreta Angga*, *Kreta warga*, *Kreta Desa*, *Kreta Negara* and *Kreta Bhuwana*. That is must be filled with inner and outer fulfillment in order to achieve happiness. This is based on the *Tri Hita Karana* synergy.

### 2. *Arjana*,

A common alternative name for *arjana* is "wealth" or "fortune." Income is one of the calculating components used to determine how much a person can enhance his economic value, whereas fortune is defined as everything that a person receives that can be beneficial, useful for all living things, and useful as a source of life. or gifts from God to his creatures that they might use however they see fit. All outcomes are welcomed when people have worked efficiently and in compliance with the standards that are in place. The *Canakya Nitisastra* quotes Darmayasa (1995) as saying that he is content with three things: the meal we serve, the spouse or family we have, and the good luck we are able to make. But never be content with only three things: serving God, doing good deeds, and learning to learn.

### 3. *Raksana*

*Raksana* can be understood as a method of ensuring that the use of fortune, or *arjana*, is suitable and doesn't divert from our intention to pursue that fortune. According to *Sarasamuccaya 262*, *I kang sabhaga sadhana rikasiddhaning dharma*, *I kang kaping rwaning bhaga sadhana ri kasiddhaning kama ika*, *I kang kaping tiga sadhana ri kasiddhaning artha ika wrddhyakene muwah*,. According to this passage, some of the luck we are given can be used to advance the *Dharma*, which can be used in part to succeed in taming *Kama* and to attain *Artha*. In order to develop *arjana*, or wealth, which is frequently alluded to, one must think about *Dharma*, *Kama*, and *Artha*, as taught by Kajeng (1991).

### 4. *Sangga*

*Sangga* is the existence of harmony that each person can experience in their daily lives. Humans are social beings who have sociological wants, which means that they require affection from their surroundings and environment. Regardless of how poor it may be, the recipient will feel content thanks to the affection that is already theirs. Since no creation of God is faultless and always has both a good and a terrible side, life in the human world requires balance in accordance with the law of *Rwa Bhineda*. Everyone is happy for people to desire to live, and it is considered greedy if they don't (Wiana, 2017). In addition to being individual creatures, humans are also social beings, and social activity cannot be isolated from them. We must sustain a harmonic relationship, known as *Tri Hita Karana*, in order to build a calm and peaceful life.

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First, let's talk about harmony in terms of our interactions with God. By following all of God's instructions in accordance with the guidelines laid down in the *Weda* writings, it is possible to harmonize human interactions with Him. One way to show this in daily life is to pray, show love for, and take care of all of His creations. On a deeper level, we should meditate in order to connect as one and express our gratitude to *Ida Sang Hyang Widhi Waca*. No matter one's status, occupation, line of work, or physical appearance, this life is fundamentally about service.

The second is to foster peaceful relationships between people. The nature of individualism in modern social life, especially in large cities, is very obvious. Communication between neighbors is quite uncommon in urban settings since everyone is preoccupied with their own concerns and interests. According to the philosophy of *Tri Hita Karana*, this phenomenon shows that society is not in harmony, hence it is essential to build a harmonious, peaceful society in order to promote shared prosperity. Harmonization is crucial, according to the teachings of *Tat Twam Asi*, which means "I Am He, He Is You." We should respect and love one another because we may establish a life that is harmonious, harmonious, safe, peaceful, and prosperous by realizing that in other people, we are the same as ourselves.

Thirdly, fostering harmony between people and the environment. Nature has genuinely helped all living creatures without expecting anything in return. Nature has provided all that is required by living beings. However, people indiscriminately abuse the natural world without considering the repercussions or the efforts taken to preserve it. For humans, this situation was disastrous. Disasters like landslides, flash floods, tsunamis, and earthquakes happen often in many places. These incidents ought to serve as a lesson for people to try to restore harmony with nature by taking care of nature and our environment, such as by growing plants around the house and getting rid of trash. In place to generate a benevolent energy that may give off a mystical or spiritual aura. and improve the harmony and mandara of the neighborhood.

### 5. **Ahimsa**

Food that is consumed because it torments the other person will generate negative vibrations in the soul, according to the concept of *ahimsa*, which implies seeking food without harming the other party. eat by following the Dharma. The *Panca Yama Bratha* includes the five types of human self-control necessary to obtain bodily and mental happiness, which are the teachings of *Ahimsa*. The Sanskrit roots of the word *Ahimsa* are "*himsa*" which means to kill or hurt, and the syllable "A," which stands for not. *Ahimsa* is the Sanskrit term for not injuring or killing other living things. The Book of *Bhavadgita XVI-2* contains the *Ahimsa* teachings, which are also found in Book of *Sarasamuccaya Sloka 135* and are backed by Book of *Manu Smerti IV.238*.

From the three passages above, it is clear that the best way to find welfare and happiness is to avoid harming or killing other creatures and to allow them to live out their lives in accordance with their individual karma. Every creature in this planet has a responsibility to live according to the *Ahimsa* teachings. Day, in the Nation and State, so that the Unitary State of the Republic of Indonesia will realize harmony and peace in accordance with what is specified in the 1945 Constitution as a tangible demonstration of moderation and religious tolerance. The ultimate and ultimate truth is not to hurt or kill living things. The Mahabharata contains the phrase "*Ahimsa parama dharma*" which translates as "Not harming is the principal virtue or the highest dharma."

### 6. **Ksaya**

*Ksaya* is to feel fulfilled in life if you are able to solve the issues that come up in this life in manners that are decent and right and not too demanding of your time, energy, thoughts, or assets. Human life and problems are inextricably linked. The character of a person can be shown in how they respond to challenges and tests. The distinction is whether or not humans can effectively solve problems or even become absorbed in them. It is impossible to separate a person's mental condition from the size of the problem. Because the mind is wired that way, sometimes a tiny problem can grow into a major one without you ever recognizing it. Therefore, be careful that the mind does not become preoccupied with the problem as it approaches.

Without a fix, a problem doesn't exist. To be able to deal with the issues that arise and turn your life around, all you need is a clear head. As for solutions to any problems, those are worth investigating. Among other things, you should surrender, identify the cause of the issue, avoid exaggerating it, view it from a different angle, think optimistically, pray confidently, and of course engage in some introspection and self-evaluation.

### 7. **Bhagya**

*Bhagya* is human behavior that consistently seeks pleasure even when it is not given. Hinduism holds that if good deeds were not performed in a previous existence, then there will be no pleasure in this one. Therefore, you should make an effort to do good things now so that you won't suffer and be miserable when you are born again. This is said to be in line with *tusti* as revealed by Mishra and Koehler (2006). Humans must maintain their contentment since performing

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good and righteous things consistently will still be done even though you will ultimately experience sadness; this is known as *Bhagya*.

### 8. *Kala*

When people are inside the boundaries of space and time, *kala* refers to the process of spiritual awareness. Humans carefully and precisely calculate the time involved in each step. Conditions that are in harmony with the environment can also be in harmony with time when applied to *Tri Hita Karana*. Money, time, energy, and food are four resources that should not be wasted, and Swami Satya Narayana believes that *Jnyana*, *Karma*, and *Bhakti* are not things that are rigidly separate and absolute, but rather are like sugar and stones.

### 9. *Atma*

To reach atmic fulfillment is the *Atma* that is mentioned in *Asta Stuti*. There are six rules for establishing the Vedas' foundation, according to *Manawa Dharmasastra II.6* namely *Sruti*, *Smrti*, *Sila*, *Events*, and *Atmanastuti*. It is taken from the *Sruti Veda* and applied to the *Smrti Veda* before continuing into the *Sila*, which is a moral code used in the Hindu social tradition known as the Gunawijaya Event. Events are the application of the teachings of the scriptures with the intention of appeasing *Atman*. *Atman* contentment is happiness that doesn't depend on satisfying one's senses. The highest aspiration in this world, above happiness and misery, is *atmanastuti*. Hindus are given advice in the book *Wrspati Tattwa 33* on how to have prosperous lives in addition to finding self-fulfillment. If there is a strong synergy between satisfaction and success, happiness in life is possible.

### 10. *Sidhi*

In Balinese society, *Sidhi* is successful. There are two stages to achieving a successful life. The first is *Wahya Siddhi*, which is a successful life according to worldly standards consisting of *Tarka Jnana*, an ability possessed by humans to realize the knowledge he has acquired in empirical life, so that the knowledge gained can be useful for increasing dignity. Having money means genuinely contributing to others, both materially and spiritually. *Adhyatika Siddhi*, the second stage, refers to success in terms of spiritual criteria. It has three dimensions: *Adibautika Duhka*, *Adhyatmika Duhka*, and *Adi Dewika Duhka*. People can be deemed to have succeeded spiritually in life if they are able to conquer the three causes of misery. *Adibautika Duhka* is suffering as a result of an injury sustained from outside the person. For instance, when a person is defamed, tormented, humiliated, or expelled from society, it causes an inner injury that causes unhappiness. In order to succeed spiritually in this world, Hindus are supposed to be able to balance praise and scorn. *Adhyatmika duhka* suffers for oneself. Low spiritual awareness is the cause of this pain, yet it is made worse so that the resulting anguish is not as intense. *Adi Dewika Duhka* is a victim whose past actions were brought upon by karma; this is connected to everyone's *karmaphala*.

People engage in extensive Dharma practice in the present. He was in excellent physical and mental shape, but they had horrible luck. *Adi Dewika Duhka* may be the root of this predicament. Humans are anticipated to not experience the misery brought on by *Adi Dewika Duhka* in order for them to have success in their lives. *Adhyatmika Siddhi*, also known as a spiritually successful existence, is claimed to have been obtained by those who are not constrained to their lives of suffering when confronted by the three sources of sorrow. One of the traits of a successful life, also known as *Hita Purusa*, which is the primary objective of *Tri Hita Karana*, is happiness.

## IV. CONCLUSION

The uniqueness of the Balinese culture must be emphasized, especially the centrality of the pursuit of happiness in Balinese social norms. People's joy is not confined to big cities; it permeates even rural and suburban locations. Bali province, Indonesia, is home to several beautiful and uniquely designed towns, and is one of the world's most visited travel destinations. However, few research have looked at whether or if persons who follow ancient cultural practices report higher levels of happiness. The purpose of this research is to build on previous literature by providing a more in-depth analysis of the Balinese people's happiness when performing their cultural obligations.

*Tri Hita Karana* promotes three types of relationships between people in this world. These three relationships are the one between people and other people, the relationship between people and the environment or the natural world, and the relationship between people and God. Each of the three connections has a style of living that involves respecting the elements around it and taking balance, harmony, harmony, and harmony into account when putting it into practice. to get the proper balance. Humans can provoke the wrath of nature if they can not control their ignorance in daily life. Humans gain expansive perspectives and eternal "Tusta" when the elements of *Tri Hita Karana* are fully ingested. In *Wrhaspati Tattwa*, contentment is typically referred to as *Tusta* or *Tusti*. *Wahya Tusti*, or worldly satisfaction, and *Adhyatmika Tusti*, or spiritual fulfillment, are the two types of happiness one can experience in life.

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## Case Study of Senior High School Students' (SMA) Learning Explanatory Text During Pandemic Era



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**ABSTRACT:** This case study focuses on learning to write explanatory texts for Eleventh Grade students of SMA Negeri 1 Pecangaan during the pandemic era. This research uses descriptive qualitative method, with a case study strategy. Data collection techniques used in this study are observation, document analysis, and in-depth interviews. The results showed that at the Lesson Plan stage, writing explanatory texts, the teacher carried out an assessment of the syllabus. Based on the syllabus, the teacher prepares a Lesson Plan. The Indonesian teacher at SMA Negeri 1 Pecangaan already has a complete set of learning tools. The learning tools are: (1) syllabus; (2) Writing a Lesson Plan explanatory text with components in accordance with Regulation of the Minister of Education and Culture (Permendikbud) Number 22 of 2016; and (3) Graduate Competency Standards, Core competency, and Baic Competency analysis. At the implementation stage of the learning process, explanatory text learning applies the Problem-Based Learning model with a text-based scientific approach. Meanwhile, at the learning assessment stage, it refers to Regulation of the Minister of Education and Culture (Permendikbud) Number 23 of 2013 which emphasizes the assessment of the learning process and learning outcomes in writing explanatory texts.

**KEYWORDS:** learning, explanatory text, pandemic era, senior high school

### I. INTRODUCTION

In school learning, the curriculum is the main reference in the learning process. In the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System Article 19 states that, curriculum is a set of plans and arrangements regarding objectives, content, and learning materials as well as the methods used as guidelines for organizing learning activities to achieve certain educational goals. The learning process in schools is carried out based on what has been planned in the curriculum.

Utomo, Sudayanto, and Saddhono (2020) stated that education is one of the fields that has experienced the worst impact due to Covid-19. The use of learning based on an emergency curriculum to the study of Indonesian during the Covid-19 pandemic. The 2013 curriculum is utilized in conjunction with this emergency curriculum to allow for flexible learning from earlier classes. The 2013 curriculum, which emphasizes a scientific approach and places a greater emphasis on scientific processes, uses the same implementation of appropriate teaching and learning processes. The emergency curriculum, which is shorter than the 2013 curriculum at the educational unit level, is still fairly new, so it is hoped that the implementation will go smoothly and successfully.

The scope of Indonesian language lessons has four aspects, reading, listening, speaking, and writing. These four aspects are related achievements. Istiqomah (2016) states that Indonesian has a significant role in improving students' good language competence. Khair (2018) also argues that learning Indonesian is learning about skills in Indonesian which must be mastered properly and correctly according to its goals and functions.

One aspect that must be mastered by students in learning Indonesian is writing activities. At the senior high school level, especially Eleventh Grade, many subjects involve writing skills, one of which is writing explanatory texts. Explanatory text as a discourse is composed of a series of sentences that are connected to one another. Rohman, Rasna, and Darmayanti (2019) revealed that through learning to write explanatory texts, it is hoped that students can practice expressing their thoughts clearly, to explain, or explain a series of processes from an event or natural phenomenon that they know correctly based on



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cause and effect, As a result, even though they are regarded as more complex than other texts, students' writing skills will be trained critically in seeking out information and facts.

In an educational institution, the implementation of learning is required to run properly and effectively. This is as stated by Sudirman (2011: 49), that the learning process can meet the good criteria if the teaching and learning process is effective and achieves goals. Learning is considered effective if it contains elements which include students, teachers, objectives, materials, media, and assessment. From these learning elements there is one learning element that can be said to be the spearhead of success and the implementation of an optimal learning process in accordance with the curriculum, which element is the teacher. Rabiman, Nurtanto, and Khofifah (2020) added that teacher innovation and creativity in presenting and delivering learning materials can support student development and intelligence. In the era of the Covid-19 pandemic, there are even more challenges faced by teachers, where teachers are required to be professional in utilizing digital technology. In line with Vitaria's opinion (2020), the Covid-19 pandemic is not a barrier to improving the quality of education. Therefore, there are many ways that can be done by the teacher based on the commitment and responsibility of the teacher in carrying out his professional duties.

Laras and Suyanto (2016) conducted research on learning explanatory texts by examining the process of learning explanatory texts in class VII SMP Global Madani Bandar Lampung. Furthermore Nasrillah, Kosasih, and Kurniawan (2019) conducted research on explanatory texts used as teaching materials in Eleventh Grade SMA Negeri 5 Bandung. Other research was also carried out by Khairullah, Syambarsil, and Wartiningsih (2019) by examining planning, implementation, and assessment in learning explanatory texts at SMAS Mujahidin Pontianak. Purba, Daulay, and Marice (2020) researched the development of a problem-based learning process for writing explanatory texts in Eleventh Grade SMK PAB 03 Medan.

SMA Negeri 1 Pecangaan is a superior public school in the Pecangaan sub-district, Jepara Regency, Central Java Province which implements limited face-to-face learning in the era of the Covid-19 pandemic. Regarding learning in senior high schools specifically for students in Eleventh Grade, learning explanatory text is based on the 2013 curriculum in Basic Competency 3.3 identifying information (knowledge and sequence of events) in oral and written explanatory texts, Basic Competency 4.3 constructing information (knowledge and sequence of events) in oral and written explanatory texts, Basic Competency 3.4 analyzes the structure and language of explanatory texts, and Basic Competency 4.4 constructs explanatory texts by paying attention to content (problems, arguments, knowledge, and recommendations), structure and language which are then simplified in the emergency curriculum in Basic Competency 3. 2 analyzing the structure and language of explanatory texts, and Basic Competency 4.2 producing explanatory texts orally or in writing by paying attention to structure and language. Learning explanatory texts during the pandemic era and then entering the post-pandemic era is expected to be implemented optimally with this research. Therefore, the researcher conducted a study entitled "Case Study of Senior High School Students' (Sma) Learning Explanatory Text during Pandemic Era".

## II. METHOD

Research on learning to write explanatory texts during the pandemic era was conducted at Pecangaan 1 Public High School located on Pecangaan street, Jepara-Kudus, Pecangaan Kulon, Pecangaan District, Jepara Regency, Central Java Province for the 2021/2022 academic year.

This research uses a descriptive qualitative research method with a case study strategy. The researcher uses a case study strategy based on the formulation of Robert K. Yin. Yin (2014: 1) defines that the case study is a suitable strategy used in the subject matter of a research regarding 'how or why'. Yin also added that the typical style of the case study method is being able to relate to various forms of data in the form of interviews, observations, documents, and equipment. This research is focused on just one case, learning explanatory text for Eleventh Grade students of SMA Negeri 1 Pecangaan during the pandemic era.

Data were collected from teaching and learning activities in class, documents, and from informants from teachers and students. Data collection was carried out using direct observation techniques in class, analysis of documents, and in-depth interviews. Data source triangulation, technique triangulation, and informant review were used to validate the data. Data is analyzed by interactive model.

## III. RESULTS AND DISCUSSION

Learning is an interactive combinative process of the various components involved in learning to achieve predetermined learning objectives (Dirman and Cicih Juarsih, 2014:3). For this reason, the implementation of learning must have clear goals, so that the ideals of the nation can be realized as expected. Law Number 20 of 2003 concerning National Education System says that the curriculum is a set of plans and arrangements regarding objectives, content, and learning materials as well as the methods used as guidelines for the implementation of teaching and learning activities.

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The curriculum, which is the elaboration of educational goals, forms the basis of the learning program. Efforts to realize these educational goals will be reflected through the educational process. While assessment is one of the activities carried out to measure and assess the level of achievement of the curriculum and the success or failure of the learning process carried out by the teacher. This further emphasizes that curriculum, learning processes, and assessment are three things that are interrelated. Based on the above, to find out to what extent the success rate of learning explanatory texts at SMA Negeri 1 Pecangaan needs to be observed and analyzed starting from the planning, implementation and evaluation stages.

### A. Explanatory Text Lesson Plan for Eleventh Grade Students of SMA Negeri 1 Pecangaan during the pandemic era

Lesson Plan is a rational decision-making activity regarding certain learning goals and objectives, in the form of changes in behavior and a series of learning activities in order to achieve learning objectives by utilizing all the potential and existing learning resources (Sanjaya, 2011: 15).

Lesson Plan is the initial stage of the learning process. Morrison, et al (in Gafur, 2012: 3) stated "Instructional design is a strategic planning of a course. It is a blueprint that you design and follow. It helps us connect all the dots to form a clear picture of teaching and learning events".

Based on Regulation of the Minister of Education and Culture (Permendikbud) Number 22 of 2016, learning plans are designed in the form of syllabus and lesson plans that refer to content standards. Lesson Plan includes an analysis of the syllabus to develop a Lesson Plan, making Lesson Plans that are tailored to the appropriate approach, determining media and learning resources, and planning assessments.

Lesson Plan for Indonesian language teachers at SMA Negeri 1 Pecangaan begins with reviewing the syllabus that has been prepared by the curriculum development team, both at the central and regional levels, then preparing a Lesson Plan. Preparation of Lesson Plans based on Regulation of the Minister of Education and Culture (Permendikbud) Number 22 of 2016.

The Lesson Plan, which was prepared based on the 2013 curriculum and adapted to the pandemic era, was made by a Pecangaan 1 Public High School teacher with a structure; Lesson Plan titles, Basic Competency, educational units, subjects, subject teachers, class/semester, subject matter, time allocation, learning objectives, learning activities (which are divided into three activities, ; introduction, core, and closing), and assessment learning.

Lesson Plan developed by the teacher is based on the syllabus. The basic competency in learning to write explanatory texts is developing the content (problems, arguments, knowledge, and recommendations) of explanatory texts orally/in writing. In each Basic Competency indicators are developed. The results of the study show that the indicators formulated by the teacher have fulfilled the three main criteria, which are formulated in clear sentences, contain certainty of meaning, and can be measured. Learning materials are packaged in the form of annexes and contain detailed theoretical descriptions.

Learning activities consist of introduction, core activities and closing. In the learning activities the teacher has included the learning syntax in accordance with the chosen learning model. The learning activities also include character education to be achieved. The learning process also requires support in the form of media, tools, and learning resources. The three carrying capacities have also been included in the Lesson Plan.

In the Lesson Plan made by the Indonesian language teacher at SMA Negeri 1 Pecangaan it has been stated that explanatory text learning is carried out using the hybrid learning method by combining offline and online learning via WhatsApp, as well as the Problem Based Learning learning model.

### B. Implementation of Explanatory Text Learning for Eleventh Grade Students of SMA Negeri 1 Pecangaan during Pandemic Era

Learning is a process of teaching and learning activities carried out in accordance with the curriculum set by the government. The implementation of the 2013 Curriculum has changed the paradigm of the concept of teaching from teaching as a process of conveying subject matter to teaching managing the environment. Like the opinion of Sanjaya (2011: 102) which states that the paradigm of the concept of teaching as a process of managing the environment has the characteristics of: (a) student-centered teaching; (b) students as learning subjects; (c) the learning process takes place anywhere; (d) learning is oriented towards achieving goals.

Based on the results of interviews with the teacher, the teacher stated that the implementation of Indonesian language learning using explanatory text material for Eleventh Grade SMA Negeri 1 Pecangaan in general contains components that support the learning process in the form of materials, media, and learning methods.

First, the material prepared by the Indonesian language teacher has been arranged in a coherent manner. According to Sabarudin (2018) learning materials in which there is a process of determining the order, the selection of which must refer to competency standards, the process of identifying aspects and types to obtain material that is relevant to Standard Competency

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and Basic Competency, requires quite a long and complicated process. Likewise, when learning material is about to be delivered, that's when the right media is needed to convey the material to achieve learning objectives.

Second, the media is a tool that can help teachers convey learning material to students easily (Anitah, 2012: 2). The media used by Indonesian teachers at Pecangaan 1 Public High School in implementing explanatory text learning in this study were pictures and Indonesian language student books published by the Ministry of Education and Culture. The Indonesian teacher at SMA Negeri 1 Pecangaan considers that media images can help students to improve their writing skills in explanatory texts.

In addition, teachers also use media in the form of modules or teaching materials, the internet, other relevant media sources to add information, as well as the WhatsApp application as a medium of communication and discussion space in online learning. According to Daheri, et al (2020) the WhatsApp application cannot stand alone as an online learning medium. It really needs the role of the teacher directly to optimize students in learning. Therefore, learning that is carried out in a hybrid manner is something that is required by schools to be carried out by teachers.

Third, in learning explanatory texts during the pandemic era, Indonesian language teachers at SMA Negeri 1 Pecangaan use the hybrid learning method with a problem-based learning model with a text-based scientific approach. Boud and Feletti (1997: 11) state that problem based learning is the most significant innovation in education. It is also explained in his book that: "Problem based learning is not the solution to all curriculum design problems in professional education. At the present time, however, it is the most fully articulated and trialled alternative to traditional practices and it can provide means of tackling some of the challenges of professional education which have appeared to date to have been quite intractable. These challenges include linking initial education with professional practice, bringing professional skills into students to develop a holistic view of practice for which they are being prepared."

This text-based approach is in line with the learning principles in the 2013 Curriculum which emphasizes a scientific approach. Text-based learning of Indonesian is used as a representation of the implementation of the 2013 Curriculum which carries a scientific (scientific) approach as the basis of the learning process. Teachers at SMA Negeri 1 Pecangaan think that this problem-based learning model is appropriate to be compared with a text-based scientific approach.

The steps for learning explanatory texts for Eleventh Grade SMA Negeri 1 Pecangaan during the pandemic era include opening activities, core activities, and closing activities. The application of the problem-based learning model with a text-based approach was carried out in five stages both at the first meeting and at the second meeting.

At the first meeting, the stages of implementing problem based learning with a text-based approach, the first step is in implementing the teacher's learning to bring up several explanatory texts with different themes in which the texts are in the form of phenomena that exist around students. Students are asked to read the text that has been provided by the teacher. From here students become motivated to continue to read and find information related to the text. This activity is the embodiment of activities in understanding and modeling text.

The second step, the teacher asks students to group with their friends. Students are faced with existing texts to be analyzed related to the structure and language rules of explanatory texts. Each group was assigned by the teacher to analyze the parts and structure of the explanatory text according to the material in the textbook. The third step, the teacher goes around the room and pays attention to the activities of each group, while asking about the difficulties that the group or individual might face. The fourth step, after all groups have finished answering student assignment sheets and solving problems, the randomly selected group must later present the results of their discussion to the front of the class which in this activity is a general discussion led by the teacher. Each group cannot take turns presenting the results of their work due to time constraints, so group selection by drawing lots is effective for adjusting learning with limited time allocation. In this discussion activity, each student must play an active role and share tasks so as to produce a good report. This activity aims to realize joint work activities to build texts.

In the fifth step, the teacher asks the two selected groups to come forward and present the results of group discussions in turn. In this case the teacher acts as a moderator for that advanced group must be able to answer questions or later these questions will be thrown at other groups. At the second meeting, explanatory text learning still uses a problem-based learning model with a text-based approach. The first step, the teacher tries to facilitate students by giving students the opportunity to ask the teacher about the explanatory text as learned the previous day. Initially, no students asked questions. However, the teacher tries to continue to motivate students to ask questions. Giving this motivation in the end makes students one by one to want to ask questions. second step, the teacher conveys material and assignments to students regarding identifying the structure of explanatory texts, the language of explanatory texts, patterns of development in writing explanatory texts, and writing explanatory texts based on linguistic structures and rules. Each student is given the task of solving the problems contained in the student textbook.

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Next, in the third step, the teacher goes around the room with the aim of paying attention to each student, while asking students what difficulties students face in carrying out assignments from the teacher. The fourth step, students formulate the results of their work regarding the structure, language, and development patterns of the explanatory texts that have been prepared by students. The fifth step, after all students have finished doing the assignment, two students are asked to read the results of their work to the front of the class. Then, students who sit in place check their own work. For students who have different opinions are welcome to ask questions and express their ideas.

The five steps of learning explanatory text using the problem-based learning model are in accordance with Andayani's statement (2015: 246) that there are steps that can be applied in the problem-based learning model, ; (1) student orientation on the problem; (2) organizing students to study; (3) guiding individual and group investigations; (4) developing and presenting works; and (5) analyze and evaluate the problem solving process.

Andayani (2015: 248) also mentions, by applying the problem-based learning model, students are encouraged to identify what they do not know or understand. So that this has a positive impact that stimulates students as if they are competing to be able to answer the challenges given by the teacher in the lesson. Students always equip themselves with reading and learning so they can compete with other students in expressing ideas to answer all existing problems, and if this happens all the time, it is certain that student achievement will be good.

### C. Explanatory Text Learning Assessment for Eleventh Grade Students of SMA Negeri 1 Pecangaan during Pandemic Era

Assessment is an activity that cannot be separated from learning activities in general. Assessment activities are accompanist activities at the end of the learning process. Arikunto (2012: 15) states that with the results of the assessment obtained, the teacher can find out which students can continue their studies because they have succeeded in mastering the material, as well as students who have not succeeded in mastering the material. Without conducting an assessment, the teacher may not be able to assess and report student learning outcomes objectively.

Evaluation is in the form of process assessment and outcome assessment. The result of implementing explanatory text learning is in the form of a portfolio of a collection of explanatory texts made by students. Evaluation is a process that is arranged systematically and continuously for use in describing, collecting, presenting information about a program to be used as a basis for decisions, interpreting, and formulating policies and compiling programs (Widoyoko, 2015: 6). Portfolio assessment is a continuous assessment based on a collection of information that shows the development of students' abilities. This information is in the form of student work from the learning process of explanatory text. The focus of portfolio assessment is a collection of student work both individually and in groups during the implementation of explanatory text learning during the pandemic era.

### D. Obstacles and Solutions offered by Pecangaan State High School Teachers in Learning Explanatory Text during the pandemic era

Learning to write explanatory texts during the pandemic era at SMA Negeri I Pecangaan was going well, but there were still various obstacles experienced by both students and teachers. Of course, these obstacles can affect student learning outcomes.

The obstacles experienced by Indonesian language teachers include; (1) there are still students who are unable to adapt to Indonesian Spelling in writing explanatory texts; (2) there are still students who are less able to come up with ideas; (3) teachers do not master information and communication technology; (4) the conditions that cause learning are not in accordance with the Lesson Plan; (5) the teacher feels that the time allocation is not optimal.

Barriers experienced by students include (1) students still lack motivation to learn; (2) students are less focused on learning; (3) students have difficulty determining ideas; (4) students lack mastery of standard writing; (5) students complain about the lack of internet quota.

Steps that can be taken by the teacher to overcome problems in learning explanatory text, ; (1) the teacher motivates students to keep learning; (2) the teacher provides training to students in terms of writing according to standard grammar; (3) the teacher generates ideas through the media of images; (4) teachers study information and communication technology by upgrading skill mastery; (5) the teacher continues to observe conditions that make learning inconsistent with the Lesson Plan by understanding the characteristics of each student; (6) the teacher informs about the provision of internet quota from the government; (7) the teacher opens a discussion room through the WhatsApp application.

## IV. CONSLUSIONS

Based on the research results, this study conclude that the Lesson Plan stage of writing explanatory texts, the teacher first conducts an assessment of the syllabus. Based on the syllabus then develop a Lesson Plan. The Indonesian language teacher at SMA Negeri I Pecangaan already has a complete set of learning tools. The learning tools are: (1) syllabus from the government;

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(2) Writing a Lesson Plan explanatory text with components in accordance with Regulation of the Minister of Education and Culture (Permendikbud) Number 22 of 2016; and (3) Graduate Competency Standards, Core Competency and Basic Competency analysis.

Implementation of the learning process by applying the hybrid learning method and the Problem Based Learning model and utilizing media images. Learning assessment has also referred to Regulation of the Minister of Education and Culture (Permendikbud) Number 23 of 2013 which emphasizes the assessment of the learning process and learning outcomes in writing explanatory texts. Assessment of the learning process emphasizes student learning motivation, while the assessment of student learning outcomes by taking explanatory writing products produced by students.

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## The Effect of Triceps Press-Down, Seated Rowing and Endurance Methods on Arm Muscle Strength



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**ABSTRACT:** The purpose of this study was to determine the effect of the triceps press down, seated rowing and endurance exercise methods on increasing arm muscle strength. Factorial method 2 x 2. There were 24 research samples. The pull up test instrument was for endurance and the holding bow digitec test. ANOVA data analysis technique  $\alpha = 0.05$ . Results (1) there is a significant difference between the triceps press-down exercise and seated rowing exercise in increasing arm muscle strength. (2) There is a significant difference in the effect of athletes who have high and low muscle endurance on increasing arm muscle strength. (3) There is a significant interaction between triceps press down and seated rowing exercises with muscle endurance (high and low) on arm muscle strength in archery athletes.

**KEYWORDS:** Triceps Press Down, Seated Rowing, Endurance, Arm Muscle Strength

### INTRODUCTION

The rapid development of science and technology in the field of sports can improve sports coaching in the future, which is expected to make many people like sports. Sports have a role as daily entertainment and have become a healthy lifestyle. Various forms of sports include invasion, striking and fielding, net game, and target game. One of the sports games that have targeted such as archery. Archery is in demand from various groups, both from the upper and lower classes, both small children, teenagers, and adults, so anyone can take part in this archery sport.

Arrows are a kind of weapon in the form of long objects, sharp at the ends and feathered at the base, which is released with a bow, while archery is releasing arrows at targets or targets (Setiakarnawijaya et al., 2021). Archery is a static sport that requires good physical condition and includes upper-body muscle strength and endurance (Arkin & Budak, 2021). When performing archery techniques when pulling the bowstring, the muscles will experience isotonic contractions, especially in the initial half-pull. In full pull (drawing), the arm that pulls the bowstring, namely the fingers, must touch the chin, and the fingers stick under the chin (anchoring), and for the arm holding the bow (holding), it must be completely locked as well as the pulling arm, so isometric contractions occur.

Archery sport does not require a lot of movement skills, and true archery is a simple sport. Archery is a sport that releasing arrows at the target as precisely as possible. Archery, of course, involves the muscles in pulling the bow and must be of particular concern because these muscles work extra hard in pulling and holding the weight of the bowstring, which is quite heavy and takes place continuously or repeatedly in a series of archery movements. Therefore, these muscles must have strength as well as endurance in order to be able to pull the string consistently and steadily according to the axis of motion. The muscles that must be trained and developed in archery are the shoulder muscles, towing fingers, forearm muscles, wrists, abdominal muscles, leg muscles, and torso muscles (Rizal et al., 2019).

Archery requires good accuracy. When an athlete releases a bow to shoot arrows at the desired target, it requires good accuracy. Many forms of exercise can be used to train archers' accuracy, such as the triceps press down and seated rowing exercises which are useful for strengthening the muscles of the bow-pulling arm when aiming because when releasing an arrow it is necessary to calm down and strengthen the fingers of the bowstring puller. The strokes of the arrows become smooth. The slightest mistake when releasing arrows will have a big effect on the accuracy obtained when releasing arrows.

Exercise comes from words in English that can contain several meanings, such as practice, training, and workout. The main aim and objective of exercise or training are to help athletes to improve their skills and achievements as much as possible. To achieve this, there are four aspects of exercise that athletes need to pay attention to and train carefully, namely (1) physical exercise, (2) technical exercise, (3) tactical exercise, and (4) mental exercise. Therefore the researcher chose the triceps press

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down and seated rowing exercises, where these two exercises are in accordance with the pattern of movement and muscle function in archery. This exercise also involves a shortening of muscle contractions during which normal tension is exercised, so that muscle strength and endurance can be increased by these exercises.

Triceps press down is a weight exercise by pulling the arm muscles, which begins standing straight facing the weight machine, then the movement pulls the handle at chest level, and both upper arms are pressed against the ribs; from this position, straighten the forearms so that the handles touch the thighs, hold for a moment, then return the handles to chest height without moving your upper arms and body (Tumminello, 2022). This triceps press exercise supports the user in a relatively stationary seated position while the user extends his or her arm at the elbow from the initial exercise position to the final exercise position (and often back to the initial exercise position). So, the triceps press-down exercise is a muscle exercise that has an important role, as the main function is to move the elbow joint for extension movement, and this exercise is included in isotonic contractions, namely dynamic exercises that are carried out with the principle of constant load and there is a change in muscle length. This exercise method is useful in strengthening and muscle endurance exercises (Rahmatika et al., 2022).

The rowing exercise apparatus is a commonly used apparatus today to elevate the heart rate and exercise the leg and upper body muscles. Typically, a handle and seat move while the feet rest on stationary pedals (R. N. Wong et al., 2022); (Wu et al., 2020). Seated rowing is a weight exercise by pulling the back muscles starting with an upright sitting position, knees slightly bent, grip the handgrip with the position of both hands straight forward, and fingers facing inward, then pull the movement towards the chest (keep your back straight) hold down then return to its original position (Ronai, 2019).

Endurance is the ability to work for a long time. The definition of muscle endurance is the capacity of a group of muscles to contract repeatedly or successively within a certain period of time against a load (Pareja-Blanco et al., 2020). Strength is the ability of a muscle or group of muscles to overcome resistance. Strength is the ability of a muscle to generate tension against a resistance (Staniszewski et al., 2020). Physiologically, muscle strength is the ability of a muscle or group of muscles to carry out one maximum contraction against a load. Muscle strength is also one of the muscles' abilities to fight load in one effort. Muscular endurance is the ability of a muscle or group of muscles to overcome resistance or exercise loads in a relatively long period of time. Arm muscle strength must also be trained so that they have the resistance to lock the target so that when pulling the bow, the hand does not move too much. Endurance is also the ability to work muscles within a certain period of time. In this case, arm muscle strength plays an important role in archery.

Based on the description above, the authors feel the need to conduct this research with the aim of increasing the endurance and strength of the arm muscles in archery athletes, and this is manifested in the form of scientific research entitled "The Effect of Triceps Press Down Exercise, Seated Rowing and Endurance on Increasing Arm Muscle Strength in Archery Athletes.

### METHOD

This study used an experimental method with a 2x2 factorial research design. The population used in this study were Archery Athletes of the District. Kulon Progo with a population of 26 athletes. In this study, to obtain the number of samples, a sample size will be taken using the formula from Slovin. The sample in this study were 24 people. The sampling technique used in this study used a simple random sampling technique. Of the total sample used, 24 people were then divided into 2 groups with the highest and lowest results based on the test results of the attributive variables (12 people with the highest test results and 12 people with the lowest tests).

The variables in this study consisted of two independent manipulative variables, namely triceps press exercises and seated rowing exercises, while as an attributive independent variable, namely endurance. Then the dependent variable is the strength of the arm muscles. An instrument to measure arm muscle strength is carried out using a pull up test. The instrument measures arm muscle endurance using the Holding Bow Digitec Test (Prasetyo et al., 2022). To test the hypothesis, it was carried out using two-way ANOVA (two-way ANOVA) and if it is proven that there is an interaction, a further test will be carried out, namely the Tukey test, using the SPSS version 20.0 software program for windows with a significance level of 5% or 0.05.

### FINDING

The data from this study are in the form of pretest and posttest data on arm muscle strength. The research process will take place in three stages. The first stage is to do a Pretest to get initial data on the assessment of muscle endurance and arm muscle strength. Descriptive statistical pretest and posttest arm muscle strength is presented in Table 1:

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**Table 1. Descriptive Statistical Pretest and Posttest arm muscle strength**

Method	Muscle Endurance	Pretest	Posttest
Triceps Press	High (A1B1)	16,00±0,63	21,67±1,21
	Low (A1B2)	14,00±1,09	15,83±1,17
Seated Rowing	High (A2B1)	16,00±0,89	17,67±0,82
	Low (A2B2)	14,00±0,89	17,83±0,98

Based on the table above, it shows that the arm muscle strength of the A1B1 group averaged a pretest of 16.00 and experienced an increase in the posttest of 21.67, the A2B1 group had an average pretest of 16.00 and experienced an increase in the posttest of 17.67, the A1B2 group had an average pretest of 14.00 and experienced an increase in the posttest of 15.83, the A2B2 group had an average pretest of 14.00 and experienced an increase in the posttest of 17.83

### NORMALITY TEST

The data normality test in this study used the Kolmogorov Smirnov method. The data summary is presented in Table 2:

**Tabel 2. Uji Normalitas**

Data		sig	Description
Pretest	A1B1	0,518	Normal
	A2B1	0,968	Normal
	A1B2	0,573	Normal
	A2B2	0,968	Normal
Posttest	A1B1	0,956	Normal
	A2B1	0,682	Normal
	A1B2	0,926	Normal
	A2B2	0,646	Normal

Based on the statistical analysis of the normality test that was carried out using the Kolmogorov Smirnov test, in all pretest and post-test data, the strength of the arm muscles was obtained from the results of the data normality test with a significance value of  $p > 0.05$ , which means that the data is normally distributed.

### HOMOGENEITY TEST

A homogeneity test was carried out to test the similarities of several samples, namely homogeneous or not. The homogeneity test is intended to test the similarity of the variance between the pretest and posttest. The homogeneity test in this study is the Levene Test. The homogeneity test results are presented in Table 3.

**Table 3. Homogeneity Test**

Group	sig	Description
Pretest-Posttest	0,656	Homogen

Based on the statistical analysis of the homogeneity test that has been carried out using the Levene Test. In the pretest-posttest, a significance value of  $0.073 \geq 0.05$  was obtained. This means that the data group has a homogeneous variant. Thus the population has the same variance or homogeneity.

### HYPOTHESIS TEST RESULTS

Testing the research hypothesis was carried out based on the results of data analysis and interpretation of the two-way ANOVA analysis. The results of the Hypothesis Test are presented in table 5:

**Table 5. ANOVA test**

Source	Type III Sum of Squares	F	Sig.
Exercise Method	7.042	5.671	0.027
Muscle Endurance	51.042	41.107	0.000
Exercise Method * Muscle Endurance	51.042	41.107	0.000

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A diagram of the interaction results between the triceps press down exercise and seated rowing exercises with muscle endurance (high and low) on arm muscle strength can be seen in Figure 1:

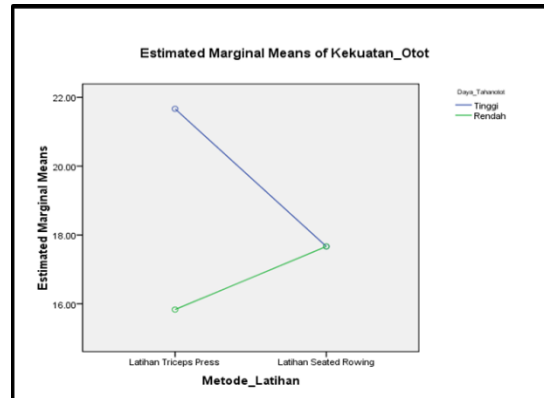


Figure 1. Interaction Results

Based on the calculation results of the Tukey test on the asterisk sign (\*) it shows that the pairs that have significantly (significant) different interactions or partners are: (1) A1B1-A2B1, (2) A1B1-A1B2, (3) A1B1-A2B2, (4) A2B1-A1B2, (5) A1B2-A2B2, while the other pairs that are stated to have no difference in effect are: A2B1-A2B2.

## DISCUSSION

### The Difference in the Effect of Triceps Press-Down And Seated Rowing Exercises On Increasing Arm Muscle Strength

Based on hypothesis testing, it is known that there is a significant difference in the effect of triceps press-down and seated rowing exercises on increasing arm muscle strength in archery athletes. The triceps press-down exercise group was higher (good) compared to the seated rowing exercise in increasing arm muscle strength in archery athletes. In weight exercise in its application for 4 weeks with 3 times a week, 3 sets of repetitions of 20 times were carried out with an intensity of 1 RM for weeks I & II 40% and weeks III & IV 50% (Bemben & Bemben, 2011); (Kramer et al., 1997) had an effect on arm muscle endurance in the treatment group because, with the given loading, significant results were obtained compared to standard archery exercise that the exercise had an effect on muscle endurance-strength. Based on the research results from the calculation of the t-test obtained t-count (18) > t-table (2.16) for t-table at a significant level  $\alpha = 0.05$ , it can be concluded as follows, there is a significant effect of barbell curls and triceps pushdown exercises on muscle hypertrophy upper arm muscles in members of the Padang City Max Power Gym & Aerobics (Cakrawala & Agus, 2019).

Triceps press down is a weight exercise by pulling the arm muscles which begins standing straight facing the weight machine, then the movement pulls the handle at chest level, and both upper arms are pressed against the ribs, from this position straighten the forearms so that the handles touch the thighs, hold for a moment, then return the handles to chest height without moving your upper arms and body (Barr, 2021). In this exercise, the triceps play an important role, which has the main function of activating the elbow joint for extension movements. The dominant tricep muscle has type II fast twitch muscle fibers which have relatively good resistance. This exercise is included in isotonic contractions, namely dynamic exercises carried out with the principle of constant load and there is a change in muscle length. This exercise method is useful in muscle strengthening and endurance exercises.

Strength exercise affects muscle hypertrophy, biochemical changes, changes in muscle composition, and changes in flexibility. Thus the physiological response and impact of strength exercise are characterized by the process of adaptation to muscle innervation, muscle hypertrophy (enlargement), adaptation of cells, muscle endurance, cardiovascular adaptation, biochemical changes, changes in muscle composition, and changes in flexibility (Krause et al., 2019); (Yoon et al., 2019).

In endurance exercise, the greatest adaptation occurs in the biochemical processes in the muscles. By utilizing mechano growth factors where these substances play a role in the process of increasing protein synthesis used in the adaptation of muscle contractions to a given exercise load. In this case, in addition to the response from the muscle fibers, it also causes an increase in the size of the capillaries, thereby increasing the use of oxygen in the muscle fibers. Muscle enlargement (hypertrophy) may occur, but only slightly. This hypertrophy is caused by an increase in protein synthesis (actin and myosin) which will stimulate amino acids and increase the number of mitochondria in muscle cells. Inside the myofibril cells will increase in size and number (Sartori et al., 2021); (Schiaffino et al., 2021). In the increased ATP and CP metabolic systems, the supply of myoglobin and creatine phosphokinase enzymes also increases. This increases the tensile strength of the tendons, ligaments, and connective tissue in the muscle in other words increasing the thickness of the connective tissue which contributes to the overall growth or

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hypertrophy of the muscle.

Muscular hypertrophy can be increased through strength exercise and other short-duration, high-intensity anaerobic exercises. Long-duration, low-intensity anaerobic exercise generally does not produce effective tissue hypertrophy, as endurance-focused athletes only increase fat and carbohydrate storage in muscle, such as neovascularization. Basically, need an adequate supply of amino acids to produce muscle hypertrophy. The given load increases contraction and stimulates motor neurons in the muscles, the contraction of these motor units simultaneously causes muscle contractions along the muscles which stimulate the activity of motor neurons. Weight exercise also affects the adaptation of nerves associated with increased recruitment of a number of muscle groups. The more motor units recruited the more active muscle fibers. Many researchers agree that motor units are generally activated based on the existence of a definite recruitment order due to neuromuscular activity that binds definitely and repeatedly, known as the principle of orderly recruitment, namely the provision of a stimulus that binds gradually to the motor unit so that the ability of the muscles increases (Edström & Grimby, 1986).

These triceps press exercises support the user in a relatively fixed sitting position while the user extends his or her arms about the elbow from an exercise starting position to an exercise ending position (and often returns to the exercise starting position). So, the triceps press-down exercise is a muscle exercise that has an important role, as the main function is to move the elbow joint for extension movements, and this exercise is included in isotonic contractions, namely dynamic exercises that are carried out with the principle of constant load, and there is a change in muscle length. This exercise method is useful for strengthening and endurance exercises (D. P. Wong et al., 2013).

### **The Difference in Effect Between Athletes who have High and Low Muscle Endurance on Arm Muscle Strength**

The results of the analysis show that there is a significant difference in the effect of athletes who have high and low muscle endurance on increasing arm muscle strength in archery athletes. Athletes who have high muscle endurance are higher (good) compared to athletes who have low muscle endurance to increase arm muscle strength in archery athletes. Endurance is the ability to work for a long time. Arm muscle strength is an important element in archery. Physiologically, muscle strength is the ability of a muscle or group of muscles to carry out one maximum contraction against a load (Nasrulloh et al., 2022). Muscle strength is also one of the muscles' abilities to fight load in one effort. Endurance strength (muscle endurance) is the ability of a muscle or group of muscles to overcome exercise resistance/load over a relatively long period of time. Arm muscle strength must also be trained so that they have the resistance to lock the target so that when pulling the bow, the hand does not move too much. Endurance is also the ability to work muscles within a certain period of time.

The more dominant endurance in archery is muscle endurance. Muscular endurance refers to a group of muscles that are capable of carrying out consecutive contractions, one of which is the arm muscles. Arm muscle endurance is the ability of a muscle or group of muscles to be able to contract dynamically or statically by holding a load for a relatively long time, to be able to maintain stability between the traction and thrust exerted by the arm muscles in order to create consistency of movement from the start. End of the game (Langer et al., 2022). The use of arm muscle endurance in archers is when pulling the bow, aiming (holding), and releasing arrows. Therefore, increasing the endurance of the arm muscles and the physical condition of the archers are felt to be very important to achieve optimal results.

The endurance function of the arm muscles in archery is very much needed, given the amount of traction and thrust that must be exerted continuously by the arm muscles. These elements will later affect the athlete's shooting rhythm because doing repetitive movements that require maximum muscle endurance. In addition, muscle endurance plays an important role because archery matches require a relatively long time. Match time can reach 4-5 hours or release as many as 108 arrows in the qualifying round or in one day. From this, it can be seen that archery is a sport that requires high arm muscle endurance. The stronger the muscle endurance, the stronger the driving force is to hold the load so that it will produce a steady movement in pulling the bowstring for a relatively long time.

### **The Interaction between Triceps Press Down and Seated Rowing Exercises with Muscle Resistance (High And Low) on Arm Muscle Strength**

Based on the results of this study, there was a significant interaction between triceps press down and seated rowing exercises with muscle endurance (high and low) on arm muscle strength in archery athletes. The results showed that the triceps press down group was more appropriate for athletes with high muscular endurance, while seated rowing exercises were suitable for athletes with low muscular endurance. From the results of the interaction form it appears that the main research factors in the form of two factors show a significant interaction. In the results of this study the interaction means that each cell or group has a different effect on each group that is paired. Couples who have significantly (significantly) different interactions or partners are as follows.

1) The group of athletes who were trained using the triceps press exercise with high muscle endurance was better than the

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group of athletes who were trained using the seated rowing exercise with high muscle endurance, with a p-value <0.05.

- 2) The group of athletes who were trained using the triceps press exercise with high muscle endurance was better than the group of athletes who were trained using the triceps press exercise with low muscle endurance, with a p-value <0.05.
- 3) The group of athletes who were trained using the triceps press exercise with high muscle endurance was better than the group of athletes who were trained using the seated rowing exercise with low muscle endurance, with a p-value <0.05.
- 4) The group of athletes who were trained using seated rowing exercises with high muscle endurance was better than the group of athletes who were trained using triceps press exercises with low muscle endurance, with a p-value <0.05.
- 5) The group of athletes who were trained using the triceps press exercise with low muscle endurance was better than the group of athletes who were trained using the seated rowing exercise with low muscle endurance, with a p-value <0.05.

### CONCLUSION

Based on the research results and the results of data analysis that has been done, the following conclusions are obtained. (1) There is a significant difference in the effect of triceps press down and seated rowing exercises on increasing arm muscle strength in archery athletes. The triceps press down exercise group was higher (good) compared to the seated rowing exercise in increasing arm muscle strength in archery athletes. (2) There is a significant difference in the effect of athletes who have high and low muscle endurance on increasing arm muscle strength in archery athletes. Athletes who have high muscle endurance are higher (good) compared to athletes who have low muscle endurance to increase arm muscle strength in archery athletes. (3) There is a significant interaction between triceps press down and seated rowing exercises with muscle endurance (high and low) on arm muscle strength in archery athletes.

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## Financial Inclusion, Intellectual Capital, and MSMEs Performance with Business Age as Moderating Variable



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**ABSTRACT:** This study aims to examine the mediating role of intellectual capital and the moderating role of business age on the effect of financial inclusion on the performance of the MSME cluster. The sample in this study were members of the Batik Tulis, Processed Fish and Coffee Lelet MSME cluster in Rembang Regency, Central Java, Indonesia with a total of 134 respondents. Data collection techniques using survey methods with questionnaires. The sampling technique used is saturated sampling. Data analysis uses structural equation modeling with the help of WarpPLS. The results of the study show that financial inclusion has no significant positive effect on MSME performance, intellectual capital has a significant positive effect on MSME performance and financial inclusion has a significant positive effect on intellectual capital. The results of this study also found evidence that intellectual capital plays an important role in mediating the effect of financial inclusion on MSME performance, and the age of the business can strengthen the relationship between financial inclusion and MSME performance.

**KEYWORDS:** Financial Inclusion, Intellectual Capital, Business Age, MSMEs Performance

### INTRODUCTION

Financial inclusion is still the Indonesian government's homework and concern to be able to reduce poverty, increase economic growth and people's welfare. MSME financial inclusion is at the heart of the challenges of economic diversification, growth, and job creation [1]. The development of the financial inclusion index from survey results shows an increasing trend as shown in Figure 1. Below:

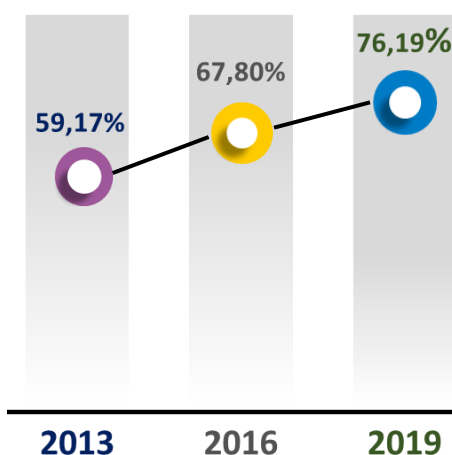


Figure 1. Development of Financial Inclusion Index in Indonesia

However, survey results [2] show that there is still a gap in the financial inclusion index between urban and rural areas. The survey results are also relevant to the Financial Services Authority survey (2019) which shows that in Java Island, as the center of the national economy, there is still a gap between Central Java (65.71%) and DKI Jakarta (94.76%), West Java (88, 48%), DIY (76.12%) and East Java (87.96%). Especially in Rembang Regency, which is located on the outskirts of Central Java, where there are only eight commercial banks located in the regency capital, namely Rembang District and 13 other sub-districts, on average there is only one commercial bank assistant office and most of the MSMEs are located in villages. The results of the survey are

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interesting for further research, especially in the leading MSME clusters in Rembang, namely the batik cluster, the fishery cluster and the "slow" coffee cluster.

In general, MSMEs also still have weaknesses in financial and capital management, production, human resources, marketing, technological knowledge, business partnerships and limitations in terms of access to financial institutions [3], [4] and [5]. Problems with financial inclusion and management need to be of concern to the leading MSME clusters in Rembang. The results of research [6],[7], [8] and [9] show that financial inclusion has a significant positive effect on the performance of MSMEs. On the contrary, research [8] shows that MSMEs do not find financial institution services and products that match the needs and business requirements of MSMEs, making it difficult to improve performance. According to [10] the difficulty for MSMEs to get access to capital from banking institutions is because MSMEs find it difficult to provide quality financial reports so that it has an impact on MSME performance. To overcome this gap, the solution of this study is to include intellectual capital as a mediating variable.

In addition, this study also includes the variable business age as a moderator of the relationship between financial inclusion and the performance of the MSME Cluster. Business age is closely related to MSME performance, so it needs to be included as a factor that can affect MSME performance [11], [12] and [13]. Companies that have a longer lifespan are assumed to have better experience and be able to survive in competition in the market with competitors. The results of research by [14] show that a longer business life can improve the performance of MSMEs in back-office services, while a younger business age can improve MSME performance in front office services. From this explanation, this study aims to examine the effect of financial inclusion on the performance of MSME clusters through intellectual capital and is moderated by the age of the business, which is also the novelty of this study.

### **LITERATURE REVIEW**

#### **The Relationship between Financial Literacy and MSME Performance**

Financial inclusion is a process of ensuring convenience in terms of access to the financial system, especially banks and the existence of banks in an area and the use of the financial system (banks) for the benefit of society [15]. Ease of access and existence of banking for MSMEs is very important to support MSMEs in improving their performance because financial inclusion for MSMEs is at the core of economic diversification, growth and job creation [8]. To encourage the growth and development of MSMEs so that they can improve their performance in a sustainable manner and compete globally, it is inevitable that there will be adequate financial inclusion in each region, especially in accessing capital for businesses and also for business transactions. Research results the results of research [6], [7], [8] and [9] show that financial inclusion has a significant positive effect on the performance of MSMEs. So, the hypothesis proposed, namely:

H<sub>1</sub>: Financial inclusion has a significant positive effect on MSME performance.

#### **The Relationship between Financial Inclusion and Intellectual Capital**

The government's policy by facilitating MSMEs so that they can access financial inclusion in every region equally is very important. The existence of government policies to encourage MSMEs to access sources of financial inclusion, especially banking in terms of access to capital with low interest rates can be a catalyst for increasing MSME intellectual capital [16]. Business capital from banking is financial capital that will be able to encourage intellectual capital. Intellectual capital in question is human capital, relational capital and structural capital. This means that the financial inclusion available to MSMEs will enable MSMEs to improve their human resource capabilities, improve MSMEs' relationships with stakeholders and the structure of MSMEs themselves. So, the hypothesis in this study is:

H<sub>2</sub>: Financial inclusion has a significant positive effect on MSME performance.

#### **The Relationship between Intellectual Capital and MSME Performance**

Intellectual capital has an important role for MSMEs. Intellectual capital is an organization's intangible or non-physical assets and resources, including process resources, innovative capabilities, patterns, intangible knowledge, and collaborative networks and organizational relationships. Intellectual capital as a combination of intangible resources and activities that enable organizations to transform a collection of physical, financial and human resources into system capabilities to create value for stakeholders [17]. SMEs that have good intellectual capital consisting of human capital, relational capital and structural capital, will be able to improve the performance of SMEs. This is because with the intellectual capital owned by MSMEs such as human resources who have high ability and willingness, have good relationships with suppliers, customers and competitors, and have products that have distinctive and varied characteristics, as well as good organizational infrastructure, it will produce high MSME performance. The results of research [17] and [18] show that intellectual capital can improve the performance of MSMEs. So, the hypothesis proposed is:

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H<sub>3</sub>: Intellectual capital has a significant positive effect on the performance of MSMEs

### The Relationship between Financial Inclusion, Intellectual Capital and MSME Performance

The intellectual capital owned by MSMEs can bridge the relationship between financial literacy and MSME performance. Financial literacy in Indonesia, although there has been an increase from time to time, is not evenly distributed in all regions, so that good intellectual capital is needed from MSMEs to improve their performance. MSMEs that have intellectual capital such as a competent human resources, broad relationships and good organizational infrastructure will be able to mediate financial inclusion, especially in accessing adequate banking to improve MSME performance. So, the hypothesis proposed is:

H<sub>4</sub>: Intellectual capital is able to mediate the effect of financial inclusion on MSME performance

### The Relationship between Financial Inclusion, Business Age and MSME Performance

The age of MSMEs is an important indicator in seeing the sustainability of a business. MSMEs that have been operating for a long time can reflect that these MSMEs are able to compete in the market, so it is hoped that the age of the business will be able to strengthen the relationship between financial inclusion and MSME performance. The existence of a financial system that is easily accessible to the public, especially MSMEs that are strengthened by experienced MSMEs, will be able to improve the performance of MSMEs. This is in accordance with the results of research by [14] showing that a longer business life can improve MSME performance in back-office services, while a younger business age can improve MSME performance in front office services. So, the hypothesis in this study is:

H<sub>5</sub>: Business age is able to strengthen the relationship between financial inclusion and MSME performance

## RESEARCH METODOLOGY

### Sampel and Data Collection

The population in this study are MSME actors who are members of the Lasem batik cluster, processed fish cluster, and slow coffee cluster in Rembang Regency, Central Java, totalling 205 MSMEs. The sampling technique uses saturated sampling, taking into account the location of businesses that are close to each other, the number of business units that are not too large, and to generalize findings. Respondents in this study were entrepreneurs/owners of MSME cluster members who were considered to have a good understanding of business management. Collecting data with direct surveys to SMEs using a questionnaire. After conducting the survey, out of the 205 questionnaires that were returned and could be processed further, there were 134 respondents with details of 58 SMEs from the Batik Cluster, 40 SMEs from the Processed Fish Cluster and 36 SMEs from the Lelet Coffee Cluster. 10 questionnaires were not returned, 26 questionnaires were damaged and 35 MSMEs were no longer operating due to the impact of the past Covid-19 pandemic, especially from the Batik Cluster. The number of samples of 134 is in accordance with the statement of [19] that the recommended minimum number of samples based on the maximum likelihood estimation technique or Structural Equation Modelling (SEM) is 100 – 200 and the number of samples still meets the minimum amount of data to be processed using PLS.

### Definitions and Measurement

The variables in this study are financial inclusion as an independent variable, intellectual capital as a mediating variable, MSME performance as the dependent variable and business age as a moderating variable. Financial inclusion is defined as a process that ensures ease of access to the formal financial system, in this case banking, the availability of banks in an area and the use of the financial system for the benefit of society [15]. Financial inclusion is measured using 5 (five) indicators, namely availability, awareness, affordability, adequacy, and accessibility as research by [16] and [9].

Intellectual capital is the intangible or non-physical assets and resources of an organization, including process resources, innovative capabilities, patterns, intangible knowledge, and collaborative networks and organizational relationships. Intellectual capital can also be interpreted as a combination of intangible resources and activities that enable organizations to transform a collection of physical, financial and human resources into system capabilities to create value for stakeholders [17]. Intellectual capital in this study is measured using 3 (three) indicators, namely human capital, relational capital and structural capital adopted from research by [18], [20], [21] dan [22]. MSME performance is the result obtained by an MSME both financially and non-financially [18] with three indicators, namely: financial performance, market performance and entrepreneurial performance [23], [24], [18]. All measures of these latent variables were reduced to a few questionnaire items and measured using a 5-point Likert scale. One: strongly dis-agree; two: dis-agree; three: neutral; four: agree; and five: strongly agree. The age variable of the business is measured using the duration of the MSME business, namely the year of research minus the year of establishment as research by [13] and [25].

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### Analysis Data

Partial least square-structural equation modeling (PLS-SEM) technique with WarpPLS version 7.0 software was used to test the research hypothesis. The relationship between indicators on each latent variable in the measurement model was analyzed for reliability and validity. Next, the structural model will be tested for its coefficient and significance between one construct and another. The PLS-SEM technique was chosen because: (1) it can simultaneously test direct and indirect effects through mediation, (2) it can process relatively small samples and there is multicollinearity between independent variables, and (3) it does not require normal distribution assumptions [26], [27].

## RESULT

### Characteristics of The Respondents

The characteristics of MSME respondents who are members of the Batik Cluster, Fish Processed Cluster and slow coffee cluster in terms of gender can be seen in Table 1 below.

**Table 1. Description of Respondents Based on Gender**

Cluster	Male		Female		Total	
	Amount	%	Amount	%	Amount	%
Batik	24	41.38	34	58.62	58	100
Processed fish	6	15.00	34	85.00	40	100
Lelet Coffee	24	66.67	12	33.33	36	100
<b>Total</b>	<b>54</b>		<b>80</b>		<b>134</b>	

From the data shown in Table 1 above, most of the respondents from all clusters were women, namely 80 people or 59.70% compared to 54 men or 40.30%. These data can be interpreted that in Rembang Regency there have been many emancipations of women, or many women who are entrepreneurs to be able to increase household income. When viewed based on clusters, the majority of female entrepreneurs are Batik UMKM (34 people or 58.62%) and Fish Processed UMKM (34 people or 85%), while female entrepreneurs in Lelet Coffee UMKM are 12 people or 33.33%. For men, most of them came from the Coffee Lelet Cluster as many as 24 people (66.67%) and the Batik Cluster 24 people (41.38%) and the least from the Processed Fish Cluster (6 people or 15%).

From the survey results, education data were obtained from respondents for each of the Leading MSME Clusters in Rembang Regency as shown in Table 2. below.

**Table 2. Description of Respondents Based on Education**

Education	Batik Cluster		Processed Fish Cluster		Lelet Coffee Cluster		Total	%
	Amount	%	Amount	%	Amount	%		
Primary school	7.00	12.07	9.00	22.5	5.00	13.89	21.00	<b>15.67</b>
Junior high	11.00	18.97	9.00	22.5	7.00	19.44	27.00	<b>20.15</b>
Senior high school	31.00	53.45	9.00	22.5	14.00	38.89	54.00	<b>40.30</b>
Diploma 3	3.00	5.17	4.00	10.0	1.00	2.78	8.00	<b>5.97</b>
Bachelor degree	6.00	10.34	9.00	22.5	8.00	22.22	23.00	<b>17.16</b>
Master	0.00	0.00	0.00	0.00	1.00	2.78	1.00	<b>0.75</b>
<b>Total</b>	<b>58.00</b>	<b>100</b>	<b>40.00</b>	<b>100</b>	<b>36.00</b>	<b>100</b>	<b>134.00</b>	<b>100</b>

Data as Table 2 above shows that most of the respondents from all the Leading MSME Clusters in Rembang Regency have a high school education equivalent with a total of 54 MSMEs or 40.30% and the least educated master is 1 person (0.75%). The second successively had a junior high school education equivalent (27 people or 20.15%), the third was a bachelor degree education totaling 23 people (17.16%) and the last was an elementary school education of 21 people (15.67%). Respondents with elementary education are MSME owners who are old, but need to be appreciated even though they are elderly and have elementary school education but are still enthusiastic about being independent with entrepreneurship, especially from the Batik MSME Cluster and Fish Processed MSME Cluster.

An overview of the ages of research respondents from the Batik MSME Cluster, Fish Processed MSME Cluster and Lelet Coffee MSME Cluster is presented in Table 3 below:

## Financial Inclusion, Intellectual Capital and MSMEs Performance with Business Age as Moderating Variable

**Table 3. Description of Respondents by Age**

Age (Year)	Batik Cluster		Processed Fish Cluster		Lelet Coffee Cluster		Total	%
	Amount	%	Amount	%	Amount	%		
21 until 30	8.00	13.79	2.00	5.00	9.00	25.00	19.00	<b>14.18</b>
31 until 40	15.00	25.86	7.00	17.50	11.00	30.56	33.00	<b>24.63</b>
41 until 50	22.00	37.93	25.00	62.50	10.00	27.78	57.00	<b>42.54</b>
51 until 60	8.00	13.79	5.00	12.50	5.00	13.89	18.00	<b>13.43</b>
61 until 70	5.00	8.62	1.00	2.50	1.00	2.78	7.00	<b>5.22</b>
<b>Total</b>	<b>58.00</b>	<b>100</b>	<b>40.00</b>	<b>100</b>	<b>36.00</b>	<b>100</b>	<b>134.00</b>	<b>100</b>

Table 3 above explains that the majority of respondents from all Cluster members are in the productive age category (21-60 years) as many as 127 people (94.77%), the remaining 7 people (5.22%) are in the underage age category. productive. Even though it is in the unproductive category, it is still productive at work. If seen further, the age of all productive MSME clusters is mostly 41-50 years old (57 people or 42.54%) followed by 31-40 years old with 33 people or 24.63%, 21-30 years old with 19 people (14.18%) and aged 51 - 60 years as many as 18 people or 13.43%. The age of MSME owners or actors who are still productive shows the potential and enthusiasm of UMKM to be able to develop even better in the future.

### Descriptive Statistics

Descriptive perceptions of respondents present the average value of each indicator for each variable in this study. To find out the respondents' perceptions of the average value of the variables studied, this study uses a range criterion of  $[(5-1)/3]=1.33$  so that the interpretation of the values is stated as follows:

1.00 – 2.33 = Low

2.34 – 3.66 = Moderate

3.67 – 5.00 = High

The results of the respondent's perception survey using a questionnaire in this study are presented in Table 4:

**Table 4. Variable Average Score and Indicators**

Variable	Indicator	Average Indicator	Average Variable	Notes
Financial Inclusion	<i>Availability</i>	3,71	3,80	High
	<i>Awareness</i>	3,60		
	<i>Affordability</i>	3,87		
	<i>Adequacy</i>	3,92		
	<i>Accessibility</i>	3,90		
Intellectual Capital	<i>Human Capital</i>	3,77	3,88	High
	<i>Relation Capital</i>	4,04		
	<i>Structural Capital</i>	3,84		
MSMEs Performance	Financial Performance	3,51	3,61	Moderat
	Market Performance	3,68		
	Entrepreneurial performance	3,68		

Based on the statistical description in Table 4 above, it shows that all variables, namely financial inclusion and intellectual capital are included in the high category, while the performance of MSMEs is included in the moderate category. The description of the age variable for UMKM members of the Featured cluster can be seen in Table 5 below.

**Table 5. Description Based on Business Age**

Business Length (Year)	Batik Cluster		Processed Fish Cluster		Lelet Coffee Cluster		Total	%
	Amount	%	Amount	%	Amount	%		
<= 10	35.00	60.34	31.00	77.50	26.00	72.22	92.00	68.66
11 until 20	19.00	32.76	5.00	12.50	4.00	11.11	28.00	20.90
21 until 30	0.00	0.00	3.00	7.50	5.00	13.89	8.00	5.97
31 until 40	2.00	3.45	1.00	2.50	1.00	2.78	4.00	2.99



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>= 41	2.00	3.45	0.00	0.00	0.00	0.00	2.00	1.49
<b>Total</b>	<b>58.00</b>	<b>100</b>	<b>40.00</b>	<b>100</b>	<b>36.00</b>	<b>100</b>	<b>134.00</b>	<b>100</b>

Based on the data in Table 5 above, there are 2 MSMEs (1.49%) that have been operating for a long time, namely more than 41 years, more precisely 62 years and 72 years originating from the Batik Cluster. As it is known that Lasem Written Batik has existed since the time of Bhre Lasem I ruled the Lasem area (1350-1375) and since 1850 Lasem has been known as a center for written batik managed by Chinese people, hereditary until now and there are several Lasem Batik Written SMEs those who have been operating for a long time are Chinese. Furthermore, there are 4 MSMEs whose business length is between 31-40 years (2 UMKM for the Batik Cluster, 1 MSME for Processed Fish Cluster and 1 UMKM for the Coffee Lelet Cluster) or 2.99%. Most of the SMEs from all clusters are less than 10 years old (92 SMEs or 68.66%) where the youngest has been doing business for 1 year from the Fish Processing Cluster.

### Measurement and Data Analysis

Construct testing uses reflective first-order variables for financial inclusion, intellectual capital and MSME performance, while the business age variable uses formative because the measurement uses a ratio scale. Reflective first-order testing for financial inclusion, intellectual capital and MSME performance by looking at the loading indicators of financial inclusion forming items with 10 question items, intellectual capital with 9 question items, and SME performance with 8 question items. From the test results it is known that there are two question items from the financial inclusion variable construct, namely AV1 and AF1 which do not meet the requirements because their loading value is <0.70. In the construct variable intellectual capital there are four questions, namely TB3, TB4, HC2 and RC4 which do not meet the requirements. As for the MSME performance construct, there are two questions that do not meet the requirements, namely KP1 and KW3. Construct-forming items with a value of <0.70 are considered ineligible so they are deleted [28]. The results of testing the construct indicators after eliminating items that do not meet the requirements and the results of the composite reliability test and average variance extracted (AVE) can be seen in Table 6 below:

**Table 6. The results of testing the variable construct**

Latent Variable	Loading	P-value	Latent Variable	Loading	P-value	Latent Variable	Loading	P-value
<b>FI</b>			<b>IC</b>			<b>PSMES</b>		
Composite Reliability = 0.735 <sup>(r)</sup> AVE = 0.555 <sup>(cv)</sup>			Composite Reliability = 0.840 <sup>(r)</sup> AVE = 0.635 <sup>(cv)</sup>			Composite Reliability = 0.728 <sup>(r)</sup> AVE = 0.659 <sup>(cv)</sup>		
AV2	0.775	<0.001	HC1	0.763	<0.001	KF1	0.855	<0.001
AW1	0.732	<0.001	HC3	0.839	<0.001	KF2	0.756	<0.001
AW2	0.785	<0.001	RC1	0.729	<0.001	KF3	0.814	<0.001
AF1	0.717	<0.001	RC2	0.732	<0.001	KP2	0.838	<0.001
KD1	0.776	<0.001	RC3	0.742	<0.001	KP3	0.839	<0.001
KD2	0.734	<0.001	SC1	0.707	<0.001	KW1	0.817	<0.001
AC1	0.702	<0.001				KW2	0,756	<0.001
AC2	0.747	<0.001						

Note (s):  
 1)<sup>(r)</sup>CR dari 0.70 or more: sufficient reliability  
 2)<sup>(cv)</sup>AVE Of 0.50 or more: convergent validity

The results in Table 6 above show that all the items forming the construct of the factor loading variable are > 0.70 and the p value < 0.05 so that it can be said that the items mentioned above fulfill the requirements as construct variables. Likewise, the Composite Reliability value of all variables is greater than 0.7 so that it can be concluded that it meets internal consistency reliability and the AVE value for each construct is greater than 0.5 so that it meets the convergent validity criteria. Table 7 below shows the results of the discriminant validity test, in which the square root value for each construct is greater than the correlation between the constructs, thus indicating good discriminant validity [29], [30].

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**Table 7. Discriminant Validity Test Results**

	FI	IC	PSMES
FI	0.505 <sup>(dv)</sup>		
IC	0.161*	0.660 <sup>(dv)</sup>	
PSMES	0.170**	0.549***	0.678 <sup>(dv)</sup>
Note(s): ***p < 0.01, **p < 0.05, *p < 0.10			

### Structural Model Analysis

There are 5 hypotheses in this study. The results of PLS-SEM testing, both direct and indirect, can be seen in Table 8 below:

**Table 8. Hypothesis Testing Results**

Hypothesis	Path Koefisien	P Value	Decision
Panel A. Direct effect			
FI → PSMEs	0,093	0,129	No Supported
FI → IC	0,161	0,026	Supported
IC → PSMEs	0,996	<0.001	Supported
Hypothesis	VAF	P-value	Decision
Panel B. Inderect effect			
FI → IC → PSMEs	0,4989	<0.020	Supported
Hypothesis	Path Koefisien	P Value	Decision
Panel C Moderating			
AGE*FI → PSMEs	0,166	0,007	Supported

Based on the results of hypothesis testing in Table 8 Panel A. the direct effect shows that hypothesis 2 and hypothesis 3 are accepted because the coefficient value is positive and the p-value is significant at 5% for hypothesis 2 and 1% for hypothesis 3. This means that financial inclusion has a significant positive effect on intellectual capital and intellectual capital have a significant positive effect on the performance of MSMEs. Hypothesis 1 is rejected because the significance value is > 0.10 and it can be concluded that the results of Hypothesis 1 show that financial inclusion has no significant positive effect on MSME performance.

Testing the fourth hypothesis in Panel B is testing the mediating effect of intellectual capital on the effect of financial inclusion on the performance of MSME members of the written batik cluster, processed fish cluster and lelet Coffee cluster using VAF calculations. According to [28] to find out how big the mediating effect is and whether there is a mediating role of intellectual capital variables using the following formula.

$$VAF = \frac{\text{Inderect effect}}{(\text{inderect effect} + \text{direct effect})}$$

The results of the VAF calculation for each variable can be seen in Table 6 below.

Calculation	VAF
FI → IC → PSMEs	0.4989 (49,89%)

Note:

VAF < 20% = no mediating effect

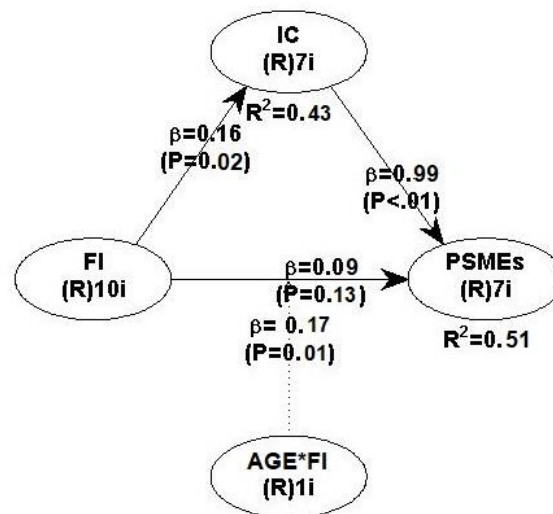
VAF: 20% - 80% = there is partial mediation

VAF: > 80% = full mediation

Based on the results of the VAF calculations in Tables 5 and 6 above, it shows that the intellectual capital variable acts as a partial mediation in mediating the effect of financial inclusion on MSME performance. This is indicated by the VAF value of FI > IC > PSMEs of 49.89% with p-value = 0.007 so that the fourth hypothesis is accepted which indicates that intellectual capital is

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able to mediate the effect of financial inclusion on MSME performance. Testing the fifth hypothesis in Panel C shows that business age is able to moderate the effect of financial inclusion on MSME performance, where the coefficient value is positive and significant at 1%. The full model of this research can be seen in Figure 2. below.



## DISCUSSION

### The Effect of Financial Inclusion on Intellectual Capital

The results of this study indicate that financial inclusion has proven to have a positive and significant impact in increasing intellectual capital. Financial inclusion is the process of promoting affordable, timely and adequate access to a range of regulated financial products and services and expanding their use by all segments of society through the adoption of specific existing and innovative approaches including financial awareness and education with the aim of promoting financial well-being and inclusion [31]. The aim of financial inclusion is to reduce the number of people who are not reached by banking services, known as unbanked, around the world, one of which is in Indonesia [32]. Financial inclusion is one of the financial literacy programs, especially in the context of increasing people's ability to use financial services to get a direct impact from financial institutions [33]. Ease of access to financial institution services make it easier for MSME actors to get capital to carry out every business process.

### The Effect of Financial Inclusion on SMEs Performance

These results illustrate that the higher the ability of MSMEs to access financial services, the better MSMEs' performance but not significant. Financial inclusion in the form of ease of access, quality and use of financial institution services by MSMEs. These three things do not affect the business performance of MSMEs because currently there is Financial Technology (Fintech) which replaces the work system of traditional financial institutions [34]. MSME actors have adapted fintech in their daily lives with a broad mindset so that they can take advantage of existing opportunities to improve their business performance. If the mindset of business people is still limited to short-term business development and is limited to traditional access to finance, it will be difficult to develop a business. Therefore, financial inclusion in this study no longer has a significant effect on the performance of MSMEs. This is relevant to the results of research by [34] and [35] which states that the level of financial inclusion does not affect the performance of MSMEs.

### The Effect of Intellectual Capital on SMEs Performance

Developments in technology and the business world have caused a shift in the implementation of work from relying on strength and skills to relying on knowledge so that intellectual capital becomes very important. Intellectual capital is a resource that has a competitive advantage for SMEs, because the tangible resources possessed by SMEs is smaller when compared to companies that have a large scale [36]. Managing intellectual capital becomes one of the most important issues especially for SMEs. Intellectual capital is able to create a competitive advantage that will lead to the organization's performance because that resource is hard to duplicate even be considered as a strategic resource [37]. Human capital as the fundamental of intellectual capital, has an important role in fostering relationships with interested parties, such as customers, suppliers and governments. Human capital plays an important role in strategic planning in the creation of competitive advantage and performance enhancement [38]. This finding is in line with the knowledge-based view, which states that intellectual capital that can create

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value and enhance competitive advantage that will lead to SMEs Performance. Intellectual Capital which includes human capital, structural capital and customer capital both partially and as a whole has a positive effect on the performance of MSMEs. It can be concluded that if MSMEs increasingly improve the skills and abilities of their employees which are balanced with operational standards in accordance with the vision and mission of the organization, have a good work culture, and have harmonious relationships with customers and/or other outside parties related to organizational routines, it will further improve its business performance so that organizational goals can be achieved [39]. This is relevant to the results of research by [39] which states intellectual capital has positive and significant effect on performance of MSMEs

### **The Effect of Financial Inclusion, Intellectual Capital and Performance**

The results of the research in Tables 8 and 9 show that intellectual capital is able to mediate the effect of financial inclusion on MSME performance. This means that intellectual capital has a very important role in improving the performance of MSMEs, this is because financial inclusion directly has no significant effect on improving MSME performance, so there is partial mediation of intellectual capital on the effect of financial inclusion on MSME performance. The results of this study are in accordance with the research of [17] and [18] showing that intellectual capital has a significant positive effect on the performance of MSMEs. An inclusive financial system can encourage MSMEs to access sources of capital, especially banking with low interest rates, which can be a catalyst for increasing MSME intellectual capital, so that MSME performance can increase [16]. MSMEs must also have good human capital, such as a workforce that has the capabilities or abilities according to their work and MSMEs are able to provide compensation to the workforce in accordance with the applicable MSE. MSME actors must maintain good relations with stakeholders (relationship capital), especially with suppliers, customers and competitors. Structurally (structural capital) MSMEs must also have characteristics and variations in their products and good business infrastructure. So that by implementing investment based on intellectual capital it will be able to improve the performance of MSMEs, especially in financial performance which includes increasing sales turnover and increasing profits; market performance such as increasing customer satisfaction, number of customers and increasing the area of marketing; as well as entrepreneurial performance such as increased product quality and workforce welfare.

As [40] stated that to achieve competitive advantage, companies must use internal strengths (resources and capabilities) in exploiting opportunities and neutralizing environmental threats and avoiding internal weaknesses. In order for a sustainable competitive advantage to occur, it is necessary to use the company's resources and capabilities effectively and efficiently. Likewise the opinion of Demartini and Beretta (2020) that intellectual capital is a combination of intangible resources and activities that allows organizations to transform a collection of physical, financial and human resources into system capabilities to create value for stakeholders, in this case the actors. MSMEs. So that by investing in intellectual capital, namely in the form of resources and capabilities owned by MSMEs, it will be able to improve the performance of MSMEs and it is hoped that this will become a competitive advantage in a sustainable manner.

### **The Effect of Financial Inclusion, Age and Performance**

Based on Table 8, it shows that the age of the business is able to strengthen the relationship between financial inclusion and MSME performance. The longer the MSME business life, the more experienced the MSME is, and shows that the MSME can survive in business competition. So that when MSMEs easily access sources of capital or financial inclusion is available in an area evenly and is supported by MSME's long experience in doing business, it will be able to improve MSME performance. This is in accordance with the results of research by [14] showing that a longer business life can improve MSME performance in back-office services, while a younger business age can improve MSME performance in front office services.

## **CONCLUSION**

The results of the study show that intellectual capital and business age have a very important role in the relationship between financial inclusion and the performance of MSMEs in Rembang, Central Java, Indonesia. Intellectual capital plays an important role in the effect of financial inclusion on MSME performance because it is able to bridge the effect of financial inclusion on MSME performance, previously the direct influence of financial inclusion on MSME performance was positive but not significant. A financial system that is more inclusive and easily accessible to MSMEs and is supported by intellectual capital owned by good MSMEs will be able to improve the performance of MSMEs

Likewise, the age of the business is able to strengthen the relationship between financial inclusion and MSME performance. The longer the age of an MSME means that the MSME has experience in entrepreneurship and is able to compete with competitors. So that with the experience of MSME businesses being able to strengthen the influence of the financial system such as banks that are inclusive in terms of ease of access and availability in each region, it will be able to improve MSME

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performance. This study also found evidence that intellectual capital has a significant positive effect on the performance of MSMEs

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## The Use of the K-Nearest Neighbor (KNN) Algorithm in Analyzing the Views of the Indonesian Society Regarding the Policy of Covid-19 Booster Vaccine



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**ABSTRACT:** At beginning of 2020, the world was shocked by the outbreak of the coronavirus from China. The coronavirus caused panic in China and killed thousands of Chinese people. Many people seemed to rely on social media for more information. As a result, social media platforms have become mediators between individuals and the rest of the world, even becoming the fastest-growing social applications. Among several well-known social media platforms, Twitter has gained special attention because users can easily broadcast information about their opinions on certain topics through public messages, called tweets. There was public anxiety about the Covid-19 vaccination. Public opinion and unrest are posted on Twitter. Based on this case, it is necessary to analyze the views or opinions of the public regarding the Covid-19 vaccination policy, especially regarding the Booster Vaccine type which can be categorized into positive or negative opinions circulating on Twitter. This research aims to analyze the views of the Indonesian people toward the Covid-19 Booster Vaccine using the K-Nearest Neighbor Algorithm (K-NN).

**KEYWORDS:** K-Nearest Neighbour, Twitter, Covid-19

### I. INTRODUCTION

At the beginning of 2020, the world was shocked by the outbreak of the coronavirus from China. The coronavirus caused panic in China and killed thousands of Chinese residents. As another consequence, many small, medium and large companies had to temporarily close their businesses. In addition, thousands of food/beverage business establishments had to close (Bahtiar, 2021).

Based on these situations and conditions, WHO on March 11, 2020, declared Covid-19 a pandemic. Indonesia then followed WHO's steps by issuing Presidential Decree No.11 of 2020 concerning the Determination of Public Health Emergencies for Corona Virus Disease 2019 (Covid-19) and Presidential Decree Number 12 of 2020 concerning the Designation of Non-Natural Disaster for the Spread of Corona Virus Disease (Covid-19) as a National Disaster (Sipayung et al., 2020).

As the current situation is due to lockdowns in several parts of the world and the implementation of social distancing, the use of social media globally has increased. This is due to the success of connecting people from different geographical places and enabling them to exchange ideas. Besides, many people seem to rely on social media for more information. As a result, social media platforms have become mediators between individuals and the rest of the world, even becoming the fastest-growing social applications. Through this social media, people show different views, opinions, and emotions towards various events that have occurred as a result of the coronavirus pandemic (Yulita, Nugroho, et al., 2021).

Among the several well-known social media platforms, there is Twitter. Twitter is a type of microblogging social media that facilitates users to write and publish their activities and or opinions. Historically, with the presence and emergence of social media, Twitter provides a certain space or a maximum of 140 characters. Just like other social media, on Twitter, users can network with other users, disseminate information, promote the opinions/views of other users, discuss trending topics right away and become part of the issue by participating in tweeting using certain hashtags (Issn, n.d.).

Twitter has gained special attention because users can easily broadcast information about their opinions on certain topics through public messages, called tweets. In addition to information voluntarily offered by users, tweets can also store information related to the user's location and may contain links, emoticons, and hashtags that can help users better express their feelings and make them a valuable source of information (Yulita, Nugroho, et al., 2021). Due to the widespread use of social media, especially Twitter, people are more likely to express their opinions on social media.

# The Use of the K-Nearest Neighbor (KNN) Algorithm in Analyzing the Views of the Indonesian Society Regarding the Policy of Covid-19 Booster Vaccine

Vaccination against COVID-19 generated new questions regarding the relatively short time required for vaccine development. As it is known, the vaccine development process usually takes a decade. The fastest previous vaccine development was four years in the case of the mumps vaccine. Even nearly forty years after the discovery of HIV, no effective vaccine has yet been developed. However, the time to develop a vaccine for COVID-19 was very short due to the state of emergency. As of December 18, 2020, the COVID-19 Vaccine Tracker website, hosted by the Milken Institute, indicated that 236 vaccines were in development, 38 were in clinical trials and 7 had reached regulatory decisions. However, on 8 December 2020 the first vaccine was administered in the UK (Yulita, Nugroho, et al., 2021).

There was public anxiety about the Covid-19 vaccination. Public opinion and unrest are written on Twitter. Based on this case, it is necessary to analyze the views or opinions of the public regarding the Covid-19 vaccination policy, especially regarding the Booster Vaccine type which can be categorized into positive or negative opinions circulating on Twitter.

Previous research was carried out under the title "Analisis Sentimen Menggunakan K-Nearest Neighbour (K-NN) Terhadap New Normal Masa Covid-19 di Indonesia" (Furqan et al., 2022). Sentiment analysis in this research was to predict comments or public opinions that tend to have positive or negative opinions. From the results of this research was concluded that the K-Nearest Neighbor (K-NN) classification using the 80% percentage split test was a more optimal test compared to other tests with 80% training data and 20% test data because it also had a high accuracy value.

The second previous research was research conducted by Winda Yulita, Eko Dwi Nugroho, and Muhammad Habib Algifari, with the title "Analisis Sentimen Terhadap Opini Masyarakat Tentang Vaksin Covid-19 Menggunakan Algoritma Naïve Bayes Classifier" (Yulita, Dwi Nugroho, et al., 2021).

The K-Nearest Neighbor algorithm is a method for classifying objects based on learning data that is closest to the object. KNN is a supervised learning algorithm where the results of the new query instance are classified based on the majority of the categories in the KNN algorithm. The class that appears the most will later become the class resulting from the classification (T et al., 2017).

Therefore, this research takes the title "The Use of the K-Nearest Neighbor (KNN) Algorithm in Analyzing Indonesian People's View Sentiments Regarding the Policy of Covid-19 Booster Vaccine ". Based on the description of this background, in this research, the formulation of the problem of formulated, it is: How to analyze the views of the Indonesian people towards the Covid-19 Booster Vaccine?

## II. RESEARCH METHOD

The method used in this research was through several stages starting from data collection to the data testing stage through the previously created GUI. These stages were applied to a flow chart or what is often called a flowchart and this is be described as follows:

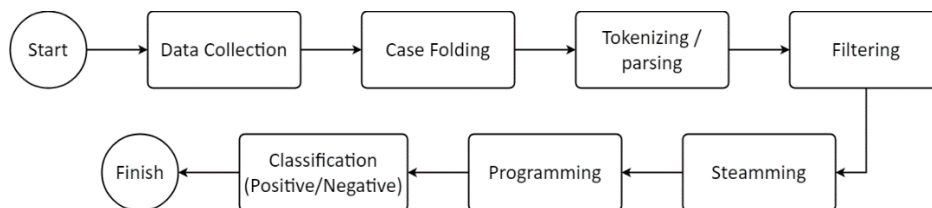


Figure 1. Research Flowchart

## III. RESULTS AND DISCUSSION

### A. Data Collection

The data were taken from Twitter social media, in which these comments were commonly referred to as "Tweet". The tweets submitted were a representation of the written language. Language in communication has a very huge impact. Language has an impact on human life. Subyantoro stated that language is basically integrated with human life. Humans convey ideas, concepts, thoughts, hopes, and desires through language. The use of language has various interests and functions of each. Language is used by humans for the benefit of education, culture, religion, and others (Permatasari & Subyantoro, 2020).

The data was stored in Ms. Excel table containing comment URL links, commenter account names, and the contents of comments taken since the vaccine was distributed in January 2022. The following is a sample data collection:

# The Use of the K-Nearest Neighbor (KNN) Algorithm in Analyzing the Views of the Indonesian Society Regarding the Policy of Covid-19 Booster Vaccine

Table 1. Sample data collection

No.	Account's name	Fill the Comments (Tweet)
1	matahari_me	Tadi pagi mengantar Bapak ke sentra vaksin booster Unika Atma Jaya. Relawannya banyak dan ramah. Pesertanya juga banyak. Tapi semua tertib dan prosesnya berjalan dgn cepat 🙌👍 Terima kasih!
2	atiekkustia	Alhamdulillah, aku udah vaksin booster kemaren 18/1/2022 Temen <sup>2</sup> ayo vaksin yuukk... bantu pemerintah perangi Covid 19/ Omicron 😊👍
3	naevyblu	apakabar putusan MA yang menyatakan harus pakai vax halal min? oia lupa negara ini mah bebas aja ya ketika badan resmipun melanggar hukum. Selama penyuntik modal bilang lanjut, terabas aja 🙌
4	Yuyuns152	Kasian masyarakat... Abis vaksin 1.. harus vaksin 2 biar tambah kuat imunnya, abis vaksin 2, 6 bulan imunnya turun, harus vaksin 3/boster... Ada ada saja, kebohongan itu bukan menyelesaikan masalah, tapi a

## B. Case Folding

Case folding is the process of converting all letters in a document to lowercase. Only the letters "a" to "z" is accepted. Characters other than letters are omitted and considered delimiter (exceeding the limit) (Yoannes Romando et al., 2019). The following table shows samples of case folding:

Table 2. Case Folding Sample

No.	Account's name	Fill the Comments (Tweet)	Case Folding
1	matahari_me	Tadi pagi mengantar Bapak ke sentra vaksin booster Unika Atma Jaya. Relawannya banyak dan ramah. Pesertanya juga banyak. Tapi semua tertib dan prosesnya berjalan dgn cepat 🙌👍 Terima kasih!	tadi pagi mengantar bapak ke sentra vaksin booster unika atma jaya relawannya banyak dan ramah pesertanya juga banyak tapi semua tertib dan prosesnya berjalan dgn cepat terima kasih
2	atiekkustia	Alhamdulillah, aku udah vaksin booster kemaren 18/1/2022 Temen <sup>2</sup> ayo vaksin yuukk... bantu pemerintah perangi Covid 19/ Omicron 😊👍	alhamdulillah aku udah vaksin booster kemaren temen ayo vaksin yuukk bantu pemerintah perangi covid omicron
3	naevyblu	apakabar putusan MA yang menyatakan harus pakai vax halal min? oia lupa negara ini mah bebas aja ya ketika badan resmipun melanggar hukum. Selama penyuntik modal bilang lanjut, terabas aja 🙌	apakabar putusan ma yang menyatakan harus pakai vax halal min oia lupa negara ini mah bebas aja ya ketika badan resmipun melanggar hukum selama penyuntik modal bilang lanjut terabas aja
4	Yuyuns152	Kasian masyarakat... Abis vaksin 1.. harus vaksin 2 biar tambah kuat imunnya, abis vaksin 2, 6 bulan imunnya turun, harus vaksin 3/boster... Ada ada saja, kebohongan itu bukan menyelesaikan masalah, tapi a	kasian masyarakat abis vaksin harus vaksin biar tambah kuat imunnya abis vaksin bulan imunnya turun harus vaksin boster ada ada saja kebohongan itu bukan menyelesaikan masalah tapi a

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### C. Tokenizing/parsing

Tokenization is the process of separating a row of words in a sentence, paragraph, or page into tokens of single word pieces or termed words that stand alone (Robinson, 2019). Tokenizing sample is shown in the following table:

**Table 3. Tokenizing Sample**

No.	Account's name	Case Folding	Tokenizing / parsing
1	matahari_me	tadi pagi mengantar bapak ke sentra vaksin booster unika atma jaya relawannya banyak dan ramah pesertanya juga banyak tapi semua tertib dan prosesnya berjalan dgn cepat terima kasih	tadi pagi mengantar bapak ke sentra vaksin booster unika atma jaya relawannya banyak dan ramah pesertanya juga banyak tapi semua tertib dan prosesnya berjalan dgn cepat terima kasih
2	atiekkustia	alhamdulillah aku udah vaksin booster kemaren temen ayo vaksin yuukk bantu pemerintah perangi covid omicron	mulai dr tgl mei kenaikannya diatas an hayo yg blm vaksin or booster bantu pemerintah dan

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			org tercinta dikeluargamu atau saudara jg temanmu cegah covid ur healthy is your priority too
3	naevyblu	apakabar putusan ma yang menyatakan harus pakai vax halal min oia lupa negara ini mah bebas aja ya ketika badan resmipun melanggar hukum selama penyuntik modal bilang lanjut terabas aja	apakabar putusan ma yang menyatakan harus pakai vax halal min oia lupa negara ini mah bebas aja ya ketika badan resmipun melanggar hukum selama penyuntik modal bilang lanjut terabas aja
4	Yuyuns152	kasian masyarakat abis vaksin harus vaksin biar tambah kuat imunnya abis vaksin bulan imunnya turun harus vaksin boster ada ada saja kebohongan itu bukan menyelesaikan masalah tapi a	kasian masyarakat abis vaksin harus

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			vaksin biar tambah kuat imunnya abis vaksin bulan imunnya turun harus vaksin booster ada ada saja kebohongan itu bukan menyelesaikan masalah tapi a
--	--	--	---

**D. Filtering/Stopword Removal**

Stopword Removal is a filtering process, selecting important words from the token results, namely what words are used to represent documents (Anwar et al., 2019). The filtering sample is shown below:

**Table 4. Filtering Sample**

No.	Account's name	Tokenizing / parsing
1	matahari_me	tadi pagi mengantar bapak ke sentra vaksin booster unika atma jaya relawannya banyak dan ramah pesertanya juga banyak tapi semua tertib



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		<p>dan          prosesnya          berjalan          dgn          cepat          terima          kasih</p>
2	atiekkustia	<p>mulai          dr          tgl          mei          kenaikannya          diatas          an          hayo          yg          blm          vaksin          or          booster          bantu          pemerintah          dan          org          tercinta          dikeluargamu          atau          saudara          jg          temanmu          cegah          covid          ur          healthy          is          your          priority          too</p>
3	naevyblu	<p>apakabar          putusan          ma          yang          menyatakan          harus          pakai          vax          halal          min          oia          lupa</p>

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		<p>negara ini mah bebas aja ya ketika badan reskipun melanggar hukum selama penyuntik modal bilang lanjut terabas aja</p>
4	Yuyuns152	<p>kasian masyarakat abis vaksin harus vaksin biar tambah kuat imunnya abis vaksin bulan imunnya turun harus vaksin boster ada ada saja kebohongan itu bukan menyelesaikan masalah tapi</p>

**E. Stemming**

Stemming is the process of obtaining the root/stem or base word of a word in a sentence by separating each word from the base word and its affixes, both prefixes and suffixes (Wahyudi et al., 2017). The following table shows the stemming sample:

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Table 5. Stemming Sample

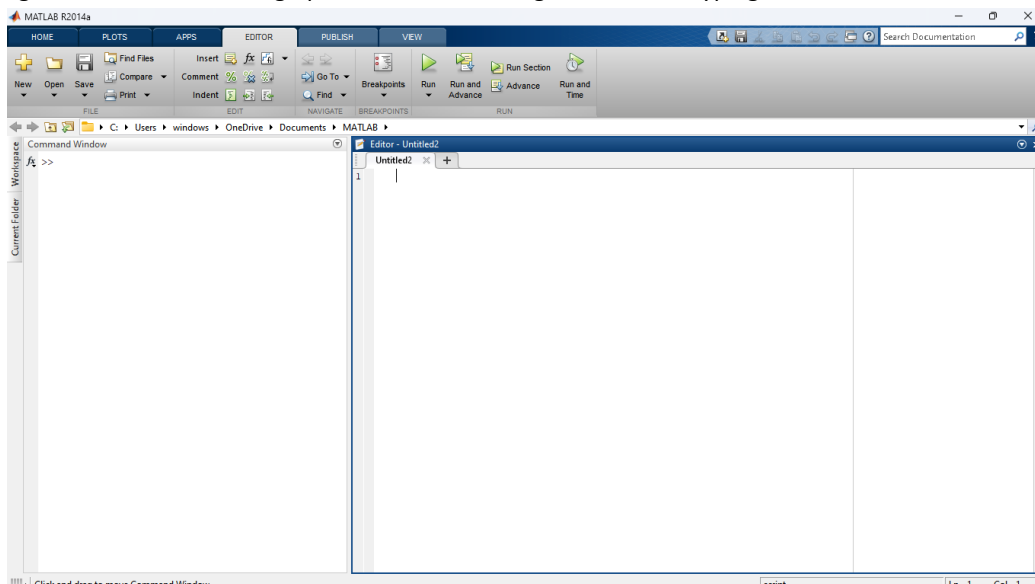
No.	Account's name	Filtering	Stemming
1	matahari_me	pagi mengantar bapak vaksin booster unika atma jaya relawannya banyak ramah pesertanya banyak tertib prosesnya berjalan cepat terima kasih	pagi antar bapak vaksin booster unika atma jaya relawan banyak ramah peserta banyak tertib proses jalan cepat terima kasih
2	atiekkustia	alhamdulillah udah vaksin booster kemaren ayo vaksin bantu perangi covid omicron	alhamdulillah udah vaksin booster kemaren ayo vaksin bantu perangi covid omicron
3	naevyblu	apakabar putusan ma menyatakan pakai vax halal lupa negara bebas badan ketika resmipun melanggar hukum penyuntik modal bilang	apakabar putusan ma nyata pakai vax halal lupa negara bebas badan ketika resmi langgar hukum suntik modal bilang

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		lanjut terabas	lanjut terabas
4	Yuyuns152	kasian masyarakat harus vaksin biar kuat imunnya abis vaksin imunnya turun harus boster ada saja kebohongan bukan menyelesaikan masalah	kasian masyarakat harus vaksin biar kuat imun abis vaksin imun turun harus boster ada saja bohong bukan selesai masalah

**F. Programming**

In this research, the Matlab program was used. Matlab (Matrix Laboratory) is a software developed by Mathworks, Inc. by utilizing the matrix in its use (Atina, 2019). Besides Matlab, Microsoft Excel was also used as an implementing tool or a place to process data, as well as using the KNN algorithm as a decision-making system. When it entered the initial appearance of Matlab, it contained related tools and interfaces. Each program has its own uniqueness in using its tools, such as in making a GUI. Whereas in the Matlab program, to be able to bring up a GUI, the first thing to do was to type guide in the Command Window.



**Figure 2. Display of Matlab Interface**

Before inputting the KNN algorithm, there was 1 (one) file in .mat format or a Matlab built-in file that functioned as a variable, then 2 (two) Excel files with functions as test data and training data that had to be created. Thus, the program with the KNN algorithm could run properly. Variables with the .mat file format can be added by selecting the New Variable menu, then a table would appear that could be filled in so that later each point on the diagram obtained its own coordinates. These variables were obtained from the KNN formula which is explained as follows:

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$$dis(x_1, x_2) = \sqrt{\sum_{i=0}^n (x_{1i} - x_{2i})^2}$$

Table 7. Test Data Sample

No.	Account's name	Fill the Comments (Tweet)	Cluster
1	upk_kemendes	Semangat memutus rantai penyebaran dengan mengikuti vaksinasi Covid-19 dan disiplin protokol kesehatan. Salam sehat ❤️	1
2	GrangerKeren	Saya & keluarga tidak vaksin covid19, tetap sehat sampai sekarang. No Vaksin Covid, badan sehat dan bugar 🍊.	2
3	black_granger23	Mari yang belum dapat vaksin, segera vaksin	1
4	matahari_me	Tadi pagi mengantar Bapak ke sentra vaksin booster Unika Atma Jaya. Relawannya banyak dan ramah. Pesertanya juga banyak. Tapi semua tertib dan prosesnya berjalan dgn cepat 🍊👍 Terima kasih!	1

## G. Classification

The classification process was carried out using the KNN method as the algorithm. The results of the classification method were to provide a conclusion that the input comments contained negative or positive elements. It followed the test data as the key to its classification. In the process of testing the method, the results of the classification of comments on Twitter were as expected by researchers. This statement was proven by the image below after entering several comments from the platform and checking. The result obtained from the system was to notify the nature of the comment, whether it was negative or positive. The following shows some of the results.



Figure 3. Display of Positive Comment Results



Figure 4. Display of Negative Comment Result

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## IV. CONCLUSIONS

According to the research results that have been analyzed with a total of 50 tweet comments, it is found that there are 37 samples with an accuracy of 74% comments on Twitter that are positive (support/agree with the Covid-19 booster vaccine policy). In addition, 13 samples with an accuracy of 26% comments on Twitter are negative (in this case it means less support for the Covid-19 booster vaccine policy). For future research, it is expected that they can analyze sentiment in a comment using English or other languages and add more data. therefore, the results obtained are even better and the level of accuracy can be higher.

## ACKNOWLEDGMENT

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## The Influence of Obesity and Self-Confidence on Students' Physical Self-Concept; Correlation Study

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**ABSTRACT:** This study aims to analyze: (1) The effect of obesity on physical self-concept. (2) The effect of self-confidence on physical self-concept. (3) The effect of obesity and self-confidence on physical self-concept. This type of research is quantitative with an ex post facto approach. The population in this study were junior high school students in Kulon Progo Regency. The sampling technique used was purposive sampling to collect 60 obese children from schools in Kulon Progo Regency. Inclusion criteria for cases and controls were obese children in the age range of 11-15 years. The instrument used is a questionnaire—data analysis technique using ANOVA analysis. The results showed that (1) there was a significant relationship between obesity and physical self-concept, with a significance value of  $0.000 < 0.05$ . (2) there is a significant relationship between self-confidence and physical self-concept, with a significance value of  $0.002 < 0.05$ . (3) there is a significant effect between obesity and self-confidence on physical self-concept, with a sig.  $0.000 < 0.05$ .

**KEYWORDS:** obesity, self-confidence, physical self-concept

### INTRODUCTION

Adolescence is the arrival of puberty, a transition period from childhood to adulthood. This period is almost always a difficult time for teenagers. The adolescent phase is a very important segment of individual development, which begins with the maturity of the physical organs (Yuldashov & Robilova, 2022). Teenagers usually start paying attention to their physical appearance and want to change their appearance by paying more attention to skin problems, wanting to have an ideal body, wanting to be taller and, of course, having an ideal body weight. The highest level of concern about body shape mainly occurs in adolescents; the problem of body shape is something that is very feared because it is considered something very important to them.

Obesity is a non-communicable disease (non-communicable) which is a health problem both in Indonesia and the world. Overweight and obesity are abnormal or excessive fat accumulation that poses a health risk. The gross population size for obesity is Body Mass Index (BMI), a person's weight (in kilograms) divided by the square of his height (in meters) (Al-Ghamdi et al., 2018). A person with a BMI of 30 or more is considered obese. Obese adolescents whom their peers shun tend to experience low self-esteem and a great sense of hopelessness. Feeling different or distinguished from the group will make obese individuals vulnerable to various psychological problems.

In fact, body shame is experienced by teenagers reaching 64%. Body shame due to being insulted and criticized by others leads to eating disorders, decreased mental health, and poor self-image in adolescents. For many victims, these swearing and embarrassing comments can leave psychological scars that predispose them to binge eating disorders and social withdrawal (Stacey, 2017). Bullied and criticized by their peers because they are fat, they tend to feel afraid, stressed, anxious, embarrassed, feeling less than human. Way of weight loss with dangerous tactics such as induced vomiting, leading to suicide attempts among school-age children.

Physical appearance and the desire to have an ideal body are what teenagers want because, at this time, individuals begin to interact a lot with their social environment and also the opposite sex. The ideal body among adolescents is considered something that has appeal but is not for obese adolescents. This causes self-concept in adolescents who are obese to be seen as disturbed, lacking, or not in accordance with the problems they are experiencing. Self-concept is all the ideas, thoughts, beliefs, and beliefs that individuals know about themselves and affect individuals in dealings with other people (Tus, 2020). Self-concept is the way an individual views himself as a whole, involving the physical, emotional, intellectual, social, and spiritual. Self-concept has five components, namely body image, self-ideal, self-esteem, self-role, and self-identity. Some things included in

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self-concept are individual perceptions of their nature and potential, interactions with other people and their environment, values related to experiences and objects, goals, hopes, and desires (Stuart, 2014).

Self-concept in students can be seen in students who have self-confidence, they can express their opinions in front of the class but if they do not have self-confidence then they can only be silent. He was afraid that one class would make fun of him if the opinions expressed were far from perfect. Sometimes symptoms of lack of confidence appear suddenly, without being noticed by someone when doing something so that person cannot optimally use their abilities. Likewise, a student who has a low physical self-concept result in a lack of self-confidence, which will then hinder the development of intellectual achievement, skills, and independence and make the student incapable of socializing (not sociable). These students do not have the courage to actualize themselves in the social environment. A lack of self-confidence makes a person angry with himself and results in a disruption of learning achievement. Most students who feel they have failed with their achievements find it difficult to develop self-confidence. Fear of challenging tasks, fear of failure, and accustomed to taking on tasks with little challenge. Moreover, teenagers who are obese, feel inferior in dealing with everything.

Research by Serassuel Junior et al., (2015) shows that the obese group is more likely to present an imbalance in behavior and emotional context compared to the normal weight group, regardless of age, skin color, and gender. The results show a negative impact on the perception of the overall self-concept and a difference between boys and girls caused by obesity. These results indicate the magnitude of the effect caused by obesity, especially in adolescence. A study by Tyrrell et al., (2019) also stated that obesity can increase the risk of depression. In addition, adolescents who have low physical activity and a highly sedentary lifestyle are more at risk of being overweight or obese (Almughamisi et al., 2017); (Aryeetey et al., 2017). From several existing theories and facts, no research has been found that examines this issue in detail. So the researcher hopes that conducting this research will help many parties in overcoming the problems described in the background.

### METHOD

This type of research is descriptive quantitative with an ex post facto approach. Ex post facto is research that aims to find causes that allow changes in behavior, symptoms or phenomena caused by an event, behavior or things that cause changes in the independent variables that have taken place as a whole. The population in this study were junior high school students in Kulon Progo Regency. The sampling technique used was purposive sampling to collect 60 obese children from schools in Kulon Progo Regency. Inclusion criteria for cases and controls were obese children in the age range of 11-15 years. The obesity instrument measures ideal body condition using the Body Mass Index (Valenzuela et al., 2020). The instrument on the physical self-concept variable uses the Children and Youth Physical Self-Perception Profile (CY-PSPP) questionnaire (Ruiz-Montero et al., 2020). The self-confidence instrument uses a questionnaire. The analysis technique used is regression analysis using SPSS for windows version 23.

### FINDING

The results of the descriptive analysis are intended to determine respondents' responses to obesity and self-confidence variables in physical self-concept based on the results of filling out the questionnaire. Statistical descriptive results based on the mean and standard deviation are detailed in Table 1.

**Table 1. Descriptive Statistics**

No	Variable	Statistic
1	Obesity	30.12±3.22
2	Confidence	196.12±6.45
3	Physical self-concept	100.42±8.36

The data normality test in this study used the Kolmogorov-Smirnov method. The results of the data normality test performed in each analysis group were carried out with the SPSS version 20.0 for windows software program with a significance level of 5% or 0.05. The summary of the data is presented in Table 2

**Table 2. Normality Test Results**

One-Sample Kolmogorov-Smirnov Test		
		Standardized Residual
N		60
Normal Parameters <sup>a,b</sup>	Mean	.0000000

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	Std. Deviation	.98787834
Most Extreme Differences	Absolute	.056
	Positive	.041
	Negative	-.056
Test Statistic		.056
Asymp. Sig. (2-tailed)		.200 <sup>c,d</sup>

Based on the statistical analysis of the normality test that was carried out using the Kolmogorov-Smirnov test in Table 6, the obesity and confidence in physical self-concept variables obtained the results of the normality test with the Asymp.Sig value (2-tailed)  $p > 0.05$ , which means normally distributed data.

Testing the linearity of the relationship is carried out through the F test. The relationship between the independent variable (X) and the dependent variable (Y) is declared linear if the sig value  $> 0.05$ . The results of the linearity test can be seen in Table 3.

**Table 3. Linearity Test Results**

No	Functional Relations	<i>p</i>	<i>Sig.</i>	Description
1	Obesity * Physical self-concept	0.542	0.05	Linier
2	Self-confidence * Physical self-concept	0.325	0.05	Linier

Based on the results of the analysis in Table 3 above, it can be seen that the relationship between obesity and physical self-concept has a significance value of  $0.542 > 0.05$  and the relationship between self-confidence and physical self-concept has a significance value of  $0.325 > 0.05$ , otherwise linear.

The multicollinearity test uses the Variance Inflation Factor (VIF) value in the regression model, if  $(VIF) > 10$ , then this variable has problems with other independent variables. The results of the multicollinearity test can be seen in Table 4.

**Table 4. Multicollinearity Test Results**

No	Variable	Tolerance	VIF
1	Obesity	0.871	1.112
2	Confidence	0.871	1.112

Based on Table 4 above, the value of the variance inflation factor (VIF) is obtained, the Obesity variable ( $X_1$ ) = 1.112 and Confidence ( $X_2$ ) = 1.112. The two independent variables have a VIF value of less than 10, so it can be concluded that there is no multicollinearity between the independent variables.

Further analysis of the hypothesis, namely partial test and simultaneous test. The t (partial) test was conducted to determine the effect of each independent variable, namely obesity and self-confidence on physical self-concept. The results of the (partial) t test analysis are presented in Table 5 as follows.

**Table 5. Results of Partial Test Analysis (t test)**

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig,
		B	Std. Error	Beta		
1	(Constant)	17.659	2.746		13.904	0.000
	Obesity	1.263	0.098	0.583	6.208	0.000
	Confidence	-0.115	0.060	-0.334	-4.021	0.002

a. Dependent Variable: Physical self-concept

The obesity variable obtained a significance value (sig) of 0.000. Because the significance value is  $0.000 < 0.05$ , then  $H_0$  is rejected, meaning that  $H_1$  which reads "there is a significant relationship between obesity and physical self-concept" is accepted. Negative value, meaning that if obesity is higher, then the physical self-concept will be less.

The confidence variable obtained a significance value (sig) of 0.002. Because the significance value is  $0.002 < 0.05$ ,  $H_0$  is rejected, meaning that  $H_2$  which reads "there is a significant relationship between self-confidence and physical self-concept" is accepted. Positive value, meaning that if the self-confidence is getting better, then the physical self-concept will also be getting better.

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The F test is used to test the hypothesis whether the independent variables simultaneously (simultaneously) affect the dependent variable. H3 reads "there is a significant influence between obesity and self-confidence on physical self-concept". The results of the analysis in Table 6.

**Table 6. Results of F Test Analysis (Simultaneous)**

ANOVA <sup>b</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	427.455	3	142.485	327.160	.000 <sup>a</sup>
	Residual	59.231	136	.436		
	Total	486.686	139			
a. Predictors: (Constant), Confidence, Obesity						
b. Dependent Variable: Physical self-concept						

Based on Table 6 above, the calculated F coefficient is 327,160 and the sig. 0.000 <0.05, then Ho is rejected, meaning. The alternative hypothesis which reads "there is a significant effect between obesity and self-confidence on physical self-concept", is accepted.

The coefficient of determination is basically used to measure how far the ability of the regression model is to explain the variation of the dependent variable. The results of the analysis in Table 7 are as follows.

**Table 7. Results of the Analysis of the Coefficient of Determination**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.548 <sup>a</sup>	0.300	0.298	2.59762
Predictors: (Constant), Confidence, Obesity				

The coefficient of determination R Square or obesity and confidence in explaining or predicting physical self-concept variables is 0.300 or 30.00%. This means that the variables of obesity and self-confidence have an influence on the physical self-concept of 30.00%, while the rest are influenced by other factors by 70.00% outside this study.

## DISCUSSION

### The Effect of Obesity on Physical Self-Concept

Based on the results of the study showed that there is a significant relationship between obesity and physical self-concept. This research is in line with research conducted by Rupang et al., (2013) where obesity greatly influences adolescent development, especially in the formation of self-concept. Self-concept is critical to psychological well-being and is a term used to describe an individual's awareness of their qualities and limitations (Jacobs et al., 2002). Self-concept can improve one's development by influencing body image not avoiding negative appearances. If a person has knowledge about himself and a better self-concept character in perceiving an individual's mental image of his body (positive self-concept), then he has a body-image satisfaction (Cade et al., 2018).

Physical self-concept was significantly higher for boys than for girls across eight subdomains, as well as global physical self-concept and self-esteem. Physical self-concept decreases with age, and there are significant age-related gender interactions in the global physical, body fat, appearance, sporting competence, and strength dimensions. Physical appearance is the subdomain that most strongly predicts global self-esteem (Klomsten et al., 2004). Sports participation has a greater effect on positive body satisfaction among boys (Gomez-Baya et al., 2019).

Boys have greater sports confidence and competence than girls, while girls have better perceptions of physical appearance and physical strength than boys. The better the physical self-concept, the less obesity is found in men and women (Zsakai et al., 2017). Cash (2012) stated that women are often dissatisfied with their bodies and also often talk about negative statements about their bodies, including weight, diet, and exercise.

The significant relationship between self-concept and body image is because someone with a positive self-concept will include compatibility between identity or ideal self-expectations. That someone will face change. Individuals who have a positive level of self-concept change can be one of the factors of body image. Self-concept can be viewed from knowledge, which means that individuals know all ways of regarding or treating themselves, expectations for the future, and each individual certainly has

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different expectations; and the assessment of individuals who evaluate and evaluate themselves, which includes conformity between identities or ideal self.

Adolescents who are obese tend to be ridiculed by their friends, so they have impaired self-concepts. One of the factors that influence self-concept is a stressor. Stressors can strengthen self-concept when individuals successfully deal with problems. On the other hand, the excessive stressor comes from the problem of the respondent's weight, and the effects of this weight are in the form of an influence on himself and the surrounding environment. Stressors in the form of excess body weight in respondents can cause a lack of confidence, inferiority, and withdrawal. In contrast, the individual's ability to deal with stressors is highly dependent on each individual's resources. If personal power is lacking, the stressor can cause the self-concept to become a negative self-concept.

Obesity is often associated with psychological and social disorders such as low self-esteem and low self-concept, feelings of inferiority, lack of self-control, depression, anti-social behavior, or inactive behavior (Teixeira et al., 2012). Higher levels of physical activity intensity can improve physical fitness and prevent or reduce excess weight among children and adolescents (Aires et al., 2010). Educational policymakers and Physical Education teachers should implement strategies to promote physical activity in schools and provide quality Physical Education programs to increase physical activity during adolescence (Fernández-Bustos et al., 2019).

### **The Effect of Self-Confidence on Physical Self-Concept**

Based on the results of the study shows that there is a significant relationship between self-confidence and physical self-concept. Someone who has a positive self-concept will be able to be an individual who is optimistic, responsible, and has high self-confidence. Self-concept is a view of the feelings that students have about themselves, which are obtained from the process of observing themselves and according to the perceptions of others in the form of physical, psychological, and social characteristics. The expected self-concept is positive because a positive self-concept will form high self-confidence in individuals that can lead to humility and generosity as well as a positive, optimistic attitude related to the success that the individual wants to achieve. Mualifah et al., (2019) stated that a positive self-concept encourages a person to be optimistic and have high self-confidence. Individuals who have a positive self-concept or tend to be high in mental health will be better at perceiving themselves as a whole, which in turn will also lead to high self-confidence.

Sharma & Sahu, (2013) on 25 schools in 5 countries, states that gender greatly influences the level of individual confidence. Specifically, this study states that the male gender has a higher level of self-confidence than the female. The results of research by Goel & Aggarwal (2012) on 363 students in 1 public junior high school and one public high school showed that age differences resulted in differences in the level of self-confidence in students, where high school students had a higher level of self-confidence. Confidence is an individual's ability to take appropriate and effective actions in any situation, even in a challenging one. Confidence is an attitude or belief in the abilities possessed by individuals so that individuals are not always anxious to act, are free to do what they like, are responsible for every action, are warm and polite when interacting with other individuals, and are able to recognize their own strengths and weaknesses. Self-confidence is formed through physical condition, ideals, caring attitude, and life experience (Oktafiani & Yusri, 2021).

Mindset is very influential on self-confidence and physical reactions and will lead to one's social interactions. Changes in individual behavior affect how the individual thinks and how the individual feels, both physically and emotionally. One's mindset is very helpful in overcoming problems related to moods, such as depression, anxiety, anger, and guilt. If a person has a positive mindset, the individual can overcome mood-related problems. Likewise, it is better if individuals think negatively, they will tend to feel depressed, insecure or embarrassed, anxious, panicked, feel guilty, which in turn interferes with their social interactions. Although positive thinking is not a solution to life's problems, thinking will help determine the mood experienced in certain situations.

In this case, self-concept has a very important role in increasing one's self-confidence, especially in increasing self-confidence in students, because a positive perspective on the abilities possessed by each individual it will make each individual feel more confident, and there will be no worry or anxiety with the abilities they have. Likewise, it is better to have a negative perspective on yourself or your abilities so that you will feel worried, insecure, and anxious about yourself.

### **The Relationship between Obesity and Self-Confidence on Physical Self-Concept**

Based on the results of the study, it can be concluded that there is a significant influence between obesity and self-confidence on physical self-concept. Among adolescents, obesity is a worrying problem because it can reduce self-confidence and cause serious psychological disorders, not to mention the possibility of discrimination from the surrounding environment. You can imagine that if obesity occurs in adolescents, then these adolescents will grow into teenagers who lack confidence. Obesity experienced by a person as a teenager is closely related to an increased risk of death in middle age. Most adolescents who are

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overweight reveal that they tend to be insecure about their weight; they show obvious changes in attitudes, such as feeling insecure about their weight because they feel they do not look better than others; in their minds, people who are overweight excess can worsen appearance (Hu & Liu, 2022). They think that a good appearance can be seen from an ideal body posture, which is why efforts to lose weight appear so that they can look better, even though the methods taken are not always for the health of the body.

Factors that affect self-concept are body image disturbances such as changes in perception of the body both in function, size, and shape, disturbances in self-ideals, role disturbances such as the aging process, identity disturbances such as uncertainty of looking at oneself doubtfully, and being unable to make decisions. Obesity in adolescents impacts psychosocial disorders such as low self-esteem, depression, withdrawal from the environment, respiratory disorders, degenerative and metabolic diseases, narrowing of blood vessels, faster physical growth, and so on (Zeiler et al., 2021). The impact caused by obesity is psychosocial disorders and self-concept, for example, low self-esteem and lack of confidence, if it is prolonged, you will experience social isolation and depression.

In adolescence, they begin to be more aware of themselves than during childhood. Adolescents will be more self-aware and pay more attention to their body image and this concern for body image will be more pronounced in young women. Psychologically, the conditions that often appear side by side with obesity are disturbances of self-concept, such as disturbances of body image and disturbances of self-esteem. Self-image, body image, body image, and body image is a person's attitude towards his body consciously and unconsciously. This attitude includes perceptions and feelings about the body's current and past size and shape, function, appearance, and potential.

### CONCLUSION

Based on the results of the study, it can be concluded that (1) there is a significant relationship between obesity and physical self-concept, with a significance value of  $0.000 < 0.05$ . (2) there is a significant relationship between self-confidence and physical self-concept, with a significance value of  $0.002 < 0.05$ . (3) there is a significant effect between obesity and self-confidence on physical self-concept, with a sig.  $0.000 < 0.05$ . For students, it is hoped that they will be able to interact with each other in a mutually supportive manner to create an attitude of mutual respect and need for each other which will be able to form a more positive self-concept which in the end can also create high self-confidence as well. Future researchers who wish to carry out this research are expected to examine other factors related to physical self-concept.

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## The Effect of Capital Structure, Profitability and Intellectual Capital on Company Value in Manufacturing Companies



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**ABSTRACT:** Company value is a condition that has been achieved by a company as an illustration of public trust in the company after going through a process of activities for several years. The main goal of a company is to maximize the value of the company. And by increasing the value of the company, an achievement will be in accordance with the wishes of the owners, because with the increase in the value of the company, the welfare of the owners will also increase. listed on the Indonesia Stock Exchange from 2017-2019. Determination of the sample used is purposive sampling, The sample used for this study was 187 companies with manufacturing categories listed on the Indonesia Stock Exchange from 2017-2019. The research method used is a quantitative method. Where data analysis is done by using multiple linear regression method. Hypothesis testing is done by using the coefficient of determination. The results of the study show that Capital Structure, Profitability and Intellectual Capital have a significant influence on firm value.

**KEYWORDS:** Capital Structure, Profitability, Intellectual Capital, Firm Value

### PRELIMINARY

The Indonesia Stock Exchange (IDX) is a government institution that acts as an exchange organizer where people carry out transactions and trade shares with various rules that have been set on the Indonesia Stock Exchange. Economic growth in Indonesia over time continues to grow. This development will always be a routine activity within the company in order to become a go public company.

Dewi and Wirajaya (2013), argue that the value of the company is very important because it reflects the company's performance which can affect investors' perceptions of the company. One of them is the view of the company's value for creditors. Firm value is the market value of a company's equity plus the market value of debt. Thus, the addition of the company's total equity to the company's debt can reflect the value of the company.

Funding decisions are very important for companies to carry out operating activities, when a company is built, the company will need optimal capital. Companies can choose various funding alternatives that will be considered to maximize the value of the company. The comparison between capital and equity will certainly be the basis of management in the formation of capital structure.

Companies that increase debt can be seen as companies that believe in the company's prospects in the future, so it is hoped that investors can catch this positive signal from the company. Anggraini (2015) in Dewi and Badjra (2013). Research on the effect of capital structure on firm value has been studied previously and there is a research gap, namely Cristy et al. (2018) states that capital structure has a positive effect on firm value. This statement is supported by previous studies, research from Dewi et.al (2014), and Chandra et al. (2018), on the other hand, research from Dewi and Badjra (2013) states that capital structure has a negative effect on firm value.

Trade off theory assumes that there are things that prevent companies from using as much debt as possible. The use of high debt will result in bankruptcy. Bankruptcy costs include the first legal fee, which is the fee that must be paid to legal experts to settle claims. The second is the distress price, where the company's assets are forced to be sold at a low price when the company is declared bankrupt. The use of debt is justified in the company if the use of leverage provides economic profitability that is greater than debt interest.

One indicator that is often seen by investors and is the main ratio is the profitability ratio. Brealey, Myers, and Marcus (2013) in Setiawati and Lim (2018) argue that shareholder value depends on good investment decisions and profitable business operations. Shareholders will be interested in investing in companies that perform well. The company's performance can be

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described through the company's ability to benefit from its business operations. From the profits achieved by the company, it can be trusted that the survival of a company in the future or survive at least one year in the future to maintain a going concern company.

Research on the effect of profitability on firm value has been carried out by several researchers and there is a research gap, namely Andhika and Retnani (2017) stating that profitability has a significant influence on firm value. Lumoly et.al.(2018) stated that profitability has a significant influence on firm value, this statement is supported by research from Setiawati and Lim (2018) that profitability has an effect on firm value, on the contrary research conducted by Kurniawati et.al (2019) stated that that profitability has no effect on firm value.

Human resources and knowledge have now formed added value and competitive advantage in modern companies and have become a new engine in the business world, nowadays many business people are aggressively emphasizing their intangible assets, in this case knowledge and the ability to increase company value. , so that the company is able to compete with its competitors and not only compete using the ownership of tangible assets so that the company can increase the value of the company, to increase the value of a company, the company needs to have value added (VA). This value added (VA) can be created by developing the intellectual capital of the company.

In Andhika and Retnani's research (2017). Intellectual capital is believed to play an important role in increasing company value and financial performance. Companies that are able to utilize their intellectual capital efficiently, the value of the company will increase. Research on the influence of Intellectual Capital on firm value has been carried out by several researchers and there is a research gap, namely Gozali and Hatane (2014) stating that intellectual capital affects firm value. This research is supported by Pambudi and Andayani (2017) intellectual capital affects firm value, On the other hand, research conducted by Widarjo (2011) shows that intellectual capital has no effect on firm value.

### **STUDY OF THEORY AND HYPOTHESES**

#### **Trade of Theory**

Trade of theory was first introduced in 1963 by Modigliani and Miller in an American Economic Review article 53 (1963, June) entitled Corporate Income Taxes on the Cost of Capital: A Correction. According to the trade-off theory expressed by Myers (2001:81), "Companies will be in debt to a certain level of debt, where the tax shields from additional debt equal the cost of financial distress (financial distress).

#### **Resource-Based Theory.**

*Resource-Based Theory (RBT)* is a thought that developed in the theory of strategic management and company competitive advantage which believes that the company will achieve excellence if it has superior resources (Solikhah et al, 2010).

#### **The Value of the Company**

Company value is a condition that has been achieved by a company as an illustration of public trust in the company after going through a process of activities for several years, namely since the company was founded until now (Noerirawan 2012). The value of the company is determined by the value of its own capital and the value of debt. The value of the company is closely related to the company's ability to increase the prosperity of its shareholders. For companies that sell their shares to the public (go public), the indicator of company value is the price of shares traded on the stock exchange.

#### **Capital Structure**

Capital structure is equity and debt funding in a company. Meanwhile, according to Brigham and Houston (2011). The capital structure that shows the ratio between total debt to equity can be measured using the debt to equity ratio (DER). DER is a company's ability to pay debts with its capital and is closely related to the explanation of a capital structure whose data affect the company's funding policy that is appropriate and useful to maximize company value.

#### **Profitability**

Profitability is income minus expenses and losses during the reporting period. Analysis of profitability is very important for creditors and equity investors. For creditors, profit is a source of interest and principal payments. As for equity investors, profit is one of the determinants of changes in the value of securities. The most important thing for the company is how the profit can maximize shareholders, not how much profit the company generates.

#### **Intellectual Capital**

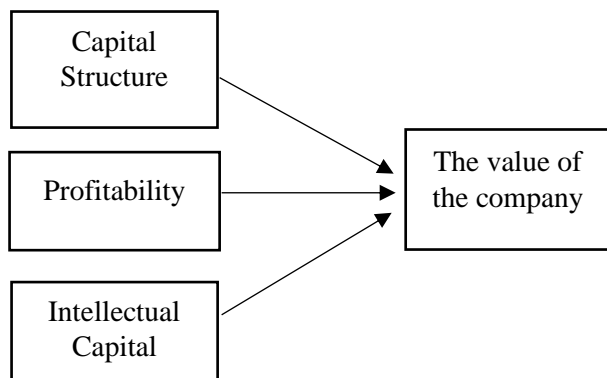
Intellectual capital is a resource in the form of knowledge available to the company, where this knowledge will become intellectual capital if it is created, maintained and managed properly. According to practitioners, intellectual mode consists of three main elements (Stewart, 1998; Sveiby, 1997; Saint-Onge). , 1996) Iranmahd et al. (2014) stated that intellectual capital has

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become an important part for companies. elements of intellectual capital can be divided into three categories, namely knowledge related to employees (human capital), knowledge related to company infrastructure and is a supporter of human capital (structural capital) and knowledge related to company partners (customer capital). These three categories form an intellectual capital for the company.

Currently efforts to determine the intellectual capital in a company is an important thing. The difficulty in intellectual capital is a measurement problem. The Pulic model measures intellectual capital not directly but by proposing a Value Added Intellectual Coefficient (VAIC™) to provide information about the efficiency of value creation from tangible and intangible assets in a company.

## RESEARCH MODEL



## Hypothesis

- H1: Capital structure has a positive effect on firm value
- H2: Profitability has a positive effect on firm value.
- H3: Intellectual Capital has a positive effect on firm value.

## RESEARCH METHODS

### Sampling Method

This research was conducted on manufacturing companies listed on the Indonesia Stock Exchange (IDX) for the 2017-2019 period which were accessed through [www.idx.co.id](http://www.idx.co.id). The object studied in this study is the influence of capital structure, profitability and intellectual capital on the value of manufacturing companies listed on the Indonesia Stock Exchange (IDX) in 2017-2019. The research population is all companies with manufacturing categories listed on the Indonesia Stock Exchange in 2017-2019 with a total of 187 companies. The sample in this study amounted to 75 companies which were determined according to the criteria based on the purposive sampling method.

### Multiple Linear Regression Analysis

The data analysis technique used is multiple linear regression analysis. This analysis is used to test the effect of two or more independent variables on the dependent variable. The dependent variable in this study is financial management, while the independent variables are financial literacy, hedonistic lifestyle, income. Data analysis was assisted by the SPSS program, The equations for testing the overall hypothesis in this study are as follows:

$$Y = 0 + 1X_1 + \beta_2X_2 + 3X_3 + 4X_4 + B_5X_5 + t$$

Information:

- Y = Company Value
- 0 = Constant
- X1 = Capital Structure
- X2 = Profitability
- X3 = Capital intellectual
- t = Error

RESULTS AND DISCUSSION

Multiple Linear Regression Analysis Results

Table 1. Multiple Linear Regression Analysis Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.231	.172		12.998	.000
	DER	.000	.001	-.028	-.438	.662
	ROE	.003	.001	.317	4.825	.000
	IC	1.86E-009	.000	.196	2.978	.003

Based on the values in Table 4.1, the multiple linear regression equation will be:

$$PBV = 2.231 + 0.000 X1 + 0.003 X2 + 0.0000000018 X3 + e$$

From these equations it can be concluded that:

The constant value of 2.231 states that if the capital structure (X1), profitability (X2) and intellectual capital (X3) are zero (0), then the firm value increases by 2.231. The regression coefficient of the capital structure variable (X1) is 0.000. It means that if the capital structure increases by one unit, the value of the company will increase by 0.000 units with the assumption that the other independent variables are constant. The profitability variable regression coefficient (X2) is 0.003. It means that when profitability increases by one unit, the value of the company will increase by 0.003 units assuming other independent variables are constant. The intellectual capital variable regression coefficient (X3) is 0.0000000018.

Classic Assumption Test Results

Normality test

The data normality test aims to test whether in the regression model the dependent variable and the independent variable both have a normal distribution or not. A good regression model is to have a normal or close to normal data distribution. Normality testing is done with the Kolmogorov-Smirnov One Sample Test, where the data is said to be normally distributed if the significance is greater than 0.05. From the results of the analysis using the SPSS version 22 For Windows program, the results of the Normality Test are obtained in Table 2 below:

Table 2. Normality Test Results

		Unstandardized Residual
N		211
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	2.37074833
Most Extreme Differences	Absolute	.212
	Positive	.212
	Negative	-.199
Kolmogorov-Smirnov Z		1.207
Asymp. Sig. (2-tailed)		.109

From Table 2 it can be seen that the Asymp.Sig value of each variable is 0.109 which is greater than 0.05, therefore it can be stated that the regression model is normally distributed.

Multicollinearity Test

The multicollinearity test aims to determine whether the regression model found a correlation between independent variables (Ghozali, 2016: 104). If the independent variables are correlated with each other, then there is a multicollinearity problem. To detect the presence or absence of multicollinearity in the regression model, it can be seen from the values of tolerance and variance inflation factor (VIF). If the tolerance value is more than 10 percent or the Variance Inflation Factory (VIF) is less than 10, it is said that there is no multicollinearity. Tolerance and VIF values can be seen in Table 3 as follows:

Table 3. Multicollinearity Test Results

Variable	Collinearity Statistics	
	Tolerance	VIF
DER	0.988	1.012
ROE	0.931	1.075
IC	0.927	1.079

In Table 3 it can be explained that the Tolerance value of the capital structure variable is 0.988, profitability is 0.931, intellectual capital is 0.927 which is greater than 0.10 and the Variance Inflation Factor (VIF) value of the capital structure variable is 1.012, profitability is 1.075, intellectual capital is 1.079 which is less than 10, so it can be concluded that the regression model does not occur multicollinearity.

**Heteroscedasticity Test**

Heteroscedasticity test aims to test whether in the regression model there is unequal variance from the residuals of one observation to another observation. If the variance of the residuals from one observation to another observation remains, it is called homoscedasticity and if there is a difference it is called heteroscedasticity. The regression model is said to be good if there is homoscedasticity or there is no heteroscedasticity. In this study, the heteroscedasticity test used the glejser test (Ghozali, 2016: 134). The Glejser test is carried out by making a regression model involving the absolute residual value, namely by regressing the absolute residual value with the independent variable. The provisions used if the significance value is greater than 0.05 then there is no heteroscedasticity, which means that the regression model does not contain any heteroscedasticity. The results of the heteroscedasticity test can be seen in table 4 as follows:

Table 4. Heteroscedasticity test results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.706	.121		14.148	.000
	DER	.000	.001	-.033	-.472	.637
	ROE	.000	.000	-.062	-.868	.387
	IC	2.57E-010	.000	.042	.584	.560

From Table 4 it can be explained that the significant value of the capital structure variable is 0.637, profitability is 0.387 and intellectual capital is 0.560 greater than 0.05, so it can be concluded that in the regression model there is no heteroscedasticity.

**Coefficient of Determination**

The coefficient of determination is used to measure the ability of variable X (independent variable) to influence variable Y (dependent). This test is intended to determine the best level of certainty in the regression analysis which is expressed by the coefficient of determination. The value of the coefficient of determination, namely  $R^2 = 1$ , means that the independent variable has a perfect effect on the dependent variable, and otherwise  $R^2 = 0$  means that the independent variable has no effect on the dependent variable.

Based on the table, it can be explained that the Adjusted R Square value is 0.159 or 15.9%. This means that the variation of Y, namely firm value, can be explained by 15.9% by variables of capital structure, profitability and intellectual capital, while the remaining 84.1% is influenced by other factors not included in the model.

**F Uji Test**

The F statistical test is used to determine the effect of the independent variable simultaneously (simultaneously) on the dependent variable. Significant means that the relationship that occurs can apply to the population. The results of the F statistical test can be seen in the ANOVA table in the sig column. If the significance value is less than or equal to 0.05, then there is a jointly significant effect between the independent variables on the dependent variable (Ghozali, 2016: 99).

Based on the results of the F test in the table, it can be explained that the F value of 14.209 with a significant value of 0.000 is smaller than 0.05, this means that the capital structure, profitability and intellectual capital jointly affect the firm value variable.

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## T Test

The t statistic test was used to partially test each variable. The results of the t test can be seen in the coefficients table in the sig (significance) column. If the probability of t value or significance 0.05, it can be said that there is an influence between the independent variables on the dependent variable partially. However, if the probability of t value or significance > 0.05, it can be said that there is no significant effect between each independent variable on the dependent variable.

Based on the results of the t statistical test, it can be explained as follows:

### First Hypothesis Testing

The value of the capital structure variable shows a t value of -0.438 with a significance value of 0.662 greater than 0.05 and a beta coefficient value of 0.000, so the results of the research that capital structure has no effect on firm value, so the first hypothesis which states that capital structure has a positive effect on value company rejected.

### Second Hypothesis Testing

The value of the profitability variable shows a t value of 4.825 with a significant value of 0.000 which is smaller than 0.05 so that the second hypothesis which states that profitability has a positive effect on firm value is accepted.

### Third Hypothesis Testing

The value of the intellectual capital variable shows a t value of 2,978 with a significant value of 0.003 which is smaller than 0.05 so that the third hypothesis which states that intellectual capital has a positive effect on firm value is accepted.

## DISCUSSION OF RESEARCH RESULTS

### Effect of Capital Structure on Firm Value

The results showed that the capital structure has no effect on firm value in manufacturing companies, the higher the capital structure does not affect the increase in firm value. In this study the capital structure is proxied by DER (Debt to Equity Ratio). The results of this study indicate that the increase in firm value is not influenced by the high and low capital structure. So that investors will assume it is reasonable when a company has debt, as long as the company is able to balance the debt with the profits generated by the company. The results of this study are in line with the research of Oktrima (2017) and Utomo, et al. (2017), which states that capital structure has no effect on firm value.

### The Effect of Profitability on Firm Value

The results show that profitability has a positive and significant effect on firm value in manufacturing companies. The higher the profitability of a company, the better the value of the company. Profitability is income minus expenses and losses during the reporting period. Analysis of profitability is very important for creditors and equity investors. For creditors, profit is a source of interest and principal payments. As for equity investors, profit is one of the determinants of changes in the value of securities. The most important thing for the company is how the profit can maximize shareholders, not how much profit the company generates. Dewi and Badjra (2013) earnings analysis will help companies to make decisions in the future or at the present time. Based on this, profitability has a very large influence for investors, so the company strives to maximize existing resources to achieve the profit targeted by the company in order to maximize shareholder prosperity. The results of this study are in line with research conducted by Andhika and Retnani (2017) which states that profitability has a positive effect on firm value. so that the company strives to maximize existing resources to achieve the profit targeted by the company in order to maximize shareholder prosperity. The results of this study are in line with research conducted by Andhika and Retnani (2017) which states that profitability has a positive effect on firm value. so that the company strives to maximize existing resources to achieve the profit targeted by the company in order to maximize shareholder prosperity. The results of this study are in line with research conducted by Andhika and Retnani (2017) which states that profitability has a positive effect on firm value.

### The Effect of Intellectual Capital on Firm Value

The results show that intellectual capital has a positive and significant effect on firm value in manufacturing companies. The higher the intellectual capital of a company, the better the value of the company. Intellectual capital is a resource in the form of knowledge available to the company, where this knowledge will become intellectual capital if it is created, maintained and managed properly. According to practitioners, intellectual mode consists of three main elements (Stewart, 1998; Sveiby, 1997; Saint-Onge). , 1996) Iranmahd et al. (2014) stated that intellectual capital has become an important part for companies. Thus, the elements of intellectual capital can be divided into three categories, namely knowledge related to employees (human capital), knowledge related to the company's infrastructure and is a supporter of human capital (structural capital) as well as knowledge related to company partners (customer capital). These three categories form an intellectual capital for the company. In Andhika and Retnani's research (2017). Intellectual capital is believed to play an important role in increasing company value and financial performance. Companies that are able to utilize their intellectual capital efficiently, the value of the company will increase. The



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results of this study are in line with research conducted by Gozali and Hatane (2014) and Pambudi and Andayani (2017) which states that intellectual capital has a positive effect on firm value.

### CONCLUSION

Based on the results of data analysis on the effect of capital structure, profitability and intellectual capital on firm value in manufacturing companies listed on the Indonesia Stock Exchange for the 2017-2019 period, it can be concluded that capital structure has no effect on firm value in manufacturing companies. This shows that the higher the capital structure does not affect the increase in firm value. Then profitability has a positive effect on firm value in manufacturing companies. This shows that the higher the profitability of a company, the better the value of the company. And intellectual capital has a positive effect on firm value in manufacturing companies.

### SUGGESTION

Based on the limitations that have been stated above, here are some suggestions that can be given to the company, namely the company should improve the company's performance every year in order to be able to compete in gaining the trust of investors, making it easier to obtain capital from outside the company. The better the performance of the company, one of which can be reflected in the greater the value of ROE. So the company needs to increase the ROE value to gain the trust of investors

#### 2. For researchers

The results of this study are expected to provide benefits in efforts to develop similar research and become a reference for future research and it is hoped that further research will sample types of companies such as mining companies, banking companies, LQ45.

#### 3. For investors

Investors should pay attention to the value of ROE and DER before investing their capital in a company. Because the value of ROE and DER can show the amount of return and risk that will be received by investors for their investment.

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## Determinants of Charter Accountant Certified Accounting Students (Empirical Study on Accounting Major Students in Bali Province)



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**ABSTRACT:** Certified accountants are needed worldwide to improve the economy and the quality of information in the financial sector. Charter accountant (CA) certification for graduate accounting students can create professional accountants and have global competitiveness. This study aims to examine the determinants of student interest in accounting majors to become certified charter accountants (CA). The research was conducted on university students majoring in accounting in the province of Bali. Determinants of interest were tested through the approach of the theory of planned behavior, knowledge and personality type. The data was obtained by survey method by distributing questionnaires to 235 respondents. The analysis technique uses partial least squares. The results of the analysis show that the determinants of the interest of accounting students to become certified accountants are attitudes, subjective norms, perceived behavioral control and personality type. Beliefs related to the assessment of a behavior, namely attitudes towards behavior. Expectations and encouragement from people around him are called subjective norms. Perceived behavioral control, namely self-perception, is easy to obtain CA certification. Personality type is the way individuals react and interact with the environment or other individuals. Knowledge has no effect on students' interest in being certified CA. This finding has implications for the Indonesian Institute of Accountants and other policy makers in their efforts to develop strategies to motivate Charter Accountants certified students. Expectations and encouragement from the people around him are called subjective norms. Control of perceived behavior, namely self-perception, is easy to obtain CA certification. Personality type is the way individuals react and interact with the environment or other individuals. Knowledge has no effect on students' interest in being certified CA. This finding has implications for the Indonesian Institute of Accountants and other policy makers in their efforts to develop strategies to motivate Charter Accountants certified students. Expectations and encouragement from people around him are called subjective norms. Perceived behavioral control, namely self-perception, is easy to obtain CA certification. Personality type is the way individuals react and interact with the environment or other individuals. Knowledge has no effect on students' interest in being certified CA. This finding has implications for the Indonesian Institute of Accountants and other policy makers in their efforts to develop strategies to motivate Charter Accountants certified students.

**KEYWORDS:** Attitude, Norm, Behavior and Personality Type.

### INTRODUCTION

Accountants are one of the most needed professions in the world of economy. The professional accountant workforce has become a free competition between countries in the global economy (Gayatri et al., 2016). The expertise of professional accountants is recognized as an important component of a country's institutional infrastructure and plays an important role in maintaining a dynamic accounting system (Brouard et al., 2016; Grace N & Ekele, 2018; Owusu et al., 2018 Thorne, 2016). Certified accountants are needed to improve the economy and the quality of information in the financial sector (Akter & Siraj, 2018). The demand for accountants is expected to increase as businesses grow, regulations for good corporate governance are increasingly needed, and corporate accountability increases to protect the interests of stakeholders (Coe, 2016).

The accounting profession in Indonesia is threatened by the lack of interest of graduates to become professional and globally qualified accountants (Pratama, 2017). This happens because many accounting graduates go directly into the world of work before obtaining the Chartered Accountant certification (Wen et al., 2015). Charter accountant (CA) certification is very important for graduate accounting students in realizing the creation of professional accountants and having competitiveness at the global level (Hasim et al., 2020; Ulfah et al., 2019). However, in Indonesia, the number of CA certification holders and registered accountants is in fact still not sufficient to meet the market demand for accountant services. The number of graduates who are certified CA is not proportional to the number of graduates of accounting students (Nisa, 2019). Based on data compiled from Hashtags. id (2019) the average number of accounting graduates in Indonesia every year reaches 35,000 people and the number

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of accounting professions until 2020 is 1,429 people (Akuntansi.or.id, 2020). This shows that the interest of accounting students in increasing professionalism as registered accountants is still relatively low.

There are many factors that influence the level of a person's interest in performing a behavior. One of them is intention, where intention is the determinant and disposition of behavior. Intention as a cognitive and connotative representation of the individual's readiness to perform a behavior, so that the individual has the right opportunity and time to display the behavior. Interest can also be explained as something that encourages individuals to lead or feel attracted to people, objects, activities or experiences stimulated by interest.

The Theory of Planned Behavior explains that the intention to perform a behavior is an indication of an individual's tendency to perform a behavior and is a direct antecedent of that behavior. There are three main factors that can measure an individual's intention to perform a behavior. Intentions are attitude toward the behavior, subjective norm, and perceived behavior control (Ajzen, 2005).

*Attitude toward the behavior* is an individual's perception of whether favorable or unfavorable towards a particular behavior. Attitude toward the behavior is determined by the combination of the individual's beliefs about the behavior and the individual's subjective value to each of the consequences of that behavior. The more individuals have an assessment of a behavior that produces a positive impact, the individual will have a tendency to carry out that behavior. Conversely, if the individual has an assessment of a behavior that will produce a negative impact, the individual will have a tendency not to do it.

Several studies on the influence of attitude on interest have been carried out by Yuniarti (2016), Vesperalis & Muliarta (2017), Dewi & Budiasih (2017), Dewi & Ratnadi (2018), Dos Santos & De Almeida (2018), Wen et al. (2018), and Wijaya (2020) prove that the greater a person's belief that following the Accounting Professional Education (PPAk) brings positive consequences, the higher the interest of students in studying in the PPAk program. Research conducted by Nisa (2019), Dewi et al. (2018), Solikhah (2014), Sumaryono & Sukanti (2016) also found that attitudes towards behavior affect an individual's intention to obtain CA certification. In addition to the individual's personal drive to take an action, environmental impulses can also influence the individual in acting.

Individual judgments or beliefs about how and what individuals expect if an action is taken and the encouragement for individuals to follow other individuals' opinions are referred to as subjective norms. Ajzen (2005) explained that subjective norms are a function of normative beliefs, namely beliefs about individual or group agreement or disagreement that are important for individuals towards a behavior or action taken. Behavior to follow the views of others is of course also accompanied by individual encouragement to comply with these directions. Motivation to obey is influenced by social forces which consist of rewards or punishments given to individuals, individual liking, expertise from referral sources, and requests from referral sources.

Several studies examining the effect of subjective norms on interest have been carried out by Dewi & Budiasih (2017), Li & Qiu (2018), Kurniawan et al. (2018), Wen et al. (2018), Febriyanti (2019), Ningrat & Dewi (2020) found that the greater a person's belief in social influence to take PPAk, the higher the interest of students to take PPAk. Giantari & Ramantha (2019), Li & Qiu (2018) stated that the family environment significantly influences a child in choosing his future. His peers or the majority of people or joining friends also affect a person's interest in behaving (Ratnadi & Widanaputra, 2019). Mihartinah & Corynata (2018), Sumaryono & Sukanti (2016) also stated that subjective norms can influence an individual's intention to obtain CA certification.

A person's perception of the ease or difficulty of realizing a certain behavior is referred to as perceived behavioral control in the theory of planned behavior. The belief that individuals have in the availability of resources and opportunities related to certain behaviors and the greater the role of these resources, the greater the individual's perception of control over these resources. Likewise, individuals who have low behavioral control should not have the intention to take these actions. (Ajzen, 2005). Perceived behavioral control is related to control over internal and external factors that facilitate or hinder behavioral performance (Pangestika & Prasastyo, 2017). The opportunity to exhibit a behavior and the availability of resources that can influence a person's actions can affect intentions (Ananda & Ratnadi, 2021), (Umar & Bello, 2019). Srijeketi et al. (2019), Sumaryono & Sukanti (2016), Solikhah (2014) also explain that perceived behavioral control has an influence on individual intentions to obtain CA certification.

Knowledge can also be used as an explanation of an individual's interest in behavior. Cognitive theory focuses on the formation of human thought at the highest level, and describes the events and conditions needed to achieve that level (Gredler, 2011: 321). A person's mindset or ability to think and behave in a directed and effective manner is influenced by the level of knowledge he has and is mastered (Kusumastuti & Waluyo, 2013). A person can make decisions quickly, precisely and easily based on the knowledge he has. The results of research by Ticoi & Albu (2018), Dewi et al. (2018) shows that knowledge about CA certification has an effect on students' intentions to obtain CA certification.

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Several previous studies have tested the determinants of interest using a theory of planned behavior approach such as Yuniarti (2016), Vesperalis & Muliarta (2017), Dewi & Budiasih (2017), Dewi & Ratnadi (2018), Dos Santos & De Almeida (2018), Wen et al. (2018), Wijaya (2020) and several other researchers such as Ticoi & Albu (2018), Dewi et al. (2018), tested knowledge as a predictor of interest. However, no one has tested personality type as a predictor of interest.

In contrast to previous research, this study extends previous research by adding personality types to predict the interest of chartered accountant-certified students which is the novelty of this study. Personality is a dynamic formation of many psychological systems within the individual which refers to the individual's ability to adapt himself uniquely to his environment. Each individual has the ability to adapt differently between each other, it depends on the individual's personality. Individual achievement motivation in the academic field is also influenced by the personality of the individual, which among them is the personality trait in the big five personality. Personality in the big five personality factors is a study through the use of personality inventory, which describes a person's character into five different factors. The big five personality traits model was put forward by a well-known psychologist, namely Lewis Goldberg. The key dimensions of the big five personality traits are Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

Someone who has a high score on the extraversion personality type tends to be enthusiastic, enthusiastic, friendly, dominant, and communicative, tends to be a pleasant person, likes to socialize, likes to discuss, is optimistic, and becomes a person full of affection. Conversely, when someone has a low score, the individual tends to lack self-confidence, is quiet and shy. These individuals also tend to be aloof, restrained, introverted but discreet, and task-oriented. Agreeableness personality types tend to be friendly, cooperative, trusting, and warm. Individuals who are low in this dimension tend to be cold, confrontational and cruel, suspicious, vindictive, violent, rude, and manipulative. Conscientiousness type in general is a person who is careful, organized, reliable and also responsible, hardworking, disciplined, meticulous, punctual, ambitious, but hard-hearted. If individuals have low scores in this type tend to be impulsive, careless, messy, and unreliable.

The neuroticism dimension tends to be anxious, sensitive, nervous and tense. On the other hand, individuals who score low on this dimension tend to be calm and relaxed, self-satisfied, and unemotional. The openness dimension generally looks imaginative, fun, creative, and artistic, has a great interest, and also has a high curiosity. While individuals with low scores in this type generally have shallow thinking, simple, boring, have little interest, conventional and humble.

Based on this description, the purpose of this study is to empirically examine the effect of attitudes on behavior, subjective norms, perceived behavioral control, knowledge and personality type on the interest of chartered accountant certified accounting students. This research is important because no previous research has tested personality type to predict interest in CA certification. In addition, the suitability of a person's personality to his choice brings benefits to the other party and the individual.

### **METHOD**

The purpose of this study is to empirically test the determinants of interest in accounting students to become certified charter accountants (CA). This research was conducted at a university (PT) majoring in accounting in the province of Bali. The selected universities were three state universities, namely Udayana University, Ganesha Education University, and Bali State Polytechnic. Three Private PTs. are the National Education University, Warmadewa University, and Mahasaraswati University. The object of research is the interest of students majoring in accounting with CA certification which is explained by the theory of planned behavior, cognitive theory and personality type theory.

Interest in being certified CA is the tendency of an individual's desire to perform the behavior of being certified CA. The indicators are (1) to become a professional accountant, (2) CA is needed by the wider community (3) to be able to compete in the job market.

Attitude towards behavior is the perception of an individual's belief in the outcome of a behavior that forms his view of the action to be chosen. The indicators are: (1) the availability of job vacancies, (2) increasing self-esteem in the community; (3) guarantee of quality of life (4) increase competence.

Subjective norms are individual perceptions of social pressures that are accepted to encourage individuals to perform or not perform a CA certified behavior. The indicator include: (1) encouragement or advice from family, (2) encouragement or advice from a friendly environment (3) encouragement or advice from lecturers.

Perceived behavioral control is a person's perception of the factors that can facilitate or hinder the conduct of behavior related to the belief that the opportunities and resources needed will be available or not. The indicator is (1) ease of obtaining a CA certificate, (2) ease of cost

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Knowledge is a collection of information obtained from any process that makes a person know something and is a determining factor for someone to act. The indicators are: (1) knowing the regulations related to CA (2) knowing the CA certification requirements.

Personality type is the way individuals react and interact with the environment or other individuals. The indicators are (1) extraversion, (2) agreeableness, (3) conscientiousness, (4) neuroticism, and (5) openness.

The population is undergraduate (S-1) or four-diploma (D-IV) students majoring in accounting in the province of Bali. The reason is that to obtain the CA designation, one must take the CA certification exam with the minimum requirement that the minimum education level is diploma four (D-IV) or bachelor (S-1) in accounting held by Indonesian universities or foreign universities. which has been registered by the competent authority in accordance with the regulations based on the applicable law.

The sample was determined using a non-probability method with a convenience sampling technique. Multivariate research (including multiple regression analysis) sample size is recommended several times the number of variables, at least 10 times or more than the number of variables in the study (Sekaran, 2006:160). Sample size is recommended with a ratio of 10:1 or 20:1 cases for each variable As a general rule (Hair et al, 2006:98-99). Respondents in this study amounted to 235 respondents people. The minimum sample is 200 people because the number of indicators is 20.

The data used in this study is quantitative data from the respondents' answers, quantified using a 5-point Likert scale. The scale provisions are as follows: strongly agree (SS) is given a score of 5; agree (S) is given a score of 4; neutral (N) was given a score of 3; disagree (TS) is given a score of 2 and strongly disagree is given a score of 1. The source of research data is primary data, namely answers from respondents. Data was collected by survey method with questionnaires distributed online via google form via whatsapp, LINE and e-mail to make it more personal.

Before being distributed to the real respondents, a validity test was conducted to determine the reliability of the questions in revealing information. Validity test is done by using product moment correlation. The test results show that all the statements in the questionnaire are valid. Reliability test is used to measure a question which is an indicator of a variable or construct to be trusted, reliable and accurate. Reliability testing uses Cronbach's alpha coefficient. The test results show that all statements are reliable with Cronbach's alpha value greater than 0.06.

The analytical tool used in this research is partial least square (PLS) which is a multivariate statistical technique. The reasons for choosing this method in this study are: (1) PLS is a variant-based SEM that can predict models to develop theory, (2) the results to be obtained from data processing using PLS remain solid even though there are abnormal or missing data. , (3) can be used on small samples, (4) can be used on data with various types of scales.

The measurement model or outer model is evaluated by examining the validity and reliability of the construct. Convergent validity is measured by looking at the outer loadings and average variance extracted (AVE). Test the discriminant validity by looking at the cross-loading value. The reliability of the model will be measured by looking at Cronbach's Alpha and composite reliability. Causal relationship between variables using the inner model by examining the percentage of variance explained by the R-square value of the latent independent variable. The stability of the estimate was evaluated using a t-test through a bootstrapping process.

## RESULTS AND DISCUSSION

### Results

The number of questionnaires distributed to respondents was 235 questionnaires and all of them have been returned and can be analyzed. The characteristics of the respondents are presented in Table 1.

**Table 1. Characteristics of respondents**

No	Information	Amount		
		Person	%	
1	Gender	Man	54	22.97
		Woman	181	77.03
2	Age	20	30	12.84
		21	194	82.43
		22	11	4.73
3	GPA	3.51 – 4.00	217	92.57

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		3.01 – 3.50	18	7.43
4	Semester	7	235	100
5	Force	2018	235	100

### Data sources analyzed, 2021

Descriptive statistics are used to provide an overview of the data seen from the number of samples, minimum value, maximum value, average value (mean), and standard deviation of each variable used. Descriptions of research variables are presented in Table 2. Based on Table 2, on average, respondents tend to agree on the questions asked for each research variable.

**Table 2. Description of Research Variables**

Variable	Number of Respondents	Minimum Value	Average value	Maximum Value	Standard Deviation
Attitude towards behavior (X1)	235	2.00	4.08	5.00	1.07
Subjective norm (X2)	235	2.00	3.92	5.00	0.94
Perceived behavioral control (X3)			4.15	5.00	0.98
	235	2.25			
Knowledge (X4)	235	2.00	3.89	5.00	0.98
Personality type (X5)	235	2.00	4.02	5.00	1.09
CA certified interest (X6)	235	2.25	3.95	5.00	0.95

**Source:** data analyzed, 2021

The PLS evaluation model is carried out by assessing the outer model and the inner model. PLS does not limit the existence of certain distribution assumptions for parameter estimation, so parametric techniques to test or evaluate significance are not needed (Chin, 1998). Evaluation of the measurement model or outer model is carried out to assess the validity and reliability of the model. The indicators in this study are reflective because the latent variable indicators affect the variables, which can be evaluated through the convergent and discriminant validity of the indicators forming the latent construct and composite reliability and cronbach alpha for the indicator block (Ghozali and Latan, 2015: 73).

Convergent validity relates to the principle that the quantifiers (manifest variables) of a construct should be highly correlated. The convergent validity test of reflexive indicators with the SmartPLS 3.0 program can be seen from the loading factor value and the average variance extracted (AVE) value. The rule of thumb for the loading factor value is that it must be more than 0.7 for confirmatory research. The loading factor value between 0.6 - 0.7 for research that is explanatory is still acceptable (Ghozali and Latan, 2015: 74).

The test results show that there is one indicator of personality type that has a loading factor of less than 0.6, namely extraversion, then the indicator is eliminated, then the other eighteen indicators are retested. The SmartPLS output for the loading factor stage 2 shows that all indicators have a loading factor value greater than 0.6. This matter it means that the indicators of attitude construct towards behavior, subjective norm, perceived behavioral control, knowledge, personality type and interest with CA certification have met convergent validity. The output of Average Variance Extracted (AVE) is presented in Table 3.

**Table 3. Output Results Average Variance Extracted**

Construct	Average Variance Extracted (AVE) Value
Attitude towards behavior (X1)	0.578
Subjective norm (X2)	0.634
Perceived behavioral control (X3)	0.755
Knowledge (X4)	0.809
Personality type (X5)	0.658
CA certified interest (Y)	0.651

**Source:** Data processed, 2021

Based on Table 2 The AVE value of the attitude toward behavior variable, subjective norm, perceived behavioral control, knowledge of personality type and interest in CA certification has a value above 0.5, meaning that the indicators used in this study are valid or have met convergent validity.



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Discriminant validity is related to the principle that the manifest variables of different constructs should not have a high correlation. Discriminant validity was measured by the value of cross loading. The cross loading value of each indicator is higher for each other indicator than the measured latent variables as presented in Table 4.

**Table 4. Value of Loading Factor**

Indicator	Variable					
	X1	X2	X3	X4	X5	Y
X1.1	0.76					
X1.2	0.74					
X1.3	0.79					
X1.4	0.75					
X2.1		0.73				
X2.2		0.85				
X2.3		0.82				
X3.1			0.88			
X3.2			0.89			
X4.1				0.91		
X4.2				0.89		
X5.2					0.80	
X5.3					0.84	
X5.4					0.76	
X5.5					0.85	
Y1						0.75
Y2						0.85
Y3						0.82

Source: data analyzed, 2021

In addition to the validity test, the measurement of the model is also carried out through the reliability test of a construct. The reliability test of a construct with reflective indicators is carried out by looking at the value of Cronbach's Alpha and Composite Reliability (Ghozali and Latan, 2015: 75). The results of the analysis are presented in Table 5

**Table 5. Composite Reliability Test Results and Cronbach's Alpha**

Construct	Composite Reliability Value	Cronbach Alpha value
Attitude Towards Behavior (X1)	0.846	0.758
Subjective Norm (X2)	0.838	0.712
Perceptual Behavior Control (X3)	0.860	0.776
Knowledge (X4)	0.895	0.765
Personality Type (X5)	0.885	0.826
CA Certified Interest (Y)	0.848	0.730

Source: Data processed, 2021

Table 5 shows that the Composite Reliability value for all tested constructs is greater than 0.7 so it can be said that the reliability of the variable is high and reliable. Score *cronbach alpha* for each variable is greater than 0.7 so it can be said consistency each answer tested is classified as good.

The structural model was evaluated using R-square ( $R^2$ ) for each endogenous latent variable as the predictive power of the structural model (Ghozali and Latan, 2015: 78). The results of adjusting  $R^2$  of 0.67, 0.33 and 0.19 for endogenous latent variables in the structural model, indicate that the model is "good", "moderate", and "weak" (Chin, 1998). Adjust value  $R^2$  influence attitudes towards behavior, subjective norms, perceived behavioral control, knowledge, and personality type on



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interests of 0.628. This can be interpreted as 62.8 percent interest is influenced by variables attitudes towards behavior, subjective norms, perceived behavioral control, knowledge, and personality type, while 37.2 percent is explained by other variables outside the variables studied. The adjusted R-square value of 0.625 also indicates that the model is moderate.

The causality relationship between variables was carried out by looking at the parameter coefficient values and the statistical significance value of T. The results of the analysis are presented in Table 6 and Figure 1.

**Table 6. Result of causality relationship test**

Construct	Original Sample (O)	T Statistics	Significance
Attitude Towards Behavior (X1)	0.173	1,918	0.054
X1.1		18,585	
X1.2		8,693	
X1.3		22,518	
X1.4		16,896	
Subjective Norm (X2)	0.195	2,728	0.006
X2.1		9,289	
X2.2		27,981	
X2.3		19,538	
Perceptual Behavior Control (X3)	0.169	2,893	0.004
X3.1		35,157	
X3.2		25,743	
Knowledge (X4)	0.018	0.285	0.775
X4.1		48,819	
X4.2		25,914	
Personality Type (X5)	0.397	6,530	0.000
X5.2		21,129	
X5.3		20,134	
X5.4		24,039	
X5.5		41,493	

Source: Data analyzed, 2021

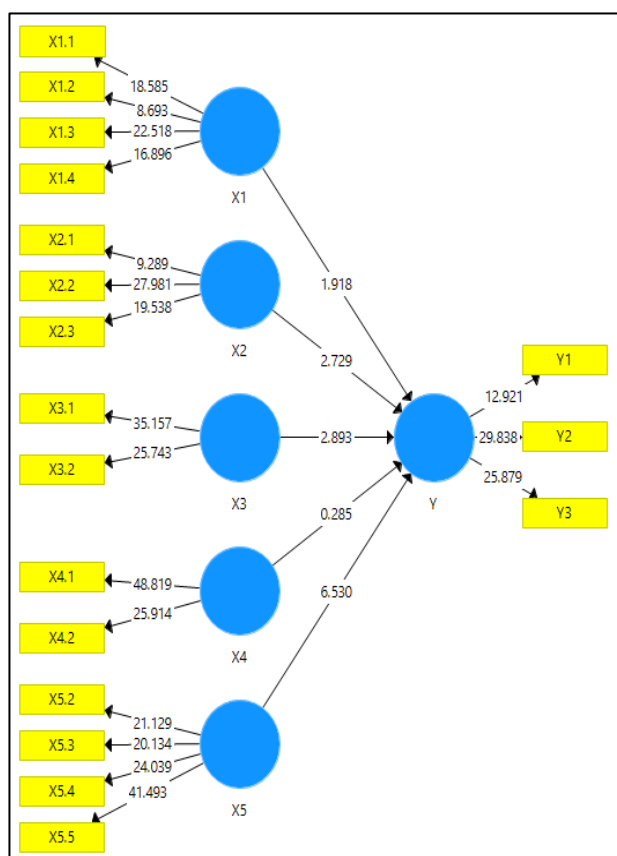


Image 1

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## PLS Analysis Results

Based on Table 6, a regression equation can be made as follows:

$$Y = 0.173.X1 + 0.195.X2 + 0.169.X3 + 0.018.X4 + 0.397.X5 + e$$

Information:

Y	= Interest
X1	= BrushGradual Behavior
X2	= NormSubjective
X3	=Perceptual Behavior Control
X4	=Knowledge
X5	=Personality type
e	= error

## DISCUSSION

The results of the analysis show that attitudes towards behavior affect the interest of CA certified accounting students. These results indicate that the higher the confidence of accounting students in the benefits of having a CA certification, the higher the interest of these students to be certified by a CA. The perception that with CA certification, there will be more job opportunities, guarantee a quality life, increase prestige in society and increase self-competence, causing increased interest in students to be CA certified. Increasing prestige in society is the main belief that influences interest in being certified CA. Based on the theory of planned behavior, an individual's attitude towards an action is determined by the belief in the consequences of a behavior called behavioral beliefs (Ajzen, 1991). Behavioral beliefs have to do with an act of assessing the benefits or losses incurred if we perform a behavior or not. This belief can strengthen the individual's attitude towards behavior based on an assessment of the behavior that can provide benefits or vice versa, individual beliefs can weaken the individual's attitude if the behavior is detrimental.

The results of this study support previous research conducted by Nisa (2019), Dewi et al. (2018), Sumaryono & Sukanti (2016), Solikhah (2014) which state that attitudes towards behavior affect a person's interest in obtaining CA certification. Yuniarti (2016), Vesperalis & Muliarta (2017), Dewi & Budiasih (2017), Dewi & Ratnadi (2018), Dos Santos & De Almeida (2018), Dewi & Sari (2018), Wen et al. (2018), Wijaya (2020) also proves that the greater a person's belief that following the Professional Accountant Education (PPAk) will have positive consequences, the higher the student's interest in participating in the PPAk.

Subjective norms have a positive effect on the interest to be certified CA. These results indicate that students' perceptions of the expectations of the people around them can increase their interest in CA certification. The stronger the suggestions from parents, encouragement from friends and suggestions from lecturers, the more confidence the CA certified students have. Confidence in the advice given by friends is the most powerful factor influencing students' interest in being certified CA. The theory of planned behavior explains that subjective norm is an individual's feeling or suspicion on the expectations of the surrounding environment if the individual takes an action or does not perform a certain behavior. It is called a subjective norm because feelings are subjective.

The results of this study are in line with previous research conducted by Permata et al. (2019), Mihartinah & Corynata (2018), Bekoe et al. (2018), Sumaryono & Sukanti (2016), Wardani & Januarti (2015) which state that subjective norms affect a person's interest in obtaining CA certification. This means that the more support from the closest people and the environment, the higher a person's interest in obtaining CA certification. The results of this study are also in line with previous research conducted by Dewi & Budiasih (2017), Li & Qiu (2018), Kurniawan et al. (2018), Wen et al. (2018), Febriyanti (2019), Ningrat & Dewi (2020) which state that the greater the student's trust in social influences to take PPAk, the higher the interest of students to take PPAk.

Perceived behavioral control has an effect on the interest of CA certified students. These results indicate that the interest of students to be certified CA is influenced by the ease of obtaining a CA and the ease of cost. Students who have high perceived behavioral control will continue to be motivated and try to succeed because they are confident in the available resources and opportunities. They believe that CA certification can be obtained through examinations and the material being tested has been obtained during college. The theory of planned behavior states that a person's interest in performing certain behaviors is based on perceived behavioral control. Ajzen (2005) states that perceived behavioral control is a person's feelings related to the ease or difficulty of realizing a certain action. This perception is determined by the individual's strong belief in the availability of resources and opportunities that support or hinder the predicted action. The more supporting factors felt by the individual and fewer inhibiting factors to be able to go through a behavior, the individual has a tendency to perceive himself as easy to carry out the behavior. On the other hand, individuals will tend to perceive themselves as difficult to perform the behavior (Ajzen, 2005).

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Individuals who have a high perception of control will be motivated and try to succeed because they believe in the available resources and opportunities. The more supporting factors felt by the individual and fewer inhibiting factors to be able to go through a behavior, the individual has a tendency to perceive himself as easy to carry out the behavior. On the other hand, individuals will tend to perceive themselves as difficult to perform the behavior (Ajzen, 2005). Individuals who have a high perception of control will be motivated and try to succeed because they believe in the available resources and opportunities. The more supporting factors felt by the individual and fewer inhibiting factors to be able to go through a behavior, the individual has a tendency to perceive himself as easy to carry out the behavior. On the other hand, individuals will tend to perceive themselves as difficult to perform the behavior (Ajzen, 2005). Individuals who have a high perception of control will be motivated and try to succeed because they believe in the available resources and opportunities.

The results of this study are in line with previous research conducted by Umar & Bello (2019) and Sumaryono & Sukanti (2016) which stated that perceived behavioral control had an effect on a person's interest in obtaining CA certification.

Knowledge has no effect on the interest of CA certified students. Respondents' knowledge of CA certification is still low. Likewise, knowledge of CA certification requirements. Based on cognitive theory, the factor that influences the process of making a decision is the ability to think by involving knowledge. Knowledge is the result of human sensing, or the result of knowing individuals on an object through the individual's senses and is strongly influenced by the intensity of attention and perception of the object (Notoadmodjo, 2012). This knowledge is obtained through a process of continuous interaction with the environment described in this theory. The results of this study are in line with previous research conducted by Sumaryono & Sukanti (2016) which stated that the level of knowledge about CA had no effect on student interest in obtaining CA certification.

Personality type has an effect on interest in being certified CA. Personality is defined as the overall way an individual responds to and interacts with the environment or other individuals. The factors that determine a person's personality can be derived from heredity, namely a person's genetic factors and environmental factors the individual is raised such as family norms or friends and social groups. Of the five dimensions of the big five personality model, the openness dimension has the greatest contribution in influencing the interest of CA certified students. The openness personality dimension groups individuals based on their interest in something and also their curiosity to learn new things. Individuals who have an openness personality type generally look imaginative, fun, creative, and artistic, intellectually curious, and always curious. Personality is a dynamic construction of the psychological system that exists within the individual that determines a person's ability to adapt uniquely to his environment. Each individual has different adaptability and is not the same between individuals with each other (Balgies, 2018). An attitude of openness can have a positive effect on cognitive and affective commitment (Utami et al. 2021).

The results of this study are in line with previous studies which examined the effect of personality type on student interest in accounting profession education. Research conducted by Husin et al. (2015), Aziz et al. (2017), Atela & Rather (2020), Astuti (2021) prove that students who have strong personalities, like challenges, don't like to procrastinate, and have a strong drive to compete tend to have an interest in joining the Professional Accountant Education.

The implication of this research is to increase the number of accounting students with CA certification and to be able to compete globally, the Indonesian Institute of Accountants can use the theory of planned behavior approach, namely three antecedents of intention: student attitudes towards CA certification, subjective norms or social environment and ease of obtaining CA certification. The personality type, namely the big five personality dimension, is also important to understand in promoting Charter Accountants.

### **CONCLUSION**

The determinants of student interest in chartering accountants are attitudes towards CA certification, subjective norms, perceived behavioral control and personality type. Increasing prestige in society, encouragement or advice from friends, the ease of obtaining a CA certificate and the openness personality type have the greatest contribution in influencing the interest of CA certified students. Meanwhile, knowledge has no effect on students' interest in CA certification.

The limitation of this research is in measuring personality type using a questionnaire so that respondents' answers are based on the available answer choices. Future research is expected to improve this research by using personality inventories developed by psychologists and to deepen testing of openness personality types in predicting interest.

### **THANK-YOU NOTE**

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## Challenges Accelerate Family Food Security Program

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**ABSTRACT:** Understanding food security in Indonesia still requires a common point of view. This is important because it will affect the parameters and indicators of the achievement of the program that is the target in the implementation of accelerating food security at the community level. One of the studies conducted in Bali showed that participation in the food security program received a very high response, namely from 35 respondents, 75% of respondents stated that the program was very important for the sustainability of food supply. Of all respondents who gave a positive response, it was influenced by age, number of families and ownership of arable land. From this study it is also proven that with the influence of the number of families and the area of land ownership on food security, then for the achievement of the food security program, the actual benchmark or indicator of achievement is family food security. This is very relevant to the concept of food security which is already understood by the community that with the existence of strong family food security, food security in a broader sense will be easier to achieve.

**KEYWORDS:** participation, acceleration, family food security, knowledge

### BACKGROUND

Since the Nawacita program was issued by the government, food security has become part of the national development priorities. One of the priority aspects is realizing economic independence by moving the strategic sector, namely increasing the economy through strengthening the agricultural sector (Ministry of Agriculture, 2016). Strengthening the agricultural sector will encourage the development of other sectors, because until now Indonesia is actually still dependent and is still popular with an agrarian country, where almost 75% of the people live by farming. Efforts to realize food security begin with the realization of food sovereignty which allows the people to determine their own food without any interference from other parties, including the government. This is actually very possible for Indonesia, which has a lot of regional specialties that are still worthy of being developed as a mainstay food.

It was further explained that with the existence of food sovereignty, the people are not only free to determine food independently, they are also free to make policies on food and have broad access to food. In order to realize strong and sustainable food security, there are 3 main components that must be developed, namely: 1} sufficient and equitable food availability, 2} effective and efficient food affordability, 3} diverse and balanced food consumption. The three components are most effective when they start from the family order. Currently, with the increasingly massive urbanization in urban areas, food diversification is also one way to accelerate family food security. Food diversification can be interpreted as a diversification of types, and also diversification of cultivation methods. For the term that is popular today is urban farming. Urban Farming is one way to overcome the limited planting area in urban areas by planting hydroponics, verticulture, roof top farming and also utilizing the home page by planting living kitchen needs and living pharmacies {TOGA}.

However, for rural areas where the planted area is still sufficient for cultivating food crops, the thing that must be intensively implemented is how to prevent the land from being converted into non-agricultural land. Support for the General Policy on Food Security {Indonesian Food Security Council, 2010} states that rice is a strategic food commodity in Indonesia that also needs to be continuously socialized and monitored so that it is implemented in accordance with the objectives.

It is common knowledge that rice, whose final product is rice, is the staple food for most Indonesians. To oversee this policy, food security programs have been carried out in 13 main rice-producing provinces and spread over 167 districts. The food security program in the province of Bali is implemented in seven regencies, namely Jembrana, Tabanan, Gianyar, Klungkung, Karangasem, Buleleng., and Bangli regencies. The success of achieving food security is not only influenced by policies from the government, but it is also determined by the participation of farmers as the key to the success of the food security program. In order to succeed in developing food security,



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### PARTICIPATION IN FOOD SECURITY PROGRAM

One of the subaks that has been studied about how the participation of subak members in the food security program is Subak Pulagan {Martiningsih, 2020}. Subak Pulagan is located in Tampak Siring Village, Gianyar Regency, whose members have been very active in applying organic cultivation technology and have received many assistance funds from various donor institutions, such as CSR funds from Bank Indonesia, Pertamina and also from several national competitive programs proposed by universities. in Bali.

The implementation of the food security program in the Pulagan subak began in 2020 and food security activities carried out in the Pulagan subak, Tampaksiring Village, Tampaksiring Gianyar District, namely: Increasing the quality of intensification carried out in the form of efforts to increase productivity through efforts to apply appropriate technology, increase knowledge and skills of farmers in the context of implementing location specific technology.

(1) Expansion of the planting area (extentification) which is carried out in the form of irrigation as well as expansion of land standards and increasing the planting index through accelerating land cultivation, cultivating idle and abandoned land. (3) Production security is taken through the use of appropriate harvesting technology, control of plant-disturbing organisms and assistance to production facilities, especially seeds, for farmers who experience puso (no yield). (4) Rehabilitation and conservation of land and groundwater is carried out in the form of efforts to improve the quality of critical land and the construction of terraces as well as dams and water traps. (Gianyar Regency Agriculture Office, 2020).

Based on observations in the Gianyar area, especially in Tampaksiring Village, the rapid population growth followed by the increasing need for housing has reduced agricultural land. Agricultural land is getting narrower due to land conversion for housing and industrial land needs. The current trend is that farmers prefer to work in the informal sector rather than stay in the agricultural sector. In addition, the declining attractiveness of the agricultural sector also makes farmers tend to give up their land ownership. Landowners change the function of their agricultural land for non-agricultural purposes because he expects more profit. Economically, agricultural land, especially rice fields, has a high selling price because it is located in a developing location, and also the knowledge of farmers in utilizing or using the technology provided by the government is still very lacking so that

program quality improvement intensification to increase productivity does not seem to work. In addition, the handling of pests and diseases in plants is still not effective due to the lack of cooperation between farmers in eradicating pests and diseases so that farmers' production results are not stable.

### CONCLUSION

1. Average score farmer participation in food security planning, {83.4%}, implementation of food security {74.5%}, and the use of food security programs {73.5%}. of 35 farmers respondents are still high which indicates that farmers are still enthusiastic in participating in programs related to food security.
2. The challenge of accelerating the achievement of food actually comes from external factors {outside the farmers} who have different interests, so that it will encourage the conversion of agricultural land.

### RECOMMENDATION

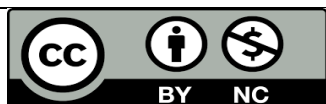
1. The food security program still needs to be implemented by involving interested parties, both internal and external
2. Policies related to family food security are very important in supporting the growth and development of the younger generation, especially the golden generation, which is one of Indonesia's comparative advantages in the era of globalization.

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## Instagram Social Media as an Effort to Increase Dental Health Knowledge



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**ABSTRACT:** Background: The high prevalence of dental and oral disease is greatly influenced by several factors, one of which is the behavior of people who are not aware of the importance of maintaining oral and dental health, this is based on a lack of knowledge of the importance of maintaining dental and oral health. Efforts to increase knowledge, namely through online media. The choice of Instagram social media is due to the high number of Instagram users in Indonesia and the tendency of Indonesian people to prefer seeing pictures rather than writing. Purpose: This study aims to analyze the effectiveness of dental and oral health knowledge before and after being given education through Instagram social media. Method: The design of this research is quasi-experimental, conducted on 37 respondents obtained by using total sampling technique. The instruments used in this study were Instagram media and questionnaires in the form of a Google form regarding dental and oral health maintenance. Analysis of the data used is a paired sample test. Results: Knowledge before and after being given education about maintaining dental and oral health through Instagram social media results in the good category (59.5%) to (86.5%), in the sufficient category (37.8%) to (13.5%), and in the less category (2.7%) to no (0%) respondents with less knowledge category. The results of the paired sample test obtained p value = 0.000, meaning that there is a difference in knowledge before and after dental health education with Instagram. Conclusion: dental health education with Instagram social media is effective in increasing dental and oral health knowledge.

**KEYWORDS:** Instagram, Dental Health Education, Knowledge

### I. INTRODUCTION

Dental and oral health is a part of body health that cannot be separated from one another because it will affect overall body health. Dental and oral disease is a community disease that can affect all age groups, from children to adults. According to the results of Basic Health Research (Riskesdas) in 2018, dental health problems in Indonesia accounted for 45.3% of the population experiencing tooth decay. In the 25-34 year age group, 44.9% experienced tooth decay/cavities/soreness, 12.1% experienced tooth loss, and 94.9% of this age group had never gone to a dental medical professional [1-3].

The high prevalence of dental and oral diseases is strongly influenced by several factors, one of which is the behavior factor of people who are not yet aware of the importance of maintaining dental and oral health. This is based on a lack of knowledge about the importance of maintaining oral health. Therefore, dental and oral health knowledge needs to be taught to the community so that they can change behavior and understand the importance of maintaining healthy teeth and mouth [4,5].

Efforts to maintain dental and oral health are any activities and/or a series of activities carried out in an integrated, integrated and sustainable manner to maintain and improve the dental and oral health status of the community in the form of improving health, preventing disease, treating disease and restoring health by the government and/or Public. Dental and oral health education is an effort to maintain and increase awareness of dental and oral health. Health education is part of health promotion as a prevention effort and provides an understanding of ways to maintain dental and oral health [6-8].

In this era of advances in information and communication technology, the use of information and communication technology must be carried out effectively and efficiently so that it can become an enable technology that encourages innovation in various aspects of the information search process. One of the uses of ICT that is of interest to the wider community is having a social media account. The Ministry of Communication and Informatics (Kemenkominfo) revealed that there are currently 63 million internet users in Indonesia. Of these figures, 95% use the internet to access social media [9,10].

Social media is a medium on the internet that allows users to represent themselves and interact, work together, share, communicate with other users to form social bonds virtually. It is undeniable that social media has a big influence in one's life. In

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social media there is no space and time limit, they can communicate whenever and wherever they are. Social media has a big influence on a person's life, and the presence of the internet is increasingly needed in everyday life, both in outreach activities, educational activities, business activities and so on [11].

Social media is growing rapidly in today's society, one of the most accessed social media, namely Instagram. Instagram is an image-based social media that provides online photo or video sharing services that can be accessed on Android, iOS, Windows Phone and computers. Based on Cuponation research (2019) the average user accesses Instagram every day for 6 hours 35 minutes. Indonesia occupies the fourth position with the most Instagram users in the world, namely as many as 61 million users and the largest percentage of Instagram users in Indonesia, one of which is in the age group 25- 34 years. The choice of Instagram social media is due to the high number of Instagram users in Indonesia and the tendency of Indonesian people to prefer viewing pictures rather than writing [12].

This was proven in a study by Dyah et al who stated that the results of providing dental health education on Instagram were an increase in the knowledge of respondents, before being given education the average knowledge of respondents was 67.94% after being given education the average increased to 91.02 %. Ease of access and attractive appearance on Instagram make Instagram considered very effective in promoting dental and oral health to obtain Oral Health Information (dental health information), increase creativity and as a forum for interaction, learning and sharing of dentistry cases in the form of photos/posters and videos that have been reviewed from the dissemination of broad community messages [13,14].

## II. METHOD AND MATERIAL

The research design used is quasi-experimental research. The research was conducted from April 26 to May 9 2022 at the Karang Taruna Cipedak, Jagakarsa, South Jakarta. The sample in this study amounted to 37 people with a total sampling technique. Data collection was carried out after the researchers obtained permission from the head of the Karang Taruna Cipedak Village. The data collection process was carried out via WhatsApp by sharing the Google form link through the chairman of the Cipedak village youth organization. Beginning with giving a questionnaire before being given education via Instagram social media, then providing education about maintaining dental health through Instagram social media for 5 days, then giving a questionnaire after being given education through Instagram social media. Analysis of the data used is a paired sample test.

## III. RESULT AND DISCUSSION

**Table 1. Frequency distribution of Knowledge before and after education with Instagram social media**

Variable	n	%
<b>Knowledge before education with Instagram social media</b>		
Good	22	59.5
Sufficient	14	37.8
Less	1	2.7
Total	37	100
<b>Knowledge after education with Instagram social media</b>		
Good	32	86.5
Sufficient	5	13.5
Less	0	0
Total	37	100

Table 1 shows that prior to conducting dental and oral health education through Instagram social media, the results obtained were 22 respondents had good knowledge criteria (59.5%), 14 respondents had sufficient knowledge criteria (37.8%), and 1 respondent had less knowledge criteria ( 2.7%) whereas after dental and oral health education through Instagram social media the results were 32 respondents had good knowledge criteria (86.5%), 5 respondents had sufficient knowledge criteria (13.5%), and there were no respondents with less of knowledge criteria.

**Table 2. Different test of dental and oral health knowledge before and after education using social media Instagram**

Knowledge	Mean	p-value
Pre-test	79.05	0.000
Pos-test	87.57	

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Table 4 shows that the results of the paired sample test analysis obtained a p-value of 0.000, meaning that education using Instagram social media is effective in increasing dental and oral health knowledge

### IV. DISCUSSION

The results of the study before being given education showed that the highest level of knowledge of the respondents was in the good criteria of 22 respondents (59.5%). Some of the factors that influence the knowledge of respondents include age and gender. The age of the respondents in this study was in the age group of 25-34 years, the more mature the level of maturity and strength a person will be, the more mature they think and work, this is as a result of experience which is a way to obtain a truth of knowledge. The gender in this study was dominated by women, when compared to male respondents with female gender tended to have better knowledge. This is because female respondents have more time to read or discuss with their environment [15,16].

Even though the criteria for respondents' knowledge are in the average good category, it is still important to carry out education to add to and improve respondents' knowledge about dental and oral health maintenance. Health education about maintaining dental and oral health is carried out using media that can attract the attention of respondents, so that knowledge will be easy to remember. This is in accordance with the theory which explains that knowledge is the result of knowing, and this occurs after people sense through the five human senses, namely the senses of sight, hearing, smell, taste and touch [17].

Providing education to this age group using print media is considered less successful, due to the fact that currently people prefer to use social media because internet facilities on mobile phones make it easier to access information. Instagram provides space for its users to share and interact and provides space for its users to display and shape what they want to convey to their audience through photos and videos assisted by captions that they write and comments [13].

Data collection in this study began on April 26 2022 by providing a questionnaire before education was carried out in the form of a Google form link sent via the youth organization's WhatsApp, and respondents were directed to follow Instagram social media accounts created by researchers. On the next day, April 27 to May 1 2022, education will be provided on Instagram social media with material, namely understanding and efforts to maintain dental and oral health in a nutshell, time to brush teeth and procedures for maintaining tools and materials for brushing teeth, brushing techniques correct teeth, foods that need to be increased and reduced in consumption for dental health, as well as the right time for dental examinations, these materials were conveyed to the respondents consecutively for 5 days. After education was carried out on Instagram social media, the researcher gave another questionnaire which was sent via WhatsApp to the youth group chairman in the form of a Google form link.

The results of the paired sample test, knowledge after being given education through Instagram social media shows that the average knowledge in research before being given education on Instagram social media is 79.05 to 87.57 with a p-value of 0.000. This means that there is an increase in knowledge from research results due to the ability of the respondents to develop, both insight and intellectual. Intellectual development is the process of changing the individual's ability to think.

When compared with the results of research conducted by Dyah et al regarding Instagram as an educational medium to increase dental and oral health knowledge. In this study, it was found that there was an increase in knowledge after counseling was carried out on Instagram online media, because the knowledge gained by the respondents increased, and the final results of the two studies were in the good category. This shows the role of online media counseling in increasing respondents' knowledge [13].

### V. CONCLUSION

Based on the results of the study, it can be concluded that dental health education with Instagram social media is effective in increasing dental and oral health knowledge.

### ACKNOWLEDGMENT

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### CONFLICT OF INTEREST

The author declared that don't have conflict of interest

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## Village Government Communication Strategy toward Freedom Cigarette Smoke in Bone-Bone, Enrekang District (Study of Rural Management Sociology Analysis)



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**ABSTRACT:** Discussion of village government strategies and supporters so that the community is smoke-free in the sociology of rural management with the aim that every citizen understands the importance of smoke-free implementation. This research is qualitative in nature by using a scientific sociological approach, to analyze the informants are determined through observation, interviews, and documentation, while the research instrument itself because it has social sensitivity, the data collected is primary and secondary with data analysis with data reduction stages, presentation data, and drawing conclusions.

The results of the study show that the communication strategy carried out by the village government so that the community is smoke free is in the following ways: a). Organizational Communication Strategy; about smoke-free, b) Group communication (interaction between groups); revolves around certain topics of common interest, c) Interpersonal Communication (Interpersonal); Strategies for receiving development messages or smoke-free outreach. While supporters of smoke-free society are the crowds of congregations in the mosque, the cohesiveness of institutions or organizations in the village, and. There is awareness of the residents themselves; about smoking-free socialization

**KEYWORDS:** Communication strategy, Government, Smoke-free, Interaction, Rural management

### INTRODUCTION

Humans as social beings always want to relate to other humans. He wants to know the environment around him, therefore the strategy becomes an important thing in social and community life. Communication strategy and society are two twin words that cannot be separated from one another. Because without communication it is impossible for society to form, conversely without society, humans cannot develop communication.<sup>1</sup> On the other hand, society must become an object of development that must be achieved through a communication process, because all development messages must be communicated. National development is essentially the development of Indonesian people as a whole, the elaboration of which is the improvement of the quality of human life. To achieve this goal, the role of various parties, both government and society, is needed. This is carried out evenly throughout the territory of the country, which is not only for a group or part of society, but for all the people.

Development communication launched by village governments in Indonesia will be different and must be different from development communication in other countries because the subjects and objects involved in development communication are indeed different. These differences, both visible and invisible, are caused by peculiarities in the goals of the state, the system of government, cultural background, the nation's outlook on life, and the values inherent in the people, namely the Indonesian people who are *Bhinneka Tunggal Ika*. The purpose of rural development communication is to promote development. Development requires people who have literacy levels and low incomes and socio-economic characteristics. Therefore those related to it must be informed about the existence of new technologies and ideas that should be implemented by them. Motivation is the most important element in rural development communication, especially regarding smoke-free development in rural areas.<sup>2</sup> Development as a process of social change that aims to improve the quality of life of all or the majority of people, regardless of the natural and cultural environment in which they are located and tries to involve as many members of society as possible in this endeavor and make them the determinants of their own goals.

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## Village Government Communication Strategy Toward Freedom Cigarette Smoke In Bone-Bone, Enrekang District (Study Of Rural Management Sociology Analysis)

On the other hand, smoking as a societal phenomenon, when it is connected with development in rural areas, including the fields of health, environmental hygiene and pollution, becomes a topic that is always discussed. Currently smoking is increasingly widespread in various places, many industrialized countries consider that smoking has become a behavior that is considered socially unacceptable. According to Pangestu, the temptation to smoke has been present since someone was young. Pressure from friends is one of the main causes. The case that occurred in Canada was that 70 percent of children who smoked claimed to be influenced by their friends who had smoked beforehand because they felt social appreciation when they smoked. Parents also have an influence on children in terms of smoking, especially smoking parents. Some research though may actually have clearly proven that children of parents who smoke are more likely to smoke "tobacco sticks" than children of non-smoker parents. On the other hand the development of village government as a process of social change with broad participation in a society for social and material progress through the greater control they gain over their environment.

The era of village government development that is currently underway is the era of regional autonomy, this is intended to make regional governments more responsible and encourage the implementation of development in the countryside. One of the basic capital of development is community participation in development. Community participation depends a lot on the awareness of the community itself. In the Village Law no. 60 of 2014 Chapter 1 Article 1 Paragraph 12 states that village community empowerment is an effort to develop community independence and welfare by increasing knowledge, attitudes, skills, behavior, abilities, awareness, and utilizing resources through the establishment of appropriate policies, programs, activities and assistance with the essence of the problem and the priority needs of the village community.<sup>3</sup>

Community awareness is usually determined by the village government or community leaders concerned. Therefore, leaders in the village or village head must be able to organize, influence and direct all members of the village community to participate in development. The Village Head as the community leader in the village should be aware of his role in the implementation of national development so that he can unite members of the community in the national development movement. According to Achmad (1985; 116) that the leadership system in the countryside is very influential in national development. A Village Head must be able to explain the meaning of the development being carried out at this time to his community. Thus, the leadership system in rural areas, both formal and informal, needs to be aligned with the development goals to be implemented. One of the efforts to achieve this is the leadership strategy which is very important, especially in socializing development programs, both development programs that are national (central government) in nature, moreover development programs launched by local governments and programs (products/regulations). village itself).

One of the remote villages in South Sulawesi, namely in Bone-Bone Village, Baraka District, Enrekang Regency, is considered a unique and well-known village in several countries, because of the success of the leadership in the village in implementing a policy in the form of village regulations, so that in the village it is known as smoke free village. Based on the description of the background, what is explored in this research is the communication strategy of the village government so that the community is smoke-free in a socialological analysis study of rural management.

### LITERATURE REVIEW

#### Strategy

The word "strategy" comes from the Greek, namely "strategos" (stratos = military and ag = lead), which means "generalship" or something that war generals do in making plans to win the war.<sup>4</sup> Strategy in the Big Indonesian Dictionary is the science and art of using all the nation's resources to carry out certain policies in war and peace, or careful planning of activities to achieve specific goals.<sup>5</sup> Strategy is basically the art and science of using and developing strengths (ideological, political, economic, socio-cultural and defense) to achieve predetermined goals. Communication strategy is a combination of communication planning with communication management to achieve the goals that have been set. This communication strategy must be able to show how practically it must be operational, in the sense that the approach can differ at any time depending on the situation and conditions.<sup>6</sup> The definition of strategy according to experts, namely: a). In Ansoff's opinion, strategy is a rule for making decisions and determining guidelines, strategy is also called the company's business concept.<sup>7</sup>, b). In the opinion of William J. Stanton Strategy is a broad basic plan of an organizational action to achieve a goal, c). In the opinion of David Hunger and Thomas L. Wheelen

<sup>3</sup>Government Regulation Number 22 of 2015 concerning Amendments to Regulations Government Number 60 of 2014

<sup>4</sup>Rachmat, *Strategic Management*, (Cet. 1, Bandung: Setia Pustaka Bandung, 2014)

<sup>5</sup>Pusat Bahasa RI, *Ministry of National Education Language Center*, Big Indonesian Dictionary Edition III (Jakarta: Balai Pustaka, 2005)

<sup>6</sup>Onong Uchjana Effendy, *Communication Studies: Theory and Practice*, (Cet. I, Bandung: PT Remaja Rosdakarya, 2006)

<sup>7</sup>Supriyono. R. A, *Strategy Management and Business Policy*, (Cet. IV, Yogyakarta: Faculty of Economics Publishing Agency, 1990)

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Strategy is a series of managerial decisions and actions that determine the company's performance in the long run, d). In Anwar Arifin's opinion, strategy is the overall conditional decision about the actions to be carried out in order to achieve goals.<sup>8</sup>

By looking at some of the opinions above, it can be concluded that strategy is the stages that must be passed towards the desired target. A good strategy will provide an overview of the main actions and decision patterns that will be chosen to realize agency goals. The stages of the strategy according to Fred R. David that in the strategy process there are stages that must be taken, namely: formulation of the strategy; Matters included in the formulation of the strategy are the development of goals, regarding external opportunities and threats, determining internal strengths and weaknesses, generating alternative strategies, and selecting strategies to be implemented. At this stage is the process of designing and selecting various strategies that ultimately lead to the achievement of the mission and goals of an organization.

### **Strategy Implementation**

Strategy implementation is also known as action within strategy, because implementation means mobilizing to change the formulated strategy into action. Activities included in strategy implementation are developing a culture in achieving strategy, achieving effective structures, changing directions, preparing budgets, developing and utilizing incoming information systems so that they are disciplined, motivated, and work hard. James M.Black in Tjokroamidjojo states that leadership is the ability to convince other people to work together under their leadership as a theory to achieve or carry out a certain goal.<sup>9</sup> Another opinion states that leadership is a collection of a series of abilities and personality traits, including authority to be used as a means in order to convince those they lead so that they are willing and able to carry out the tasks assigned to them voluntarily, enthusiastically, have inner joy and they not forced.<sup>10</sup> In line with this, the success of a leader in carrying out his leadership duties is determined more by his ability and expertise in mobilizing other people, this is what is called managerial skill.<sup>11</sup>

### **Development Communication Strategy**

According to the Academy for Educational Development (AED) (1985), there are four development communication strategies that have been used so far, namely: Media based strategy Communicators using this strategy usually group their activities around certain preferred. This strategy is indeed the easiest, most popular, and of course the least effective technique.

### **Instructional Design Strategy**

This strategy is generally used by educators. They focus their strategy on targeted individual learning as a fundamental objective. This group strategy, based on formal learning theories, and focused on a systems approach to the development of learning materials such as formative evaluation, trials, and tiered program design.<sup>12</sup> Instructional designers are plan and systems oriented people. They first identify: (1) Objectives to be achieved, (2) Criteria for success, (3) Participants, (4) Sources, (5) Approach used, (6) Time. Typically, their activities can be classified into three interrelated stages namely: planning, implementation, and evaluation stages.

### **Participant Strategy**

In this participatory strategy, important principles in organizing activities are community cooperation and personal growth. And in this strategy the emphasis is not on how much information a person learns through development communication programs, but rather on the experience of participating as an equal in the process of sharing knowledge or skills. The implementation of this strategy is reflected in forms of non-formal education activities such as animation programs.

### **Marketing Strategy**

This strategy grows as a communication strategy that is direct and feels normal in terms of social marketing principles, namely marketing techniques that do not only seek profits from a sale, but instead focus on what consumers need and want from something produced by producers.

### **Sociological Communication**

The term communication in English is called communication, derived from the word communicatio or from the word communis which means "same" or the same meaning or shared understanding, with the intention of changing thoughts, attitudes, behavior,

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<sup>8</sup>Anwar Arifin, *Communication Strategy*, (Bandung: Armilo, 1984)

<sup>9</sup> Bintoro Tjokroamidjojo, *Introduction to Development Administration* (Jakarta: LP3ES, 1974).

<sup>10</sup>Ngalim Purwanto, *Administration and Education Supervision* (Bandung: Rosdakarya Youth, 1987),

<sup>11</sup>Burhanuddin, *Analysis of Education Management Administration and Leadership* (Jakarta: Bumi Aksara, 1994)

<sup>12</sup>Rochajat Harun and Elvinaro Ardianto, *Social Change Development Communication*, (Jakarta: PT RajaGrafindo Persada, 2011)

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recipients and carrying out what the communicator wants.<sup>13</sup> The notion of communication is paradigmatic and many are defined by experts. In terms of terminology, communication can be defined as a mechanism for establishing relationships between human beings by developing all the symbols and thoughts along with the meanings that accompany them. This understanding implies that in communication between a person and another there is a relationship of collectively pouring out all his thoughts through meaningful symbols. Corel L. Hovland argues that communication is a systematic effort to formulate firmly the principles of conveying information and forming opinions and attitudes. The definition above shows that what is used as the object of communication studies is not only the delivery of information, but also the formation of public opinion and the formation of attitudes which play a very important role in social life. Another opinion regarding communication, namely according to Brent D. Ruben, communication is a process through which individuals in relationships, in groups, in organizations and in society create, transmit, and use information to coordinate their environment and other people.<sup>14</sup>

According to Anderson, communication is a process whereby we can understand each other and be understood by others. Communication is a dynamic process and constantly changes according to the prevailing situation.<sup>15</sup> It can be concluded that communication is the process of conveying a statement by one person (communicator) to another person (communicant). Communication is also a very important conversation tool in every aspect of life. And it is undeniable that the scientific treasures of communication are influenced by the social sciences, which are the mother of communication and are supported by other disciplines. Humans in communicating not only aim to provide information, but also provide entertainment, education and influence other people so that they want to carry out the message conveyed by the communicator. In that verse, it is explained that call on, that is, continue your efforts to call on all that you can call on the path indicated by your Lord, namely the teachings of Islam, with good wisdom and teaching and refute them, that is, anyone who rejects or doubts the teachings of Islam, by means of the best. From some of the above understandings regarding strategy and communication, it can be concluded that the sociology communication strategy is a guide for communication planning and communication management to achieve a predetermined goal. To achieve this goal, the communication strategy must be able to show how the operational tactics are practically carried out. And the communication strategy also determines the success or failure of communication activities effectively.

### **Forms of Sociology Communication Strategy**

Sociological communication can be classified into four forms, organizational interpersonal communication, mass communication, group communication, and interpersonal communication. Organizational communication is the sending and receiving of various organizational messages within the formal and informal groups of an organization. In organizations, communication is very important, because communication is an integral part of the organization, both internal communication and external communication.<sup>16</sup>

### **Mass and group communication (mass and group interaction)**

Mass communication is a process through which communicators use the media to disseminate messages widely and continuously create meanings and are expected to influence a large and diverse society in various ways. Its characteristics are: There are very many people who communicate or become communicants (public, audience, audience). The public, audiences, audiences involved in the communication are scattered everywhere (in various regions and regions). If you were in one place, then the public, audiences, audiences are very diverse. The things that are conveyed (the topics discussed) are general in nature and concern the interests of many people.<sup>17</sup> Most or even all of the public or audience do not know each other.<sup>18</sup> Group communication is a group of people who have common goals who interact with each other to achieve common goals, get to know each other, and view them as part of the group. Group communication is divided into two parts, namely large group communication and small group communication. Big group communication is a group of communicants who, because of their large number, in a communication situation have almost no opportunity to provide verbal responses, aimed at the communicant's affections and the process takes place in a linear fashion. Small group communication (small group communication) is communication that takes place face to face because the communicator and communicant are in a situation of facing each other and seeing each other. Its members interact with each other. The characteristics of group communication, namely: The number of people involved in communication is approximately 50-100 people, The things discussed revolve around a certain theme or topic that concerns common interests

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<sup>13</sup>H.A.W. Widjaja, *Communication: Communication and Public Relations*, (Jakarta: Bumi Aksara, 2002)

<sup>14</sup>Arni Muhammad, *Organizational Communication*, (Cet. I, Jakarta: PT Bumi Aksara, 1992)

<sup>15</sup>Divine Revelation, *Da'wah Communication*, (Cet. I, Bandung: PT Remaja Rosdakarya, 2010)

<sup>16</sup>Romli, Khomsahrial, *Complete Organizational Communication*, Jakarta: PT Grasindo, 2011)

<sup>17</sup>Anwar Arifin, *Communication Strategy*, (Bandung: Armilo, 1984)

<sup>18</sup>Teuku May Rudy, *Communication and International Public Relations*, (Cet. I, Bandung: PT Refika Aditama, 2015)

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(certain groups), There are interests and interests that are almost the same among members group members, usually some of the participants already know each other or all of them know each other

### **Interpersonal Communication (Interpersonal)**

Interpersonal communication is communication that takes place face to face (face to face) between two or more people by delivering verbal and non-verbal messages so that each can understand each other and interact effectively. In interpersonal communication, a good relationship between the communicator and the communicant must also be maintained properly, because the success or failure of communication depends on a good relationship between them. According to Kathleen S. Verderber (2007), interpersonal communication is a process through which people create and cultivate their relationships, carry out reciprocal responsibilities in creating meaning.<sup>19</sup> In every communication process there are elements or components, namely the communicator (sender), message (message), channel (media), communicant (receiver), effect (effect), feedback (feedback) and the environment.

### **Dissemination of Smoke-Free Village Regulations**

Society and rural or village, two words that have their own meaning. To get the meaning of these two words, society is defined as large groups and small groups consisting of several humans with or because of themselves group related and influencing one another.<sup>20</sup> Society can also be interpreted as a group of people who interact. From the explanation above, it has been explained that rural community are two separate words or have their own meanings, to be able to get the meaning of these two words, they must be interpreted word by word first so that the two words can be made into the meaning as expected. Paul H. Landis, a rural sociology scholar from the United States, suggested a definition of village by making 3 choices based on the purpose of the analysis. For analysis purposes, a village is defined as a neighborhood of less than 2500 people. For the purpose of social psychological analysis, the village is defined as an environment where the inhabitants have intimate relationships and often share information among their fellow citizens. Meanwhile, for economic purposes, the village is defined as an environment whose population depends on agriculture.<sup>21</sup> Rural or village communities can be interpreted as communities that have a deeper and closer relationship than the general life system in groups on the basis of kinship and the majority of rural community members live from agriculture. The community is homogeneous, such as in terms of livelihoods, religion, customs, and so on. In other words, rural communities are synonymous with the term gotong royong which is cooperation to achieve their interests. In the introduction to the Law of the Republic of Indonesia No. 6 of 2014 concerning Villages it is stated that.<sup>22</sup> : a). That the Village has the rights of origin and traditional rights in regulating and managing the interests of the local community and plays a role in realizing the ideals of independence based on the 1945 Constitution of the Republic of Indonesia, b). That in the course of the constitutional administration of the Republic of Indonesia, the Village has developed in various forms so that it needs to be protected and empowered so that it becomes strong, advanced, independent and democratic so that it can create a strong foundation in carrying out governance and development towards a just, prosperous and prosperous society, c). Whereas Villages in the composition and procedures for administering government and development need to be regulated separately by law.

Meanwhile, in the Village Law and government regulations of the Republic of Indonesia No. 22 of 2015 Chapter 1 Article 1 Paragraph 5 it says that Village meetings or what are referred to by other names are meetings between the Village consultative body, the Village government and community elements held by the Village consultative body to agree on strategic matters. Likewise in Article 1 Paragraphs 7 and 8 it is stated that: Village Regulations are statutory regulations stipulated by the Village Head after being discussed and agreed with the Village Consultative Body. And Village Development is an effort to improve the quality of life and life for the welfare of the Village community as much as possible. In Article 85 of the Village Law and government regulations of the Republic of Indonesia No. 22 of 2015 : 1). The development of rural areas is carried out by the government, Provincial Regional Government and Regency/City Regional Government, through regional work units, Village government, and/or Village Owned Enterprises (BUMD), involving Village communities, 2). The development of rural areas carried out by the government, regional, provincial and district/city regional governments and third parties must utilize the potential of natural resources and human resources and involve the village government and village community, 3). Development of rural areas on a local Village scale must be handed over to the Village and/or cooperation between Villages. In relation to the development socialization system, it is necessary to have basic guidelines regarding the implementation of socialization and information on

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<sup>19</sup>Muhammad Budyatna, *Interpersonal Communication Theory: An Introduction*, (Ed. 2, Cet. 1, Jakarta: Kencana, 2011)

<sup>20</sup>Hasan Shadily, *Sociology for Indonesian Society*, (Jakarta: Rineka Cipta, 1993)

<sup>21</sup>Raharjo, *Introduction to Rural and Agricultural Sociology*, (Yogyakarta: Gadjadara University Press, 1999)

<sup>22</sup>Republic of Indonesia, *Village Law No. 6 of 2014 Concerning Villages*, (Jakarta; Permata Press Team, 2014)



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village development and development of rural areas. namely: a). Paragraph 1 that the Village has the right to access information through the Village information system developed by the Regency/City Regional Government, b). Paragraph 3 that the Village information system as referred to includes hardware and software facilities, networks, and human resources, c). Paragraph 5 that the intended Village information system is managed by the Village government and all stakeholders. One of the virtues of the nature of messages or information according to Alo Liliweri regarding law (policies and regulations) in counseling is persuasive, meaning how to design messages in such a way as to influence other people so that they can find out information, enjoy information, decide to change their thoughts, words and actions according to by the will of the attorney.

### Cigarettes and the Phenomenon of Society.

Cigarettes are rolled or rolled tobacco rolled or wrapped in paper, leaves or corn husks the size of a little finger with a length of 8-10 cm, usually smoked by someone after burning the tip. Smoking is one of the habits of the Indonesian population, from all walks of life, including the lower economic community. Smoking habit is an important problem nowadays. For some people, cigarettes have become a necessity and a lifestyle that cannot be left behind in everyday life. Smoking is a habit that is detrimental to health. This fact can not be denied, many diseases have been shown to be a bad result of smoking.<sup>23</sup> Sondang Simarmata stated that smoking has become one of the common habits that we often encounter in everyday life, including rich or poor, men or women, parents, and even many teenagers who have started to try smoking. Cigarettes seem to have become one of the needs that almost match the basic needs. Smoking behavior has become a serious problem marked by increasing health problems such as cancer, respiratory diseases, fetal abnormalities in pregnant women who are smokers and impotence. Therefore, smoking has become a national and international problem.<sup>24</sup>

According to the World Health Organization (WHO) in 2003 stated that smoking is one of the problems that can never be resolved when talking about the right way of handling it. For some men and women in Indonesia, smoking forms a culture of its own, they will definitely smoke while waiting or smoking before or shortly after eating. Uniquely, cigarettes have become a phenomenal object in Indonesia because they are both revered and reviled. This is proven by the fact that even though many people are aware of the dangers of smoking for their health, there are still many people who insist on continuing their smoking habit. It is undeniable that for some people smoking is needed but on the other hand it becomes an enemy for people who are aware of the dangers of smoking. Indonesia is in the 3rd position with the largest number of smokers in the world after China and India (WHO, 2008) and remains in the 5th position as the largest cigarette consumer after China, the United States, Russia and Japan in 2007. Not only that, what is more concerning is the high number of smokers in Indonesia aged 10 years and over. Everywhere it can be seen that smokers can smoke as they please and as much as they want wherever they are and under any circumstances, this is a fact that people are free to smoke wherever they are, for example in the office, public transportation, parties and even in air-conditioned rooms, even though there is a warning that says "No Smoking" it turns out that a smoker does not hesitate to smoke.

### SIGNIFICANT AND METHODS

This type of research uses qualitative research methods with a descriptive approach, which is a series of activities or process of filtering data or information that is reasonable about a problem in certain conditions, aspects or fields in the object's life.<sup>25</sup> The descriptive method describes variable by variable, one by one, this study does not seek or explain relationships, does not test hypotheses or make predictions.<sup>26</sup> The research approach uses two perspectives, namely the communication approach and the sociology approach. The data source is the subject from which the research data was obtained. Based on the source, the data were obtained directly from the informant or the source to be studied, either through interviews, observation or other means. The secondary data sources referred to are in the form of books, magazines, newspapers, the internet, and other data sources that can be used as complementary data.<sup>27</sup>

Researchers direct the field to collect accurate data from informants in the data collection process. The data collection techniques used in research; observation, interview, and documentation.<sup>28</sup> The research instrument is the researcher himself with

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<sup>23</sup>Rani Dwi Nurjanah, *Definition of smoking and its consequences*, <http://ranidwi68.WordPress.Com/203/01/09/pertinence-smoking-and-its-consequences/>, Accessed 01 February 2018.

<sup>24</sup>Sondang Simarmata, *Smoking Behavior in Model Kuok State Madrasah Tsanawiyah Students, West Bangkinang District, Kampar Regency, Riau Province*, 2012, (University of Indonesia Thesis, 2012)

<sup>25</sup>Nawawi Hadari, *Scientific Research Methods*, (Jakarta: Rineka Cipta, 1994)

<sup>26</sup>Rahmat, Jalaluddin. *Communication Psychology*. (Bandung: Teen PT Rosadakarya.-, 2005)

<sup>27</sup>Syamsuddin AB, 2017, *Fundamentals of Theory of Social Research Methods*, (Ponorogo, CV Wade Group, 2017)

<sup>28</sup>Wiratna Sujarweni, *Research Methodology*, (Yogyakarta: PT Pustaka Baru, 2014)



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assistive devices such as books, photographs, documents, biographies, as well as supporting tools such as cameras, voice recorders and notebooks. Researchers use qualitative data analysis, the steps are: data reduction, data presentation (data display), inference and data verification

### **DISCUSSION**

The background to the birth of the smoke-free rule in Bone-Bone is related to issues of science, the economy, their relation to people's income levels as well as problems of unemployment, public health, and especially religious issues. As a rule that was born at the village level, it has a positive impact on community development. The enactment of the village regulations regarding smoke-free in Bone-Bone, namely when the village head was still the head of the Bone-Bone hamlet, when it was not yet in the form of a Bone-Bone village, at that time the socialization of smoke-free issues among the people of the Bone-Bone hamlet began. Accordingly, there are several village government strategies and supporting factors so that the community is smoke-free in the study of sociological analysis of rural management in the village of Bone-Bone as follows:

#### **Organizational Communication Strategy**

In organizations, communication is very important, because communication is an integral part of the organization. The village is a formal institution and organization, which is led by a village head and organizationally equipped with a village secretary and other village officials, thus creating a dynamic organization because communication and cooperation are established within it (internally), besides that it is important to accommodate community components. (externally). The socialization strategy regarding smoke-free in Bone-Bone village, is explained through the intended organization's communication channels. Before starting this rule, community leaders, religious leaders and even the elders in the community must be socialized and invited to a meeting and gather at the village office to start the smoke-free rule stage. It has been agreed upon as a rule/product of the village itself. What was stated by the informant, illustrated the existence of internal communication, then moving on to external organizational communication. When socializing smoke-free rules was about to start, people who were considered to be educated were summoned or invited to come to a meeting at the village office to implement smoke-free steps. Moreover, these rules are followed by sanctions against those who violate them, there are social sanctions and some are subject to payment. The socialization of smoke-free rules with a communication strategy for official events, whether carried out individually or by the government, is always conveyed or always reminded that smoking is very bad for health and very draining for the economy. Organizational communication in the framework of smoking-free socialization in Bone-Bone Village is not only carried out in village government organizations but every time there are activities in the community this communication is also carried out. This is in line with communication theory which states that organizational communication is the sending and receiving of various organizational messages within formal and informal groups of an organization. In organizations, communication is very important, because communication is an integral part of the organization, both internal communication and external communication.<sup>29</sup> From this brief description it is illustrated that the socialization of smoke-free regulations in Bone-Bone was carried out with an organizational communication strategy, both internal and external communication.

#### **Group Communication (Interaction Between Groups)**

Group communication or interaction between groups is a group of people who have a common goal who interact with each other to achieve common goals, get to know each other, and view them as part of that group. When it is related to some of the characteristics of group communication that the things discussed revolve around a particular theme or topic that concerns common interests, there are common interests among the members of the group, including some of the participants who already know each other or all of them know each other. Referring to the conditions in the field, then the communication strategy in the leadership of the Village Head in Bone-Bone Village in the socialization of smoke-free rules so as to implement a group communication strategy.

#### **Interpersonal Communication (Interpersonal)**

Referring to the theory of communication science, socialization in the leadership of the Village Head in implementing smoke-free, using interpersonal communication strategies, what is meant in this case is face-to-face communication between two or more people by bringing messages, so that each can understand one each other and interact effectively. The communication strategy in the Village Head's leadership uses various strategies and approaches, regardless of the number of community members present to receive development messages or outreach including the smoke-free rule promoted by the Bone-Bone Village government. As

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<sup>29</sup>Romli, Khomsahrial, *Complete Organizational Communication*, (Jakarta: PT Grasindo, 2011)

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the recipient of the mandate, the village government is engaged in socialization and maintaining what has been well received by the community. The leadership system in Bone-Bone Village utilizes various approaches including approaching the community, even though the number is relatively small, only a few people are sincere in conveying the smoke-free regulations. The communication strategy in the leadership of the Village Head, both the Village Head who was in office at the time the rule was enforced and the Village Head who served until this research took place, all used an approach strategy that adjusted to the conditions of the residents they faced even though the residents were found alone. Even in these conditions a family atmosphere was built so that the socialization of village regulations was well received by residents. The awareness of some residents not to smoke after the implementation of the smoke-free rule in Bone-Bone Village was largely non-coercive and unaffected by the existence of sanctions on the regulation, however, residents were born with their own awareness not to smoke due to the Village Head's communication method or strategy. Looking at what has been stated, it is in accordance with the communication theory put forward by Kathleen S. Verderber (2007), interpersonal communication is a process through which people create and cultivate their relationships, carry out reciprocal responsibilities in creating meaning.<sup>30</sup> Thus it can be understood that the leadership communication strategy in conveying village regulations regarding smoking-free was actually an interpersonal communication strategy that was quite arousing the feelings of residents to reduce their smoking habit and even stop altogether. Supporting factors so that the smoke-free community in Bone-Bone Village certainly accompanies every activity.

The habit of mutual cooperation that the residents of Bone-Bone Village encourage as their habit turns out to make it easier for the Village Head and his officials to convey important things to his residents, including the dissemination of smoke-free rules. This is in line with communication theory, especially small group communication theory which states that small group communication takes place face to face because the communicator and communicant are in a situation of facing each other and looking at each other. Its members interact with each other, this is socialized under the following conditions:

### **Crowds of Jama'ah in the Mosque**

Due to the habituation of the people of Bone-Bone Village in carrying out congregational prayers both Friday prayers and other prayer services, it is understandable that this has become one of the supporting factors in facilitating the implementation of the communication strategy for the village government. Therefore the village government conveys information after the implementation of the Friday prayer and often this information is also conveyed after the implementation of other congregational prayers. The Village Head in conveying information as a group communication strategy in socializing matters that are considered important, including the socialization of smoke-free rules.

### **Cohesiveness of Institutions or Organizations in the Village**

The presence of institutions and organizational groups in the village such as farmer groups, taklim assemblies, village and hamlet level PKK groups, youth organizations, youth mosques, etc. These institutions or organizations, after the researchers confirmed with several parties or the managers of the institutions and organizations in question, it turned out that they had built togetherness and cohesiveness under the coordination and guidance of the Village Head. The presence of institutions and organizations in Bone-Bone Village accompanied by the cohesiveness of the organization turned out to be a supporting factor in the implementation of a communication strategy with residents. The existence of a number of these organizations will make it easier to convey information to residents or village communities. This is in line with organizational communication theory which states that organizational communication is the sending and receiving of various organizational messages within formal and informal groups of an organization. In organizations, communication is very important, because communication is an integral part of the organization, both internal communication and external communication.

### **There is Awareness of the Residents Themselves.**

As previously stated, prior to the smoke-free socialization in Bone-Bone Village, community leaders, religious leaders and educational leaders were invited to attend to discuss the former together with the government, this was a socialization strategy. Among the community leaders who attended, it turned out that there was awareness of its own relation to the smoke-free rule. There are community leaders who first understand the presence of smoke-free rules, so after returning to their environment they immediately convey it to anyone they meet, including their own close family.

## **CONCLUSION**

Based on the results of the discussion on village government strategies and supporters so that the community is smoke-free in the study of rural management sociology analysis, it can be disseminated in the following ways: a). Organizational Communication Strategy; The socialization strategy regarding smoke-free is explained through communication interaction channels socialized by

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<sup>30</sup>Muhammad Budyatna, *Interpersonal Communication Theory: An Introduction*, (Ed. 2, Cet. 1, Jakarta: Kencana, 2011)

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community leaders, religious leaders, b) Group communication (interaction between groups); characteristics of group communication that revolves around certain topics that concern common interests, c) Interpersonal Communication (Interpersonal); The communication strategy in the Village Head's leadership uses various strategies and approaches, to receive development messages or smoke-free outreach.

There are also supporting factors for smoke-free society, namely 1). Crowds of Jama'ah at the Mosque; the village government conveys information after the implementation of Friday prayers and often this information is also conveyed after the implementation of other congregational prayers, 2). Cohesiveness of institutions or organizations in the village; The existence of a number of these organizations will make it easier to convey information to residents or village communities. 3). There is awareness of the residents themselves; before the smoke-free socialization, religious leaders and educational leaders were invited to attend to discuss beforehand with the government, this is a socialization strategy.

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## Video Media and Flipchart on Dental Health Knowledge



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**ABSTRACT:** Increasing knowledge about dental and oral health can be done with counseling. To facilitate counseling activities, a media is needed as a tool that makes it easier for listeners. Media that can be used include video media and flipcharts which can increase dental health knowledge. Purpose: this study was to analyze the effectiveness of video and flipchart media on dental health knowledge. Methods: The research design of is quasi-experimental. The sampling technique used was total sampling, which was divided into two groups, the intervention group was given video media and the control group was given flipchart media. The data collection instrument uses a questionnaire. Data analysis using t-test. Results: Before counseling was carried out using video media, the results were 75% in the good category, 20.8% in the sufficient category, and 4.2% in the less category. After counseling with video media, the results obtained were 100% in the good category. Prior to counseling using flipcharts, the results were 75% in the good category, 20.8% in the sufficient category, and 4.2% in the less category. After conducting counseling using flipcharts, the results obtained were 91.7% in the good category and 8.3% in the sufficient category. The results of the t-test obtained by video and flipchart media on dental health knowledge with a value of  $p = 0.690$ . Conclusion: Video and flipchart media are effective in increasing dental health knowledge.

**KEYWORDS:** Video Media, Flipchart, Dental and Oral Health Knowledge.

### I. INTRODUCTION

Dental and oral health is an integral part of general health. The mouth is the first gate in the digestive system. Food and drink are processed in the mouth with the help of the teeth, tongue and saliva. Maintenance of dental and oral hygiene is one of the efforts to improve health. A healthy oral cavity allows a person to communicate effectively, eat a variety of foods, improve quality of life, be confident and have a good social life. On the other hand, an unhealthy oral cavity can affect a person's social life, limited masticatory and speech functions, pain and disruption to work or school [1–3].

One of the causes of dental and oral health problems in society is the behavioral factor or attitude of ignoring dental and oral hygiene. This is based on a lack of knowledge about dental and oral health and its treatment. A person's awareness of the importance of dental health can be seen from the knowledge possessed when a person has a high level of knowledge, the concern for caring for his teeth and mouth is also high [4–6].

According to the 2018 Riskesdas report as many as 57.6% of Indonesian people experience dental and oral health problems in the form of dental caries and periodontal disease. A significant increase in dental and oral problems occurs in adolescents with an age range of 12-18 years. This age range is a period of transition from child to adult or known as adolescent puberty. Puberty adolescents often complain about the condition of their teeth, even though they have brushed their teeth [7–9].

The high number of adolescent complaints about dental and mouth problems is related to the level of knowledge of adolescents in maintaining oral health. Knowledge of dental and oral health is a person's ability to know everything about dental and oral health, knowledge is used as self-education to achieve optimal dental and oral health. In Sitanaya's research (2019) it was found that students' knowledge increased after health counseling was carried out. The results of counseling using audiovisual media were better than counseling using print media as seen from the average value of audiovisual media which was 23.8 higher compared to printed media which was 22.0 [10,11].

Carrying out promotional activities with counseling aims to change behavior from unhealthy aspects of knowledge, attitudes and actions towards healthy behavior so as to create a good understanding of dental and oral health. In carrying out promotional activities in the form of health education, this cannot be carried out optimally considering the number of schools and promotional media that are not quite right. Health promotion media are essentially educational aids used to facilitate the delivery and reception of health messages to information targets. This promotional media is media or props in promoting a

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health problem which is defined as a tool for health promotion that can be seen, heard, touched, felt or smelled, to facilitate communication and information dissemination [12,13].

Video is a display of moving images accompanied by sound. Video media is one type of audio-visual media. Audio visual media itself relies on the sense of hearing and the sense of sight. This media can increase students' interest in learning because students can listen and see pictures at the same time. Videos can present information, describe processes, explain complex concepts, teach skills, shorten or extend time, and influence attitudes [14,15].

Flipchart is one of the printed media that is simple and effective in conveying information so that it makes it easier for educational targets to understand the content of the material provided. Flipchart media consists of sheets of paper that are bundled together with ring bindings so that they can be reversed, which contain messages and are explained with pictures that explain a topic in sufficient detail so that the delivery of information becomes concise and practical accompanied by a direct explanation from the facilitator. Each specific topic of discussion always consists of 2 pages, one illustrated page with limited text facing the participants while the page facing the facilitator contains key information. Presentation of information using flipchart media tools in this study used attractive pictures, as well as concise and clear sentences adapted to the comprehension of educational goals. Bagaray et al. argued in their research that the capture of knowledge imparted through flipchart media utilizes more than one sense, namely the senses of sight and hearing (13% of the sense of hearing and 75% -87% of the sense of sight). The more senses involved in providing information, the easier the message can be received and understood properly [16,17].

Based on a preliminary study conducted by researchers on several students at SMP PGRI 10 South Jakarta, it was found that there were several grade VIII students who still lacked knowledge regarding dental and oral health maintenance such as when brushing their teeth, using toothpaste, etc. and the school had never conducted research on dental and oral health before.

## II. METHOD AND MATERIAL

The research design used in this study was a quasi-experimental study which aimed to analyze the effectiveness of dental and oral health knowledge before and after being given counseling using video media and flipcharts. This research was conducted in class VIII students of SMP PGRI 10 South Jakarta, which was conducted in April 2022.

The sampling technique used was total sampling, so the number of samples used in this study were 48 grade VIII students of SMP PGRI 10 South Jakarta, which were divided into two groups, the intervention group was given video media and the control group was given flipchart media.

The research instrument used was a pre-test and post-test questionnaire. Data collection was carried out by using a questionnaire given to class VIII students at SMP PGRI 10 South Jakarta, the data was taken directly by the researcher using a pre-test and post-test questionnaire given directly to students. The data collection procedure is carried out in the following way:

1. Before conducting the research, the researcher introduced himself to class VIII students at SMP PGRI 10 South Jakarta, then explained the aims and objectives of conducting the research.
2. The researcher gave a pre-test questionnaire sheet to class VIII-A students.
3. Researchers conducted counseling using video media.
4. The researcher gave a post-test questionnaire sheet to class VIII-A students.
5. The researcher continued counseling to class VIII-B, the researcher introduced himself to class VIII-B students of SMP PGRI 10 South Jakarta, then explained the purpose and objectives of conducting the research.
6. The researcher gave a pre-test questionnaire sheet to class VIII-B students.
7. Researchers conducted counseling using flipchart media.
8. The researcher gave a post-test questionnaire sheet to VIII-B class students.

## III. RESULT

**Table 1. Dental health knowledge before and after counseling with video media**

Knowledge	Before		After	
	f	Percentage (%)	f	Percentage (%)
Good	18	75	24	100
Sufficient	5	20.8	0	0
Less	1	4.2	0	0
Total	24	100	24	100



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Table 1 shows that before counseling was carried out with video media, the level of knowledge of dental and oral health of the respondents included in the good category as many as 18 people (75%), in the sufficient category as many as 5 people (20.8%), and in the poor category 1 person (4, 2%). Whereas after counseling with video media, the level of knowledge of dental and oral health of the respondents included in the good category as many as 24 people (100%), the moderate category did not exist (0%), and the less category did not exist (0%).

**Table 2. Dental health knowledge before and after counseling with flipchart**

Knowledge	Before		After	
	f	Percentage (%)	f	Percentage (%)
Good	18	75	22	91.7
Sufficient	5	20.8	2	8.3
Less	1	4.2	0	0
Total	24	100	24	100

Table 2 shows that before counseling was carried out using flipchart media, the level of knowledge of dental and oral health of the respondents included in the good category as many as 18 people (75%), in the sufficient category as many as 5 people (20.8%), and in the poor category 1 person (4, 2%). Whereas after counseling with flipcharts, the level of knowledge of dental and oral health of the respondents included in the good category as many as 22 people (91.7%), 2 people in the sufficient category (8.3%), and in the less category none (0%).

**Table 3. Results of different dental health knowledge tests before and after counseling in the intervention and control groups**

Groups	Mean	p-value
intervention	93.3	0.690
control	92.6	

Table 3 shows that the results of the t-test obtained by video and flipchart media on dental health knowledge with a value of  $p = 0.690$ . meaning that video and flipchart media are equally effective increasing dental health knowledge.

## IV. DISCUSSION

Knowledge is the result of human sensing, or the result of knowing someone about an object through the senses they have (eyes, nose, ears, and so on). By itself at the time of sensing so as to produce knowledge is strongly influenced by the intensity of attention and perception of the object. So, knowledge is the result of knowing that occurs after someone senses a certain object. Knowledge is one of the three domains that influence human behavior. Knowledge has a very important role in forming one's actions, because from experience and research it turns out that behavior based on knowledge will last longer than behavior that is not based on knowledge [18].

The results showed that prior to counseling with video media, the results were 75% in the good category. After counseling with video media, the results obtained were 100% in the good category. Meanwhile, knowledge of dental and oral health prior to counseling using flipcharts obtained 75% results in the good category. After conducting counseling using flipcharts, the results obtained were 91.7% in the good category and 8.3% in the sufficient category. The results of the t-test obtained by video and flipchart media on dental health knowledge with a value of  $p = 0.690$ . meaning that video and flipchart media are equally effective increasing dental health knowledge.

Based on the pyramid with the Cone of Experience by Edgar Dale, students will more concretely gain knowledge through direct experience, through imitation objects, experience through drama, demonstrations, tours, and through exhibitions. This is possible because students can directly relate to the object being studied. While students will be more abstract in obtaining knowledge through objects or intermediary devices, such as television, motion pictures or films, radio or tape recorders, visual symbols, verbal symbols [18].

Video media and flipcharts accompanied by lecture methods have the same concrete level in Edgar Dale's cone of experience theory. Both of these educational media involve the senses of hearing and sight so that people can remember 50% of what they see and hear. In addition, the reach of counseling using video media is relatively larger than flipcharts. Utilization of video media in learning can provide a more complete, clear, varied, interesting and fun learning experience. Video media is included in electronic educational media which has advantages such as involving many senses so that it is easier to understand, more interesting because it has sound [19].

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In the previous research conducted by Utami et al. it was shown that video media was effective in increasing knowledge. while for counseling using flipcharts it also shows that flipchart media is effective in increasing knowledge. The results of the study above, when compared with the results of the researchers, showed the same results, namely an increase in dental and oral health knowledge after counseling was carried out and there was a difference in the increase in dental and oral health knowledge between using videos and flipcharts [20].

## V. CONCLUSION

Based on the results of the study, it can be concluded that there is video and flipchart media are equally effective increasing dental health knowledge

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dan flip chart terhadap peningkatan pengetahuan kesehatan gigi dan mulut anak. *E-GiGi* 2016;4. <https://doi.org/10.35790/eg.4.2.2016.13490>.

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## Intensive and Extensive Interval Training; Which is Better Against $VO_2$ max Football Athletes?



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**ABSTRACT:** This study aimed to determine the difference between intensive and extensive interval training on the  $VO_2$ Max of football athletes. This type of research is an experiment. The sample used was football athletes at LPSB Mutiara Purwokerto, totalling 14 athletes with an age range of 13-15 years. Samples were divided into two groups based on pretest scores using ordinal pairing. The instrument for measuring  $VO_2$ Max uses the intermittent Yo-Yo test. Data analysis techniques include descriptive analysis, prerequisite tests (normality and homogeneity tests), and hypothesis testing using paired sample tests and independent sample tests. The analysis used SPSS 23 software. The results showed (1) a significant effect of intensive interval training on the  $VO_2$ Max of football athletes. The magnitude of the increase in  $VO_2$ Max in soccer athletes after being given intensive interval training was 5.07%. (2) There is a significant effect of intensive interval training on the  $VO_2$ Max of soccer athletes. The magnitude of the increase in  $VO_2$ Max in soccer athletes after being given extensive interval training was 12.54%. (3) There is a significant difference between intensive and extensive interval training on the  $VO_2$ Max of football athletes. The mean difference in the increase in  $VO_2$ Max of the intensive and extensive interval group soccer athletes was 2.02, so the extensive interval training group was better than the intensive interval training group on the  $VO_2$ Max of soccer athletes.

**KEYWORDS:** intensive intervals, extensive intervals,  $VO_2$ Max

### INTRODUCTION

Football is a sport that needs to improve its achievements, especially in Indonesia. For football players to achieve good performance, supporting factors are needed, one of which is the ability to be in good physical condition. Physical condition greatly affects the performance of an athlete when playing/competing because, with a less-than-perfect physique, an athlete's game can harm himself and can also harm his team. Football is a game that has dynamic movements (Zouhal et al., 2019) and has good physical conditions such as strength, speed, agility, endurance, flexibility, accuracy, power, reaction, and coordination (Abd Karim et al., 2019); (Boraczynski et al., 2019). A player is required to be able to make fast movements such as jumping, running, stepping forward and backward, running with fast dribbles, and dribbling past opponents (Doewes et al., 2020); (Abdullaeva, 2021), and there are many more basic movements in the game of football that are required to be able to use excellent physical conditions.

Recent literature has also provided physical performance information that describes the most intense periods of soccer play (Rennie et al., 2020); (Dolci et al., 2020). The premise for obtaining this data is to gather evidence about the most demanding parts of the game, which coaches can use to condition their players appropriately (Delaney et al., 2017). Another study identified periods of intense competition using a rolling average of 3 minutes and reported average peak speeds ranging between 160 and 180 m per minute (Black et al., 2016). The physical components that soccer players must possess are cardiorespiratory fitness or what is often referred to as the Maximum Oxygen Volume ( $VO_2$ Max) level (Jemni et al., 2018); (Kuswoyo & Lahinda, 2020).  $VO_2$ Max endurance is a physical condition component that must be developed first before developing other physical condition components (Taufik et al., 2021).

Based on a research journal on the  $VO_2$ Max of football players in Belgium, according to (Boone et al., 2012), the  $VO_2$ Max reported in the literature varies between 55 and 65 ml/kg/min for elite soccer players. A soccer player with a higher  $VO_2$ Max value, the better stamina. Vice versa, the lower the value, the lower the stamina. The standard  $VO_2$ Max value for Indonesian players is usually only 56, while foreign players average 60. The standard  $VO_2$ Max for a goalkeeper is 52, centre-backs 55, full-backs 61, midfielders 60, and attackers 56. Differences in standard  $VO_2$ Max based on position are normal because there are

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different positions. Demands harder performance than other positions. The sample consisted of 289 adult players from 6 first division teams in the Belgian league (Boone et al., 2012).

Globalization in the field of sports leads to innovation in training methods, thus giving birth to a type of exercise to increase VO<sub>2</sub>Max, which is often termed interval training. The exercise interval training method aims to develop and increase aerobic endurance (Menz et al., 2019); (Hurst et al., 2019). Interval training is highly recommended because, indeed, the results are very positive for the development of an athlete's endurance. Interval training itself is a training system interspersed with intervals in the form of rest periods (Trisaptono & Sumintarsih, 2020); (Christiansen et al., 2021). The interval training method has characteristics, namely consistency in the effort made and the rest period between repetitions taking place consistently (Haugen et al., 2019). The implementation of the interval training method is divided into extensive interval training and intensive interval training.

Intense interval training is a training method that can be used to increase an athlete's VO<sub>2</sub>Max. Intensive interval training is a training method in which distance, travel time, the number of repetitions and recovery time have been determined (Yamin & Gusril, 2020). The intensive interval training method is carried out with a relatively small amount of load, with exercise intensity ranging from 80-90% and loading time ranging from 30-60 seconds with not full rest. The next interval training method is extensive intervals. In principle, extensive intervals are a training method that is the same as regular interval training in which the intensity, reps, number of sets, and rest are determined. The extensive interval method is known through medium load intensity, which ranges from 60 percent to 80 percent, large amounts of load through many repetitions and incomplete rest. Extensive interval training is a form of exercise used to increase endurance.

Several previous studies, including those conducted by (Yamin & Gusril, 2020), showed that extensive interval training was more effective than intensive interval training in increasing VO<sub>2</sub>Max in school football players. Furthermore, the study conducted (Suhdy, 2018) proved that there was a significant difference in the VO<sub>2</sub>Max of the two groups of intensive-extensive training method tests. Where the extensive interval training method is better than the intensive training method. In contrast to the results of previous research, the study conducted (Mubarak & Kharisma, 2021) shows that the intensive interval training method has a better effect than the extensive interval training method on increasing aerobic endurance.

### METHODS

This type of research is an experiment. Experimental research is research conducted to find out the consequences of a treatment given intentionally by researchers (Rogers & Revesz, 2019). The sample used was football athletes at LPSB Mutiara Purwokerto, totaling 14 athletes with an age range of 13-15 years. Samples were divided into two groups based on pretest scores using ordinal pairing. Instruments for measuring VO<sub>2</sub>Max use the Yo-Yo intermittent test (Michailidis et al., 2020); (Taskin & Taskin, 2021). The score is obtained from the distance travelled during the test treatment, after which it is calculated using the Yo-yo Intermittent Recovery Test formula. Yo-yo Intermittent Recovery Test level 1 takes around 6-20 minutes per session (Smith et al., 2022); (Ramirez-Campillo et al., 2018). Data analysis techniques include descriptive analysis, prerequisite tests (normality and homogeneity tests), and hypothesis testing using paired sample tests and independent sample tests. Analysis using SPSS 23 software. The intensive-extensive interval training program is shown in Table 1.

**Table 1. Intensive-extensive interval training program**

Description	Intense Interval Training	Extensive Interval Training
Intensity	80–90%	60-80%
Repetition	6-10 times	20-30 times
intervals	90-180 seconds	45-90 seconds

### FINDING

The research process was carried out for 16 meetings for 5 weeks. The results of the descriptive analysis of the VO<sub>2</sub>Max pretest and posttest statistics are presented in Table 2.

**Table 2. Results of Descriptive Analysis of VO<sub>2</sub>Max Pretest and Posttest Statistics**

VO <sub>2</sub> Max		N	Minimum	Maximum	Mean	Std. Deviation
Intensive Interval Group	Pretest	7	28.40	37.45	32.55	3.03
	Posttest	7	30.20	38.50	33.99	3.13
Extensive Interval Group	Pretest	7	27.60	35.70	32.29	2.85
	Posttest	7	30.20	40.50	35.75	3.66

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Based on Table 1, it shows that the VO<sub>2</sub>Max of the intensive interval group soccer athletes at the pretest averaged  $32.55 \pm 3.03$  while the posttest increased by an average of  $33.99 \pm 3.13$ . The VO<sub>2</sub>Max of soccer athletes in the extensive interval group at the pretest averaged  $32.29 \pm 2.85$  while the posttest increased by an average of  $35.75 \pm 3.66$ .

The data normality test uses the Shapiro-Wilk method with a significance level of 0.05, the results are in Table 3:

**Table 3. Results of Normality Test Analysis**

VO <sub>2</sub> Max		Shapiro-Wilk		
		Statistic	df	Sig.
Intensive Interval Group	Pretest	0.981	7	0.966
	Posttest	0.936	7	0.603
Extensive Interval Group	Pretest	0.949	7	0.723
	Posttest	0.965	7	0.864

Based on the statistical analysis of the normality test that was carried out using the Shapiro-Wilk test, the VO<sub>2</sub>Max data during the pretest and posttest obtained normality test results with a significance value of  $p > 0.05$ , which means that the data is normally distributed.

Homogeneity test using the Levene Test, the results are in Table 4:

**Table 4. Results of Homogeneity Test Analysis**

Test of Homogeneity of Variances				
VO <sub>2</sub> Max	Levene Statistic	df1	df2	Sig.
Pretest	0.015	1	12	0.904
Posttest	0.229	1	12	0.641

Based on the results of the analysis in Table 4, it can be seen that the VO<sub>2</sub>Max pretest-posttest obtained sig.  $p > 0.05$ , so the data is homogeneous.

Hypothesis analysis using the t-test, the t-test used is the paired sample test and the independent sample test. The first and second hypotheses were analyzed using the paired sample t test ( $df = n-1$ ) using SPSS 23 at a significance level  $< 0.05$ . The results of hypothesis testing are presented in Table 5:

**Table 5. Results of Paired Sample T Test Analysis**

Paired Samples Test								
Pair	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest-Posttest Intensive Interval Training	-1.44	0.94	0.35	-2.31	-0.58	4.069	6	0.007
Extensive Interval Training Pretest-Posttest	-3.46	0.88	0.33	-4.28	-2.65	10.369	6	0.000

Based on the analysis results in Table 5, the pretest-posttest for the intensive interval group obtained a t-count of 4.069 with a p-significance value of  $0.007 < 0.05$ . These results indicate that there is a significant difference. Thus the first hypothesis, which reads, "There is a significant effect of intensive interval training on the VO<sub>2</sub>Max of football athletes", is **accepted**. The magnitude of the increase in VO<sub>2</sub>Max in soccer athletes after being given intensive interval training was 5.07%.

Based on the analysis results in Table 5, the pretest-posttest for the extensive interval group obtained a t-count of 10,369 with a p-significance value of  $0.000 < 0.05$ . These results indicate that there is a significant difference. Thus the second hypothesis, which reads, "There is a significant effect of intensive interval training on the VO<sub>2</sub>Max of football athletes", is **accepted**. The magnitude of the increase in VO<sub>2</sub>Max in soccer athletes after being given extensive interval training was 12.54%.

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**Table 6. Results of the Independent Samples Test Analysis**

Independent Samples Test								
t-test for Equality of Means								
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
VO <sub>2</sub> Max	Equal variances assumed	4.149	12	0.001	-2.02143	0.48724	-3.08302	-0.95983
	Equal variances not assumed	4.149	11.958	0.001	-2.02143	0.48724	-3.08344	-0.95942

Based on the results of the analysis in Table 6, the VO<sub>2</sub>Max of the intensive and extensive interval groups obtained a  $t_{count}$  of 4,149 with a p-significance value of  $0.001 < 0.05$ , these results indicate that there is a significant difference. Thus the third hypothesis which reads "There is a significant difference between intensive and extensive interval training on the VO<sub>2</sub>Max of football athletes", is **accepted**. The mean difference in the increase in VO<sub>2</sub>Max of the intensive and extensive interval group soccer athletes was 2.02, so that the extensive interval training group was better than the intensive interval training group on the VO<sub>2</sub>Max of soccer athletes.

### DISCUSSION

Based on the results of the analysis, it is known that there is a significant effect of intensive interval training on the VO<sub>2</sub>Max of football athletes. The magnitude of the increase in VO<sub>2</sub>Max in soccer athletes after being given intensive interval training was 5.07%. The results of this study were reinforced in the research (Alkayis, 2019), which showed that there was an effect of intensive interval training on VO<sub>2</sub>Max abilities in extracurricular participants at SMA Negeri 1 Slawi in 2019. Research (Mubarak & Kharisma, 2021) showed that intensive interval training methods had an effect on increasing power aerobic resistance. Research (Yamin & Gusril, 2020) shows that intensive interval training has an effect on increasing VO<sub>2</sub>Max.

Intensive interval training is a training method in which distance, travel time, the number of repetitions and recovery time have been determined. The intensive interval training method is carried out with a relatively small amount of load, with exercise intensity ranging from 80-90% and loading time ranging from 30-60 seconds with no full rest (Yamin & Gusril, 2020). Intense interval training is characterized by fewer repetitions and long breaks. In this training method, longer rest periods are given, thus providing better rest opportunities. According to (Alkayis, 2019), the characteristics of the intensive interval method are load intensity of 80-90% of maximum ability, moderate amount/volume of load, namely 6-10 times per series, intervals/rest of 90-180 seconds per series, and the effect of this exercise increases endurance speed.

Application through an intensive interval method with a moderate-high intensity training program with a pulse rate of more than 180-190x/minute, few repetitions, not many intervals, a maximum of 3 sets with rest time settings between repetitions and between sets, shows a greater effect Good for increasing aerobic endurance. The intensive interval method will be able to improve complex motor nerves. This incomplete rest can be done with passive rest, namely resting without doing activities (sleeping, standing, sitting) and in the form of active rest, namely resting by doing light activities (jogging, walking) (Suhdy, 2018).

The intensive interval training method provides development of aerobic endurance abilities. Physical condition training has a very important role in improving and maintaining physical ability, the higher the physical ability, the more aerobic capacity it determines. Through high-intensity training methods, few repetitions and short rest periods can increase maximum aerobic capacity which is often called VO<sub>2</sub>Max which is classified as one of the physical factors in determining achievement (Yudi et al., 2022); (Hardiansyah, 2020).

Based on the results of the analysis, it is known that there is a significant effect of intensive interval training on the VO<sub>2</sub>Max of football athletes. The magnitude of the increase in VO<sub>2</sub>Max in soccer athletes after being given extensive interval training was 12.54%. The results of this study were reinforced in the research (Alkayis, 2019), which showed that there was an effect of extensive interval training on VO<sub>2</sub>Max abilities in extracurricular participants at SMA Negeri 1 Slawi in 2019. Research (Mubarak & Kharisma, 2021) showed that the extensive interval training method increased power aerobic resistance.

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Research (Yamin & Gusril, 2020) shows that extensive interval training has an effect on increasing VO<sub>2</sub>Max. Research (Badaruddin, n.d.) shows that there is an effect of extensive interval training on aerobic ability for students of SMP Negeri 1 Tomia, Wakatobi district. Research (Khaidir & Komaini, 2019) shows that extensive interval training has an effect on cardiovascular endurance. Research (Pianda & Tohidin, 2019) shows that there is a significant effect of the extensive interval training method on VO<sub>2</sub>Max ability.

The extensive interval method is known through medium load intensity, which ranges from 60 to 80%, large amounts of load through many repetitions and not full rest. The number/volume of high loads and the number of repetitions is 20-30 times per series, and the intervals/rests are not full, namely 45-90 seconds per series. Extensive interval training means that the training load given to athletes has the following characteristics: (a) large training volume; (b) low or medium training load intensity; (c) long recovery time and; (d) the frequency and rhythm of slow and slow motion.

In principle, extensive intervals are a training method that is the same as regular interval training in which the intensity, reps, number of sets and rest are determined. The extensive interval method is known through medium load intensity, which ranges from 60-80%, large amounts of load through many repetitions and incomplete rest (Yamin & Gusril, 2020). The application of training through the extensive interval training method, which is carried out at low-moderate intensity, pulse rate below 170x/minute, lots of repetitions, short intervals and lots of sets/series, has shown a good effect on increasing aerobic endurance ability. Providing training using the extensive interval training method shows an advantage in increasing aerobic endurance ability. The training method with activities in the form of repeated repetition so that the stimulus and response associations become very strong and not easy to forget.

Extensive interval training is a form of exercise which has the characteristics of moderate training intensity, lots of repetitions and longer rest than intensive interval training. This exercise is required for the athlete trying to fight or overcome fatigue. The application of extensive interval training with many repetitions and little rest will stimulate the work of the heart so that the process of taking oxygen will be maximised. The characteristics of the extensive interval method are moderate load intensity, namely 60% -80%, high load volume/volume and many repetitions, namely 20-30 per series, and incomplete intervals/rest, namely 45-90 seconds per series. Thus it is hoped that the effect of the exercise will be an increase in fighting fatigue (Pianda & Tohidin, 2019).

Based on the results of the analysis, it is known that there is a significant difference between intensive and extensive interval training on the VO<sub>2</sub>Max of football athletes. The mean difference in the increase in VO<sub>2</sub>Max of the intensive and extensive interval groups of soccer athletes was 2.02%, so the extensive interval training group was better than the intensive interval training group on the VO<sub>2</sub>Max of soccer athletes. This form of interval training is useful for increasing VO<sub>2</sub>Max capacity because training with an intensive interval method demands maximum performance, while training with an extensive interval method requires moderate endurance for a relatively long time so that athletes can improve their VO<sub>2</sub>Max ability for the better.

The results of this study were reinforced in the research (Suhdy, 2018), which proved that there was a real difference in the VO<sub>2</sub>Max of the two groups of intensive-extensive training method tests. Where the extensive interval training method is better than the intensive training method. Alkayis (2019) showed that there were differences in the effect of extensive interval training and intensive interval training on increasing VO<sub>2</sub>Max. Research conducted (Sulastio, 2016) proves that extensive interval training is better than intensive interval training. Research (Yamin & Gusril, 2020) shows that extensive interval training is more effective than intensive internal training in increasing VO<sub>2</sub>Max.

Interval training is a system of exercises interspersed with intervals in the form of rest periods. In implementing the interval training method, there are rest periods between training activities, so there is a sequence of activities, namely: exercise–rest–exercise–rest–exercise and so on (Oliveira et al., 2022). Apart from being used in strength training and speed training, interval training can also be used to develop aerobic and anaerobic endurance and to develop other types of endurance (Kelly et al., 2021).

The interval training method in execution aims to develop and improve aerobic endurance. Interval training is highly recommended because the results are very positive for the development of endurance athletes. Interval training is a system of exercises interspersed with intervals in the form of rest periods. If a person does aerobic endurance exercise for a certain period of time, the pulse reflex point will increase. This increase is caused by changes in the cardiovascular system, such as changes in heart size, changes in muscle mitochondria, changes in blood vessels and increases in blood haemoglobin levels (Bossi et al., 2020).

Interval training takes place alternately between work intervals and rest intervals, and the rest phase is developed in the form of work relief and rest relief. This exercise is a form of training method that can be used for all sports to improve physical conditioning abilities. By using the principles of training in such a way, you can increase the anaerobic system as the primary energy system and the aerobic system as the main system or develop it in a balanced way so that physical abilities will increase



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gradually. The interval training method has characteristics, namely consistency in the effort made and the rest period between repetitions taking place consistently. The implementation of the interval training method that must be considered is the need to know the athlete's pulse for recovery after the first work/activity (repetitions). The results of the pulse that are known at the beginning will be a benchmark for use as rest time for the next repeat, and again see the recovery time after the end of the repetitions in the first set, which is then used as a benchmark for resting between sets (Feito et al., 2018).

The forms of intensive interval training and extensive interval training certainly have different characteristics but lead to the same goal, namely improving the quality of a player to achieve a goal, namely achievement. This means that with the intensive interval method and the extensive method, there is a difference that is more efficient and effective in increasing the VO<sub>2</sub>Max of soccer players. Extensive interval training is a training method that is almost the same as the intensive interval training method in which the intensity, reps, number of sets and rest are determined. In principle, extensive interval training is one method of interval training that is carried out continuously and systematically with moderate intensity loads, lots of repetitions, and few rest periods. With lots of repetitions and a little rest, this will stimulate the work of the heart so that the process of taking oxygen will be maximised (Yamin & Gusril, 2020).

### CONCLUSION

The conclusions of the study show (1) there is a significant effect of intensive interval training on the VO<sub>2</sub>Max of soccer athletes. The magnitude of the increase in VO<sub>2</sub>Max in soccer athletes after being given intensive interval training was 5.07%. (2) There is a significant effect of intensive interval training on the VO<sub>2</sub>Max of soccer athletes. The magnitude of the increase in VO<sub>2</sub>Max in soccer athletes after extensive interval training was 12.54%. (3) There is a significant difference between intensive and extensive interval training on the VO<sub>2</sub>Max of football athletes. The mean difference in the increase in VO<sub>2</sub>Max of the intensive and extensive interval groups of soccer athletes was 2.02%, so the extensive interval training group was better than the intensive interval training group on the VO<sub>2</sub>Max of soccer athletes.

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## An Ethnographic Approach on Betawi Culture: The Existence of Busker of Ondel-Ondel from Cultural Perspective



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**ABSTRACT:** Ondel-ondel is one of the arts in the form of a tall and large giant doll from the Betawi Tribe. Its existence can still be seen in the community, especially in Pondok Aren Village, South Tangerang. In the history of Betawi culture, ondel-ondel underwent several changes in function, at first ondel-ondel functioned as a protector, repellent of evil (catastrophe) and disturbances from spirits by the Betawi community, along with the development of the times later ondel-ondel turned its function into an entertainment in the people's party and even now ondel-ondel has shifted into a busking tool for a few people. This caused controversy in the community. The purpose of this study was to find out public opinion regarding the existence of ondel-ondel buskers from various perspectives, especially cultural perspectives. This study uses a qualitative research method with an ethnographic approach. The subjects in this study were the general public, indigenous Betawi people, Betawi community leaders and ondel-ondel buskers. The results show that not all people think that the existence of ondel-ondel buskers has a negative impact on a culture, there are some people who consider that the presence of ondel-ondel buskers indirectly introduces an art to the community and shows the community that until now ondel art -ondel still exists and its existence is maintained.

**KEYWORDS:** Betawi Culture, Ondel-Ondel buskers, Community Perspective

### I. INTRODUCTION

The Indonesian nation has a diversity of tribes and cultures, this is due to geographical factors as an archipelagic country. In Law no. 6 of 1996 concerning Indonesian Waters the number of islands in Indonesia is 17,508 islands, in 2019 as many as 16,671 islands have been reported to the United Nations through the UNGEGN (United Nations Group of Experts on Geographical Names) session. Thousands of islands stretching from Sabang to Merauke are Indonesia's wealth. Based on data from the Central Statistics Agency (BPS) in 2010, Indonesia has 1,331 tribes. Each island has different ethnic and cultural diversity.

Culture is a way of life that develops in a particular society that originates from human creativity and initiative and is passed down continuously from one generation to the next. For example customs, language, clothing and so forth. Culture is the result of human creativity, taste and initiative which is obtained by learning or studying it, such as science, belief, art and others. The function and use of culture apart from being an identity for a society or nation, culture also functions as a shaper of behavior and attitudes as well as being a barrier between one community group or nation and another group or nation. Culture comes from several elements such as art, technology and equipment systems, social organization, language, livelihood systems, knowledge systems and religious systems. Culture is created through a long and complicated journey, so it is fitting for every nation to maintain and preserve its culture.

Preservation is an activity carried out to protect, maintain, maintain, maintain, utilize, foster and develop. Preservation is also an effort made by a group of people with the aim of maintaining, maintaining, and maintaining, as well as fostering and developing things such as objects, patterned activities, and ideas. Preserving culture means maintaining the existence of culture so that it exists and lives in people's lives.

The era of globalization has had a major influence in various fields, including one in the socio-cultural field. The entry of foreign culture causes a shift towards local culture. Currently foreign culture is considered more interesting and more unique. Western culture is considered modern culture and eastern culture is considered traditional culture. Local culture means the culture that belongs to the indigenous people and is inherited from generation to generation. Every generation needs to be introduced and

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given knowledge about local culture, so that there will be a sense of love so that there will be a desire to maintain and preserve their culture, by protecting culture means maintaining national dignity because culture is part of national identity

Culture has three manifestations, the first form is abstract, cannot be touched or photographed, Indonesian people call it customs, the second form is concrete in the form of daily human actions or activities, and the third form is the most concrete, namely in the form of physical results. , activities, actions and works of humans. It can be seen, touched or photographed. Ondel-ondel is an example of the most concrete form of culture because it can be seen, touched and photographed. Ondel-ondel is a giant doll with a height of 2.5 meters and a width of about 80 cm, one of the cultures originating from the Betawi tribe.

The Betawi tribe is a tribe that has inhabited the city of Jakarta since the 1600s and is known as a native of the city of Jakarta. Jakarta is currently the capital of the State of Indonesia. Previously, Jakarta was a port city and a trading city because it was located on the beach. The Betawi people and their culture are the result of a mixture of various nations and tribes originating from Indonesia. This is very possible because as a port city and trading city, various nations from all over the world come with various interests and bring their own culture so that an assimilation process occurs.

As the nation's capital, the city of Jakarta is a destination for immigrants from all over Indonesia and abroad. The arrival of these immigrants made the Betawi tribe marginalized, many of them left Jakarta and moved to areas in West Java and Banten provinces. Amid the swift flow of culture brought in by immigrants, the Betawi tribe is a tribe that is strong in maintaining its culture. Apart from ondel-ondel, Betawi also has other cultures such as tanjidor, Betawi lenong performances, doorstop, silat beksi and the Cokek dance. This culture or tradition still exists and has survived to this day.

Ondel-ondel is one of the Betawi cultures that is still very well preserved today. The big doll is still seen going back and forth in the area of the aren cottage and its surroundings. In the history of Betawi culture, originally ondel-ondel was named "Barongan". In the past, the Betawi people believed in Barongan as a repellent or protector from evil things that disturbed the surrounding community. Over time, this belief faded. In accordance with cultural characteristics, namely dynamic, meaning that culture is always changing all the time following the development of society. Today's people call Barongan as Ondel-ondel, if in the past Barongan was always associated with mystical things, it was different from Ondel-ondel which is currently used as entertainment and is often performed at people's parties and also to welcome guests of honor. There are even some people who use ondel-ondel as a singing tool. Its unique and attractive shape makes ondel-ondel an interesting spectacle so that it is used by ondel-ondel buskers to get income in the form of money.

The existence of ondel-ondel ngamen creates a polemic in society, especially the Betawi people, as the original owners of ondel-ondel culture. The presence of ondel-ondel buskers is considered to reduce cultural values in ondel-ondel. The DKI Jakarta Provincial Government has already controlled the ondel-ondel buskers. This control is based on DKI Jakarta Governor Regulation (Pergub) No. 11 of 2017 concerning Betawi Cultural Icons and DKI Jakarta Provincial Regulation (Perda) No. 8 of 2007 concerning Order Article 39 (1) Chapter VIII concerning Social Order. Residents caught using ondel-ondel for busking will receive training at the Social Institution, while the Ondel-Ondel media and loudspeakers used are secured at each Kelurahan Office. However, this regulation does not yet apply to suburban areas of Jakarta, such as South Tangerang and Depok

From another point of view, the existence of ondel-ondel has a positive impact from a cultural perspective. Indirectly, the buskers introduce Betawi culture to the wider community and preserve this culture so that it exists and is known. In the 1945 Constitution Article 32 paragraph 1 mandates "The state advances Indonesian national culture in the midst of world civilization by guaranteeing the freedom of the people to maintain and develop their cultural values." The existence of ondel-ondel ngamen from a cultural perspective means participating in maintaining culture. If only through cultural festivals not all people can see ondel-ondel directly, the festival can only be seen by a limited circle. It is different from ondel-ondel ngamen which can be seen and witnessed by the general public, at all levels and ages. This will further remind the public and also increase knowledge, especially for children, as the next generation of culture regarding Betawi culture.

In previous research by Iren Chienita, Eko Harry Susanto, Septia and Winduwati (2018) entitled Betawi People's Perception of the Ondel-Ondel Ngamen Phenomenon, it was found that the Betawi people did not support making ondel-ondel a singing tool because ondel-ondel is part of Betawi culture and Betawi icons, should be preserved not used as a means of making money. Besides that, the clothes worn by the ondel-ondel players are not in accordance with Betawi customs, the players should wear Betawi traditional clothes. The majority of Betawi people do not agree with the existence of ondel-ondel buskers.

Research by Sinta Paramita (2018) states that currently ondel-ondel has experienced a shift in meaning, if in the past ondel-ondel served as a repellent to repel reinforcements or to disturb the spirits that roam. Nowadays, ondel-ondel is used as entertainment for the people of Jakarta and its surroundings, and it is even used as a livelihood for some people.

The author also makes research by Hildigardis M. I. Nahak (2019), as reference material, the novelty in this research is that the era of globalization has caused foreign cultures to continue to enter Indonesia unstopably, this can erode or fade Indonesia's

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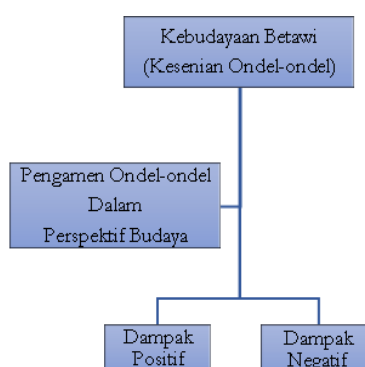
local culture. For this reason, efforts are needed to preserve the original cultures of Indonesia. Efforts that can be made include the following: 1) Raising awareness about the importance of culture, 2) Participating in cultural preservation, 3) Studying and outreach to others to help preserve.

### II. RESEACH METHODS

Researchers used qualitative research methods with an ethnographic approach. The stages in this research are the first by determining the cultural community to be examined, namely Betawi culture, the second is determining the problems, issues or realities to be studied, the object or problem being studied in this research is ondel-ondel art, the third is determining the informant as the subject. , the subjects in this study were the general public and Betawi people, Betawi community leaders and ondel-ondel buskers, fourthly observing and interviewing informants, including examining how each individual interpreted the situation and meaning in interactions within their cultural group, fifthly recorded the results of observations and interviews , the sixth analyzes the results of observations and interviews including documenting the process during the observations and interviews, and the seventh writes a report.

This research was conducted in the Pondok Aren area, South Tangerang, where ondel-ondel buskers go around every day. In addition, researchers also conducted research at Setu Babakan or Lake Babakan which is located in South Jakarta, because there is a center for the Betawi Cultural village and the area is intended for the preservation of the original Betawi cultural heritage. The techniques used in collecting data are observation, in-depth interviews, and documentation. The steps in analyzing the research data include: data collection, data reduction, data display, and conclusion drawing/verification

### III. RESULT AND DISCUSSION



Betawi is one of thousands of tribes in Indonesia. This tribe inhabits the DKI Jakarta area and its surroundings. In Melalatoa's opinion, the Betawi tribe is the result of an assimilation process, namely the assimilation of various ethnic groups and cultures, both originating from the territory of Indonesia and tribes and cultures brought by other nations. These tribes come from Indonesian regions such as Sundanese, Javanese, Balinese, Malays, and so on. Meanwhile, other nations that came were Arab, Chinese, Portuguese, Dutch, Indian and British. The cultures of these tribes blended and gave birth to a new culture, namely Betawi. The existence of the names of the tribes that became the names of regions in Jakarta shows that in the past these tribes lived in groups. Like the names of the areas of Kampung Bali, Kampung Makassar, Kampung Melayu, Kampung Ambon and so on.

Another opinion says that the Betawi tribe is the result of inter-ethnic and national marriages in the past that were brought by the Dutch to Batavia. Meanwhile, Betawi culture is a representation of the Betawi people whose existence was shaped by various ethnicities brought in by the Dutch colonialists in the past and formed a kind of ethnicity in the form of the Betawi people.

Betawi has a lot of cultural diversity in terms of food, music, dance, theatre, art, clothing, handicrafts and ceremonies. This research focuses on Betawi arts, namely ondel-ondel. Ondel-ondel was designated as an icon of the City of Jakarta in order to establish Betawi as a native of the City of Jakarta. 11 of 2017 concerning Betawi Cultural icons. Eight Betawi cultural icons besides Ondel-ondel are Coconut Kembang, Balang Teeth Ornament, Sadariah Dress, Kebaya Design, Betawi Batik, Egg Kerak and Pletok Bir.

"Ondel-ondel is a work of ancient Betawi art which was originally part of the people's sacred ritual activities." At this time ondel-ondel is used for various purposes. In Jakarta, ondel-ondel is always displayed at Jakarta city anniversary celebrations and is also used as an ornament at official events of the DKI Jakarta Provincial government, folk festivals, performances by foreign artists, exhibitions, shopping centers, the tourism industry and conference halls. According to Mr. Abdul, a maker of ondel-ondel dolls,



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he often gets orders from schools in Jakarta for the ondel-ondel to be displayed (decoration) at school doors. The Betawi people in Pondok Aren use ondel-ondel dolls as displays at weddings and circumcisions.

Contrary to the fact above, there are a handful of people who use ondel-ondel as a busking tool. After conducting interviews with several groups of ondel-ondel buskers. Researchers obtained information that their goal was to get money. However, there are also buskers who are reluctant to give their names, saying that apart from wanting to earn money, the intention of busking ondel-ondel is to entertain the public and introduce the art of ondel-ondel to the wider community.

"Ondel-ondel has been used pragmatically by the community." The buskers want everything that is done or expected to be achieved immediately without wanting to think long and without going through a long process. It is proven by the way they sing ondel-ondel, they sing using makeshift tools, such as loudspeakers (TOA) filled with songs as musical accompaniment and they wear ordinary clothes (not Betawi traditional clothes). According to Nurul (2018) the musical instrument that accompanies the ondel-ondel art is actually a drum without song accompaniment, but currently the Betawi people use Gambang Kromong music and the tanjidor musical instrument in carrying ondel-ondel. Gambang Kromong is an orchestra which is a form of acculturation of Betawi and Chinese culture, combining elements of Chinese music and percussion, which are called xylophone and kromong. Tanjidor is a Betawi art in the form of an orchestra accompanied by blowing and beating musical instruments. The musical instruments that are blown are clarinets, pistons, trombones, and trumpets. While the musical instruments that are played are drums (membranophone), cymbals (percussion), and side drums (drums).



Sumber. mbludus.com

Gambar 2 Alat Musik Gambang Kromong



Sumber. mpokiyah.com

Gambar 3 Alat Musik Tanjidor

Apart from using makeshift musical instruments, the clothes (costumes) worn by ondel-ondel buskers are very much different from the real Betawi culture. According to Iren Chienita in a journal (2018) the costumes used by the ondel-ondel players are actually encim kebaya, conscious clothes or oblique ends, shawls, and checkered sarongs (cukin) complemented by coconut flowers. Meanwhile, the clothes used by ondel-ondel buskers today are only T-shirts and material pants or jeans, most of them don't even wear footwear. After conducting observations and interviews with the ondel-ondel buskers, the researchers found that the reason they did not use the proper instruments was because the rental of musical instruments was expensive, not to mention that they had to rent a car to take the ondel-ondel to the area where they were singing. Apart from that, the reason they didn't wear the proper ondel-ondel costumes was because not many of them understood the costumes that had to be worn when parading ondel-ondel, the ondel-ondel buskers in the Pondok Aren area were dominated by underage children. They

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know that ondel-ondel is a Betawi art, but they do not know the history or traditions that must be done when parading ondel-ondel. These things make the Betawi people disagree or not happy with the existence of ondel-ondel buskers.



Sumber. dokumen pribadi

Gambar 4 Pengamen Ondel-Ondel Cilik



Sumber. dokumen pribadi

Gambar 5 Pengamen Ondel-Ondel (Pemuda 14 Tahun)

Based on information from Mrs. Ulfa (a native of Jakarta), even though the DKI Jakarta Government has banned ondel-ondel buskers, these buskers are still around and around every evening. He also said that ondel-ondel singing were allowed to go around as long as they used Betawi songs and not other songs. Then one of the buskers also said that he was allowed to keep going around but the musical instruments had to be complete, they were not allowed to use recordings (cassettes, MP3s and others).

For the City of South Tangerang there has been no official ban from the regional government regarding ondel-ondel ngamen. Until now, Pondok Aren residents still tolerate what the ondel-ondel buskers are doing. It's just that many residents expect that there will be control regarding the busking time. There must be rules so that they do not disturb public order. The control has been implemented in one of the RT (Rukun Tetangga) in Pondok Aren District. The head of the RT in the area applies rules regarding busking hours in his area, buskers may not sing at sunset (6:00 p.m.) until the morning.

For some people, the presence of ondel-ondel buskers is in fact not always viewed negatively. This opinion is based on informants or subjects in this study. As told by Mr. Adi, a resident of Pondok Aren from Mandailing, North Sumatra. He said "For the children and for the people themselves, especially the Betawi, don't forget their traditions in the future, they still know their characteristics." The same thing was also conveyed by Mrs. Ati, she has lived in Pondok Aren for 17 years, "The positive thing is that before I didn't know, what's with the doll, it's so big, scary, so you know it's a Betawi doll."

Negative impact means showing a change in a bad direction or not good. For the Betawi people themselves, of course they are very opposed to the existence of ondel-ondel buskers, as owners of ondel-ondel art, they feel that their culture is being misused, placed in the wrong place and not as it should be, deviating from the original purpose of ondel-ondel being created. . Pak Toni, a native of Betawi, said that the presence of the ondel-ondel buskers was "disturbing because ondel-ondel is not for singing, but it is Betawi cultural heritage, that is not the way to preserve culture, for example art performances, 17an events (Independence Day)." Pak Dika, a native of Pondok Aren, one of the Betawi sons also conveyed the same thing, "For me it is troubling because

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ondel-ondel is Betawi art, the ondel-ondel is not disturbing what is troubling is people taking advantage of the ondel-ondel. If you want to introduce culture, that's not the way to do it, for example with a contest, don't sing like that."

Based on the opinions of some of the informants above, it can be seen that the presence of ondel-ondel buskers has both positive and negative impacts. The positive impact is introducing an art to the wider community and also indirectly helping to preserve or maintain the existence of a culture. The negative impact is that ondel-ondel art becomes a means to gain profit (money) especially as a livelihood for a handful of people, besides that using underage children to sing is worrying for many people and is considered to damage the image of Betawi culture.

Culture must be introduced and preserved, but not by making it a singing tool. The government's role is needed in solving this problem, because the buskers are busking to fulfill their daily needs. The economic factor is the main factor in this problem. According to an informant named Ahmad Hidayat, "if indeed busking ondel-ondel violates the rules or damages a culture, it is hoped that the government will provide jobs so they can still earn income even if they are not busking"

### **IV. CONCLUSION**

Culture is a way of life that develops in a particular society that originates from human creativity and initiative and is passed down continuously from one generation to the next. Culture is a result of human creativity, taste and intention which is obtained by learning or studying it. Culture comes from several elements such as art, technology and equipment systems, social organization, language, livelihood systems, knowledge systems and religious systems. These elements show that culture is created through a long and complicated journey, so it is fitting for every nation to protect and preserve its culture.

Ondel-ondel is one of the cultural products (art) of the Betawi tribe in the form of a tall and large giant doll. In the history of Betawi culture, ondel-ondel has undergone several changes in function. In the past, the Betawi people considered ondel-ondel as a sacred and mystical doll, used to repel reinforcements or evil things that disturbed the local community, then changed its role to become an entertainment and was even used to add liveliness to people's parties and also to welcome honored guests. But now the art of ondel-ondel has shifted to become a singing tool for a handful of people. Economic factors are one of the reasons buskers use ondel-ondel. The existence of ondel-ondel buskers caused a polemic in the community, some agreed and disagreed with their presence. Some people consider that the positive impact of ondel-ondel ngamen is introducing Betawi culture to the community and maintaining the existence of ondel-ondel art so that its existence is known. Apart from that, economic factors make some people tolerate its presence. Residents of Pondok Aren Urban Village still allow these buskers to busk for humanitarian reasons and entertainment for children. It's just that the residents hope that the buskers will be disciplined, especially regarding the time (hours) of the busking rather not disturb the residents' comfort.

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## The Effect of 8 Weeks of Training with Resistance Band on Limb Power of Taekwondo Athletes



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**ABSTRACT:** The purpose of this study was to determine the effect of 8 weeks of training with resistance bands on the leg power of taekwondo athletes. This type of research is an experiment. The sample used was taekwondo athletes totalling 27 athletes with an age range of 14-17 years. The leg power test instrument uses a vertical jump. Data analysis techniques include descriptive analysis, prerequisite tests (normality and homogeneity tests), and hypothesis testing using paired sample tests. Analysis using the help of SPSS 23 software. The results showed that eight weeks of training with resistance bands was significant for increasing the leg power of taekwondo athletes. The increase in leg power of taekwondo athletes after being given eight weeks of training with resistance bands was 3.31%. For further research, it is hoped to further expand the scope of the study by examining other factors that influence increasing leg muscle power, as well as developing the research sample.

**KEYWORDS:** 8 weeks workout, resistance bands, leg power

### INTRODUCTION

Taekwondo is one of the sports that are of concern to the authors in this study. Taekwondo competitions are divided into two numbers: poomsae and kyorugi (Wirya et al., 2021). Poomsae is the art of demonstrating movements in taekwondo. In this number, each athlete tries to play one or two moves in turn and where the athlete who succeeds in having the highest accumulated score will be the winner (Koshcheyev, 2019). Kyorugi is a fight between two taekwondo where they attack each other and defend themselves while protecting themselves from attacks by using kick, block and punch techniques in the taekwondo (Tirtawirya et al., 2017).

Taekwondo is a martial art that uses many techniques; one of the techniques that need to be strengthened is kicks. One of the things that Taekwondoin often does to get points is to do a series of kicks. Kicks that are capable of producing points must have enough power. The kicking technique in Taekwondo is greatly influenced by the quality of the athlete's leg muscle power. Leg muscle power is the ability of a person to maximize strength and speed to overcome resistance or load (Aloui et al., 2019); (Rodriguez-Lopez et al., 2022). Power is the product of strength and speed (Pereira et al., 2020).

To get good power abilities, you have to do structured and continuous training. Training is the process of carrying out sports activities based on systematically arranged training programs, aiming to improve the ability of athletes in an effort to achieve the maximum possible performance, especially carried out in preparation for a competition (Pisapia & D'Isanto, 2018). Therefore the provision of training that is applied to athletes is very appropriate when prioritizing leg power. Many studies use training methods to increase power, but weight training can also be used to increase an athlete's power.

The training method is not only chosen by the coach appropriately, but the training method must evaluate the athlete's shortcomings. One method that will be applied in this research is resistance bands. In recent years, one that has become widely accepted in training programs around the world is the resistance band combination added to free weight training (Shavelson, 2018); (Ghram et al., 2021). Before using this resistance band, it is best to ensure that the condition of the elastic rubber does not break during use, because if it is cut, it can endanger safety. In addition, it must also be ensured that the pivot point where the resistance band is tied must be strong, so that the exercise can be carried out comfortably and safely.

This exercise using resistance bands is an alternative to weight training using rubber or elastic cables as resistance (Bergquist et al., 2018); (Souto et al., 2021). Rubber resistance bands have various elasticities, in this study medium-sized resistance bands can be used for strength training. In the field there are still many coaches who do not know the form of power training using rubber resistance bands. The combination of resistance band exercises is very effectively used to increase jump height and leg strength, increase speed, and agility (Katushabe & Kramer, 2020); (Aloui et al., 2020); (Agopyan et al., 2018); (Hammami et al., 2021).



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Elastic bands can strengthen certain muscle groups and affect flexibility and balance (Oh, 2021). In addition, exercises using resistance bands can also increase joint strength and can be used for aerobic exercise. The results of the study (Liao et al., 2018) that Elastic band resistance training has a significant beneficial effect on muscle mass, muscle quality, and physical function in older women with obesity. Similar results were found for muscle quality, physical capacity, and physical function outcomes. Based on the observation results, it was found that leg power was still relatively lacking. It can be seen empirically that the kicks performed in several competitions are still very weak. This shows that leg power is still low. In the Kyorugi competition, athletes who have good kick power will be more profitable in getting points in the competition. Therefore training with an important technical approach is given. A creative trainer must have expertise in choosing the right method and form of training and according to the needs of athletes. Therefore, this study aims to determine the effect of 8 weeks of training with resistance bands on the leg power of taekwondo athletes.

### METHOD

This type of research is an experiment. Experimental research is research conducted to find out the consequences of a treatment given intentionally by researchers (Rogers & Revesz, 2019). The population as well as the sample used were taekwondo athletes totaling 27 athletes with an age range of 14-17 years. Instruments to measure leg power using a vertical jump with units of centimeters. Data analysis techniques include descriptive analysis, prerequisite tests (normality and homogeneity tests), hypothesis testing using paired sample tests and independent sample tests. Analysis using the help of SPSS 23 software. An 8-week training program with resistance bands on the leg power of taekwondo athletes is presented in Table 1.

**Table 1. Resistance Band Exercise Program**

Practice	Intensity	Set	Repetition	Recovery	Interval
1-6	40%	5 set	5x	25 seconds	1.5 minute
7-12	50%	5 set	6x	25 seconds	1.5 minute
13-18	60%	5 set	7x	25 seconds	1.5 minute
19-24	70%	5 set	8x	25 seconds	1.5 minute

### FINDING

The research process was carried out for 18 meetings for 8 weeks. The results of the descriptive statistical analysis of the pretest and posttest leg power of taekwondo athletes are presented in Table 2.

**Table 2. Results of Descriptive Analysis of VO<sub>2</sub>Max Pretest and Posttest Statistics**

Data		N	Minimum	Maximum	Mean	Std. Deviation
Power Limbs	Pretest	27	33.00	45.00	39.00	3.36
	Posttest	27	34.00	46.00	40.29	3.42

Based on the descriptive statistics, Table 1 shows that the leg power of taekwondo athletes at the pretest averaged  $39.00 \pm 3.36$  at the posttest after being given 8 weeks of training with resistance bands increasing by an average of  $40.29 \pm 3.42$ .

The data normality test used the Shapiro-Wilk method with a significance level of 0.05. Analysis using SPSS 23 software. The results of the normality test are presented in Table 3:

**Table 3. Results of Normality Test Analysis**

Power Limbs	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest	0.949	27	0.204
Posttest	0.961	27	0.383

Based on the statistical analysis of the normality test that was carried out using the Shapiro-Wilk test, the data on the leg power of taekwondo athletes during the pretest and posttest obtained normality test results with a significance value of  $p > 0.05$ , which means that the data is normally distributed.

Homogeneity test using the Levene Test with a significance level of 0.05. Analysis using SPSS 23 software. The results of the homogeneity test are presented in Table 4:



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**Table 4. Results of Homogeneity Test Analysis**

Test of Homogeneity of Variances				
Power Limbs	Levene Statistic	df1	df2	Sig.
Pretest- Posttest	0.015	1	54	0.904

Based on the results of the analysis in Table 4, it can be seen that the pretest-posttest leg power of taekwondo athletes obtained sig.  $p > 0.05$ , so the data is homogeneous.

Hypothesis analysis using the t-test, the t-test used is the paired sample test. Analysis using SPSS 23 at a significance level  $< 0.05$ . The results of hypothesis testing are presented in Table 5:

**Table 5. Results of Paired Sample T Test Analysis**

Paired Samples Test								
Pair	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest-Posttest Limb Power	1.29	0.82345	0.15847	-1.62204	-0.97055	8.180	26	0.000

Based on the results of the analysis in Table 5, the pretest-posttest for the intensive interval group obtained a t-count of 8,180 with a p-significance value of  $0.000 < 0.05$ , these results indicate that there is a significant difference. Thus the hypothesis "There is a significant effect of 8 weeks of training with resistance bands on the leg power of taekwondo athletes", is **accepted**. The magnitude of the increase in leg power of taekwondo athletes after being given 8 weeks of training with resistance bands was 3.31%.

### DISCUSSION

The results showed that 8 weeks of training with resistance bands significantly increased the leg power of taekwondo athletes. The increase in leg power of taekwondo athletes after being given 8 weeks of training with resistance bands was 3.31%. The combination of resistance band exercises is effectively used to increase jump height and leg strength, as well as increase speed and agility (Loturco et al., 2022). The results of the study (Yoon et al., 2017) show that the use of elastic bands provides a significant increase in the level of cognitive function, physical function, and muscle strength. Research from (Yasuda et al., 2014) shows that exercise using elastic bands has increased muscle activation and is an effective method for building muscle hypertrophy in adults who have low activity.

The results of research (Spracklin et al., 2017) by placing a circular resistance band around the thighs can be used as a training strategy to increase hip muscle activation during free barbell back squats using moderate to heavy loads without negatively affecting performance. A meta-analysis study conducted by (Lopes et al., 2019) shows that resistance training using elastic bands has an effect on increasing muscle strength similar to conventional resistance training using weight machines and dumbbells in sedentary older adults. Resistance bands have advantages including being cheaper when compared to conventional resistance devices such as weight machines and dumbbells, easy to use and easy to carry. (Guillot et al., 2019) proved that elastic band training significantly improved sit-and-reach (29.16% increase,  $p = 0.01$ ) as well as side split stretching performance (2.31% increase,  $p < 0.001$ ).

This study (Foley et al., 2017) investigated the effect of a loop resistance band, placed around the distal thigh, on medial knee collapse and muscle activity during a barbell back squat. More specifically, the band is evaluated in terms of training status (trained or untrained) and load (3RM or BW). Interestingly, there was a significant effect of load intensity (3RM or BW) on lower extremity muscle activity. Resistance bands will improve neuromuscular function and can also cause post-activation potentiation, which is a temporary increase in muscle work which is the result of previous contractions (Low et al., 2019).

Resistance band training, also known as strength training or weight training, is often used as an effective method of developing muscle fitness (Özsu, 2018). (Chen et al., 2018) stated that resistance training is an exercise program that causes muscles to contract against external loads in the hope of increasing endurance, strength, muscle mass. In resistance band training, the athlete works to develop the eccentric phase of muscle contraction by first losing body or weight and then overcoming the body weight using concentric contractions. Research related to the effect of resistance bands was conducted (Andersen et al., 2018); (Dewanti et al., 2020) shows that resistance band training has an effect on power.

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The strength of the elastic band provides resistance for muscle movement. The degree of resistance depends on the stretch properties of the tape material. Currently, rubber bands are used for physical therapy and rehabilitation to improve individual functional capacity, for chronic illnesses and to develop the functional capacity of athletes. It is preferable to provide the opportunity to set individual power and traction ratios. Elastic bands can be used to strengthen certain muscle groups, and also affect flexibility and balance (Oh, 2021). The benefits of resistance bands have been proven to be real after being used by senior classes and their use also has a fairly high level of safety if done under the supervision of a trainer. Exercise using resistance bands has been shown to increase muscle activation and is an effective method for increasing muscle mass. The better the power an athlete has, the more likely the athlete will be able to perform technical movements in sports, because it is known that power will allow the muscles to do physical work explosively.

### CONCLUSION

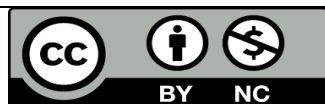
Based on the results of the study it can be concluded that 8 weeks of training with resistance bands is significant for increasing the leg power of taekwondo athletes. The increase in leg power of taekwondo athletes after being given 8 weeks of training with resistance bands was 3.31%. For further research, it is hoped that it will further expand the scope of research, by examining other factors that influence increasing leg muscle power, as well as expanding the research sample.

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## The Effect of Sprint Exercise on Stairs and Clips on Increasing Limb Power in Aerobic Gymnastic Athletes



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**ABSTRACT:** The purpose of this study was to determine the effect of sprint training on stairs and inclines on increasing leg power in aerobic gymnastic athletes. The sample used was at LPSB Mutiara Purwokerto, totaling 14 athletes with an age range of 13-15 years. Samples were divided into two groups based on pretest scores using ordinal pairing. Instrument for measuring leg power in aerobic gymnastic athletes using the Yo-Yo intermittent test. Data analysis techniques include descriptive analysis, prerequisite tests (normality and homogeneity tests), hypothesis testing using paired sample tests and independent sample tests. The analysis used SPSS 23 software. The results showed (1) there was a significant effect of sprint training on the stairs on the leg power of aerobic gymnastic athletes, amounting to 6.66%. (2) There is a significant effect of sprint training on an incline on the leg power of aerobic gymnastic athletes, amounting to 7.06%. (3) There is no significant difference between sprint training on stairs and sprint training on inclines to the leg power of aerobic gymnastic athletes, with  $t$  count  $0.111 < t$  table  $2.120$ , and a significance value of  $0.913 > 0.05$ . Based on the results of the research that has been done, it proves that there is no difference in sprinting on stairs and sprinting on inclines to the leg power of aerobic gymnastic athletes. It is suggested to the trainers, to use the sprint training method on the stairs and sprint on the incline as a variation of the exercise in increasing the leg power of aerobic gymnastic athletes.

**KEYWORDS:** sprints on stairs, on inclines, leg power

### INTRODUCTION

In this era of globalization, gymnastics is a sport that is very popular both on a regional and international scale. The unique nature of gymnastics is that it requires movement, skill, and body control that is not the same as other sports (Sands et al., 2016). Gymnastics involves physical movements that require good physical condition and performance. The components of the physical conditions needed for gymnastics include muscle strength, muscle endurance, cardiovascular endurance, explosive muscle strength, and flexibility (Xu et al., 2020); (Mkaouer et al., 2018); (Russo et al., 2021). Further disclosed ((Gasparetto et al., 2022); (Paunović et al., 2022); and (Markov, 2020), the components of physical condition that contribute to gymnastics include arm muscle strength, leg muscle explosiveness, balance, and agility. The discipline of gymnastics demands the implementation of perfect technical elements, where many components of fitness, such as strength, speed, aerobic capacity, flexibility, power, balance, coordination and agility, as well as anthropometric characteristics, are very decisive in success (Santana et al., 2019). Based on the opinion above, there are two physical components that are considered quite important, namely speed and strength commonly referred to as power. (Zemková et al., 2017) states that "Power is calculated as a product of force and velocity and the actual position by integration of velocity". Muscle power or explosive power concerns the strength and speed of dynamic and explosive muscle contractions and involves a maximal expenditure of muscle strength in the shortest time (Aksović et al., 2021); (Niu & Durakoglu, 2021). Power is critical in determining success in many sports such as aerobics gymnastics, built by two physical components, including speed and strength. In the field, there are still coaches who do not know the form of power training in gymnastics. Based on these results, the coach realized that athletes still lacked power, considering that leg power is very important for gymnastic athletes.

A successful gymnastic training program will pay attention to the characteristics of each individual, be balanced, and experience improvement. It should be noted that choosing a training method to help smooth the training process is one very strategic effort that can be carried out by a coach to convey the training material that has been prepared. In this study, the emphasis will be on sprint training on stairs and inclines. The stair climbing exercise can also be called the Harvard step. This stair climbing exercise is carried out with the aim of increasing the elements of speed and strength in physical condition because the elements

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of speed and strength are fundamental parts of power. The essence of this exercise is to practice going up and down the stairs by jumping up one step at a time.

Running uphill or uphill running is part of speed training. Speed is the ability to perform movements in a short or short time (Haugen et al., 2019); (Nygaard Falch et al., 2019). One way to train that speed is by running uphill. Uphill running is a running movement on an incline or incline, the way to run uphill as fast as possible, then down slowly for recovery. The number of reps depends on the length and steepness of the climb. The easier it is to the top, the more reps. Uphill running training aims to master running skills, train reaction speed, and increase leg muscle power. As an effect of being given uphill running training, there is a change in speed as a form of adaptation of the body to the training provided in the form of increasing the ability to work muscles (Hinks et al., 2022); (Kavaliauskas et al., 2018).

### METHODS

This type of research is an experiment. Experimental research is research conducted to find out the consequences of a treatment given intentionally by researchers (Rogers & Revesz, 2019). The sample used was Pekanbaru female gymnastic athletes aged 14-19 years, totalling 18 athletes. Samples were divided into two groups based on pretest scores using ordinal pairing. An instrument for measuring leg power using a vertical jump. Data analysis techniques include descriptive analysis, prerequisite tests (normality and homogeneity tests), and hypothesis testing using paired sample tests and independent sample tests. Analysis using the help of SPSS 23 software.

### FINDING

The research process was carried out in 16 meetings for 5 weeks. The results of the descriptive statistical analysis of pretest and posttest leg power in aerobic gymnastic athletes are presented in Table 1.

**Table 1. Descriptive Analysis Results of Pretest and Posttest Leg Power Statistics in Aerobic Gymnastics Athletes**

Kelompok		N	Minimum	Maximum	Mean	Std. Deviation
Sprint Training Group on Stairs	Pretest	7	29.00	40.00	33.33	3.71
	Posttest	7	31.00	43.00	35.56	4.00
Sprint Training Group on an Incline	Pretest	7	28.00	38.00	33.00	3.54
	Posttest	7	29.00	42.00	35.33	4.47

Based on Table 1, it shows that the leg power of the aerobic gymnastic athletes in the sprint training group on the stairs at the pretest averaged  $33.33 \pm 3.71$  at the time of the posttest increased by an average of  $35.56 \pm 4.00$ . Leg power in the aerobic gymnastic athlete in the sprint training group was inclined at the pretest with an average of  $33.00 \pm 3.54$  while at the posttest it increased with an average of  $35.53 \pm 4.47$ .

The data normality test uses the Shapiro-Wilk method with a significance level of 0.05, the results are in Table 2:

**Table 2. Results of Normality Test Analysis**

Kelompok		Shapiro-Wilk		
		Statistic	df	Sig.
Sprint Training Group on Stairs	Pretest	0.932	9	0.499
	Posttest	0.938	9	0.558
Sprint Training Group on an Incline	Pretest	0.952	9	0.712
	Posttest	0.942	9	0.600

Based on the statistical analysis of the normality test that was carried out using the Shapiro-Wilk test, data on leg power in aerobic gymnastic athletes during the pretest and posttest obtained normality test results with a significance value of  $p > 0.05$ , which means that the data is normally distributed.

Homogeneity test using the Levene Test, the results are in Table 3:

**Table 3. Results of Homogeneity Test Analysis**

Test of Homogeneity of Variances				
Power Limbs	Levene Statistic	df1	df2	Sig.
Pretest-Posttest Limb Power Sprint Group on Stairs	0.007	1	16	0.934
Pretest-Posttest Leg Power Sprint Group on an Incline	0.134	1	16	0.719

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Based on the analysis results in Table 3, it can be seen that the pretest-posttest Power of the limbs in aerobic gymnastic athletes obtained sig.  $p > 0.05$ , so the data is homogeneous.

Hypothesis analysis using the t-test, the t-test used is the paired sample test and the independent sample test. The first and second hypotheses were analyzed using the paired sample t-test ( $df = n-1$ ) using SPSS 23 at a significance level  $<0.05$ . The results of hypothesis testing are presented in Table 4:

**Table 4. Results of Paired Sample T Test Analysis**

Paired Samples Test									
Pair	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pretest-Posttest exercise on stairs	Sprint	2.22	1.20185	0.40062	-3.14605	-1.29840	5.547	8	0.001
Pretest-Posttest practice on an incline	Sprint	2.33	1.32288	0.44096	-3.35019	-1.31648	5.292	8	0.001

Based on the analysis results in Table 4, the pretest-posttest of the intensive interval group obtained a t-value of 5.547 with a significance value of  $p$  of  $0.001 < 0.05$ . These results indicate that there is a significant difference. Thus the first hypothesis, which reads, "There is a significant effect of sprint training on stairs on leg power in aerobic gymnastic athletes", is **accepted**. The magnitude of the increase in leg power in aerobic gymnastic athletes after being given sprint training on the stairs was 6.66%.

Based on the analysis results in Table 5, the pretest-posttest for the sprint group on an incline obtained a t count of 5,292 with a significant p-value of  $0.001 < 0.05$ . These results indicate that there is a significant difference. Thus the second hypothesis, "There is a significant effect of sprint training in an incline on leg power in aerobic gymnastic athletes", is **accepted**. The magnitude of the increase in leg power in aerobic gymnastic athletes after being given sprint training on an incline was 7.06%.

**Table 5. Results of the Independent Samples Test Analysis**

Independent Samples Test									
t-test for Equality of Means									
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
							Lower	Upper	
							Power	Equal variances assumed	0.111
	Equal variances not assumed	0.111	15.808	0.913	0.22222	2.00077	-4.02342	4.46786	

Based on the analysis results in Table 6 above, it can be seen that the t count is 0.111 and the t table (df 16) is 2.120 with a p-significance value of 0.038. Because the t count is  $0.111 < t$  table 2.120, and the significance value is  $0.913 > 0.05$ , these results show no significant difference. Thus the alternative hypothesis ( $H_a$ ), which reads, "There is a significant difference in sprint training on stairs and sprinting on inclines to the leg power of aerobic gymnastic athletes", is rejected. This means there is no difference between sprint training on stairs and sprinting on an incline towards the leg power of aerobic gymnastic athletes.

## DISCUSSION

### Effect of Sprint Exercise in Stairs on Leg Power

Based on the results of the analysis shows that there is a significant effect of sprinting on the stairs on the leg power of aerobic gymnastic athletes. The magnitude of the increase in leg power after being given a sprint on the stairs was 6.66%. The results of this study were strengthened in research (L. F. Pratama & Wahyudi, 2022); (Sari & Madri, 2022) that there is an effect of training up and down stairs with sig. (2-tailed) of 0.000 with a significant level  $<0.05$ . The stair climbing exercise can also be called the Harvard step. This stair climbing exercise is carried out with the aim of increasing the elements of speed and strength in physical condition because the elements of speed and strength are a fundamental part of leg power.



## **The Effect of Sprint Exercise on Stairs and Clips on Increasing Limb Power in Aerobic Gymnastic Athletes**

This exercise cannot be separated from the strength of the leg muscles because it uses many leg muscles besides just using the leg muscles. The main muscle components involved in climbing stairs are the Sartorius muscle, Gracilis muscle, Semitendinosus muscle, Gluteus Maximus muscle, Vastus Lateralis muscle, Vastus Medialis, Vastus Intermedius muscle, Gastrocnemius muscle, Peroneus longus muscle, Halucis longus extensor muscle, and Halucis longus muscle. Flexor. Stair climbing exercises help improve aspects of movement, balance, coordination of muscle strength and reaction time between all parts of the body and change direction quickly for players, even at high speed. Apart from the physical benefits, using this tool can also improve the nervous system and related muscle groups (N. E. Pratama et al., 2018).

Stair climbing exercises are used to increase leg work in maximizing athletic performance (Jamil et al., 2015). Stair climbing exercises are multi-directional training, which helps improve strength, power, balance, agility, coordination, proprioception, core and joint stability, foot speed, hand-eye coordination, reaction time and mobility (Pawar & Borkar, 2018). Stair training sessions will help achieve many of the above objectives by doing the exercises in rhythm and teaching the body and mind various leg combinations.

Ladder training is the newest method of the multi-directional training program because the elements of the motor components; strength, power, balance, agility, coordination, joint stability, foot speed, hand-eye coordination and reaction time increase (Ravi & Kalimuthu, 2019). The mind and body get to grips with the different leg combinations with training. Speed ladder training is essential for all sports where agility, leg power, aerobic capacity and speed are important. Exercises for agility Ladder exercises should be done immediately after warming up so that the muscles are fresh and ready to give 100% under proper form (Pramod & Divya, 2019).

### **The Effect of Sprint Training on Climbs on Leg Power**

Based on the results of the analysis shows that there is a significant effect of sprint training on an incline on the leg power of aerobic gymnastic athletes. The magnitude of the increase in leg power after being given sprint training on an incline was 7.06%. The results of this study were reinforced in the research (Krisyanto & Rachman, 2021) that uphill running exercises can increase leg power. The exercises were carried out for 16 meetings. In stage 1, the sample does 5 reps and 4 sets with 1-minute intervals followed by a 15-second recovery. In stage 2, the sample performs 6 reps and 5 sets with 1-minute intervals followed by 15 seconds of recovery. In stage 3, the sample performs 7 repetitions and 6 sets with 1-minute intervals followed by 15 seconds of recovery. In stage 4, the sample performs 8 reps and 7 sets at 1-minute intervals followed by a 15-second recovery. Why can it increase, because the assumption is that if a runner runs in a field that is not the field of his race, a runner is running in a horizontal plane, but he has to run in a diagonal field that automatically requires more muscle strength. It is hoped that from this exercise, the power will increase because increased power is increased strength to be fast, which will automatically increase the ability to run.

Compared with flat running, in uphill running, due to the position of the lower extremities, the muscles of the hip joint increase their work, while the work of the knees and ankles remains the same compared to flat running. The use of elastic energy also changes as you go uphill. While most of the energy stored in the tendons is recovered in flat running, running uphill at a steeper incline requires an increase in the center of mass, causing an increase in the positive tissue generated by the body since the stored elastic energy cannot be used due to the increased ground contact time. Analyzing mechanical efficiency, previous research has proven that uphill runners show an efficiency of about 25%. This value corresponds only to muscle contraction (Snyder et al., 2012); (Whiting et al., 2022); (Hunter et al., 2022); (Whiting et al., 2020).

Dewolf (2016) stated (1) When running uphill at a certain speed, the average external power developed during the positive work phase appears to be a limiting factor. As the incline increases, being maintained air time longer, the vertical velocity at takeoff will increase as the minimum vertical displacement increases. It will require more power during the boost. (2) When running downhill, the average external power developed during the negative working phase appears to be the limiting factor. Indeed, although vertical velocity is lower on takeoff,  $t_a$  and thus  $T$  - increases with incline and velocity as ballistic drop increases. The longer it increases, the external force developed during the brakes because the energy to be extended after a touchdown is greater. In addition to better muscle performance during eccentric than concentric contraction, force during braking is limited by (1) an increase in brake at the expense of thrust and (2) a reduction in an upshift. As a result, the bouncing mechanism when walking decreases gradually disappears as speed and incline increase.

### **Differences in Sprints in Stairs and Sprints in Inclines against Leg Power**

Based on the results of the analysis showed that there was no significant difference between sprint training on stairs and sprinting on inclines to the leg power of aerobic gymnastic athletes, with a significance value of  $0.913 > 0.05$ . This means that both types of exercise are equally good for increasing the leg power of aerobic gymnastic athletes. The increase in muscle strength is caused by an increase in the number of contractile proteins, actin and myosin filaments and increases the strength of

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connective tissue and ligaments. In addition to increasing leg muscle strength, leg muscle speed will also increase with jumping movements that are carried out quickly and repeatedly (Suyanto et al., 2021). An increase in muscle strength and speed of the leg muscles will directly affect the increase in the explosive power of the leg muscles. This is based on two important elements in explosive power, namely muscle strength and muscle speed.

Explosive power training methods can be done with several training methods including circuit training, weight training, interval training, and so on. On the basis of the training method, experts further develop it into a form of training with certain characteristics according to their respective versions. Exercising a maximum of 4 times per week is sufficient to stimulate an increase in muscle phosphorylase activity. To increase strength and speed, a progressive weight training system is used, which is based on the 10 RM (Maximum Repetitions) system.

### CONCLUSION

Based on the results of data analysis, description, testing of research results, and discussion, it can be concluded that: (1) There is a significant effect of sprint training on stairs on the leg power of aerobic gymnastic athletes, with  $t$  count 5.547 >  $t$  table 2.306, and a significance value 0.001 < 0.05. The magnitude of the increase in leg power after being given sprint training on the stairs was 6.66%. (2) There is a significant effect of sprint training on an incline on the leg power of aerobic gymnastic athletes, with  $t$  count 5.292 >  $t$  table 2.306, and a significance value of 0.001 < 0.05. The magnitude of the increase in leg power after being given sprint training on an incline was 7.06%. (3) There is no significant difference between sprint training on stairs and sprint training on inclines to the leg power of aerobic gymnastic athletes, with  $t$  count 0.111 <  $t$  table 2.120, and a significance value of 0.913 > 0.05. Based on the results of the research that has been done, it proves that there is no difference in sprinting on stairs and sprinting on inclines to the leg power of aerobic gymnastic athletes. It is suggested to the trainers, to use the sprint training method on the stairs and sprint on the incline as a variation of the exercise in increasing the leg power of aerobic gymnastic athletes.

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## The Impact of Covid 19 Pandemic on Online Learning in Sport, Health and Physical Education in Vocational High School 1 Kaligondang Purbalingga



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**ABSTRACT:** The spread of Covid-19 has an impact on the education sector in Indonesia. It causes learning to change from conventional to online learning. The purpose of this study is to determine the impact of Covid-19 pandemic on online learning in Vocational High School 1 Purbalingga students. The research subjects were 90 students divided into several classes. This type of research is quantitative descriptive using survey methods. The results showed that online learning was not effective enough (55%), the most perceived obstacle was the quickly depleted internet quota package (43%) and the most suggestions put forward by the subject were online learning not only assignments and facilities provided by students. It can be concluded that the impact of the covid-19 pandemic that is occurring thoroughly in the world, especially in Indonesia, greatly affects the educational process, especially in the field of sports because it cannot be directly practiced and be observed together as students' activities

**KEYWORDS:** Learning facilities, Physical Education, Sports, Covid-19 pandemic

### INTRODUCTION

Almost all over the world is made up and shocked by the emergence of the Corona Virus or so-called Covid-19 nowadays. This virus attacks human respiratory system. The spread of this virus results in diseases that are mild to severe. The disease is transmitted by the Sar Cov-2 virus outbreak for patients who are infected with fever, dry cough and breathing difficulties with an incubation period of between 5 days to 6 days and a maximum of 14 days, who says the virus is a new virus that is endemic in Wuhan City, Hubei Province of China. This virus can spread globally is very important to determine the severity. This virus has spread in various countries including Indonesia, the country affected by Covid 19. On June 4, 2020 in East Java, especially in the city of Surabaya, which has been designated a black zone or can be called a zone with more than 1000 people. This virus can spread through the air, touch and other solid objects. According to the latest data from the World Health Organization (WHO) on April 24, 2020, 213 countries have contracted Covid-19, 2,631,839 of which were confirmed positive and 182,100 died [1].

With the Covid-19 Virus, many have been affected both from the economic, social, tourism and education sectors. Many people are not ready for the consequences caused by Covid-19. The Circular Letter, Surat Edaran (SE), issued by the government on March 18, 2020 states that all activities both indoors and outdoors must all be postponed in order to reduce the impact of Covid-19. The government also encourages people to live using health protocols such as using masks, doing social distancing and physical distancing, using masks and gloves, etc.

The impact of the spread of this virus includes several sectors such as economy, education, etc. In the education sector, the Minister of Education and Culture has provided a Circular Letter on 24 March 2020 issuing a policy on implementing the learning process that is carried out at home or remotely. Online learning must remain under the supervision of teachers, teachers and parents [2]. Online learning is learning that uses internet networks to access multiple learning applications with good connectivity and flexibility [3]. Online learning has several advantages and obstacles. Online learning can increase the mastery of course material by more than 70% [4] [5], and can be accessed anytime and anywhere [6]. Online learning also has the advantage of being able to foster learning independence (self-regulated learning) [3].

The obstacles encountered when using online learning are weak signals and limited internet quota [5] [7]. Online learning/distance learning is done using several applications in today's technology such as Zoom, Google Meet etc. Online learning

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is expected to be able to suppress the spread of Covid-19 virus. In addition, online learning is also expected to be able to continue the teaching and learning process in the world of education so that people continue to learn and explore their potential.

Since 2014 the Directorate of Learning and Scholarship, Directorate General developed the Open and Integrated Indonesian Online Learning Program (Pembelajaran Daring Indonesia Terbuka dan Terpadu, PDITT), which was launched on October 15, 2014 by Vice President Boediono. On September 18, 2016, it was renamed to Online Learning System (Sistem Pembelajaran Daring, SPADA). Therefore, for the online learning process, both from educational institutions, teachers, and students must understand and know what must be prepared for online learning either from applications or with adequate internet facilities. Learning steps must be clear so that the effectiveness of online learning can be created. Online learning itself can provide new experiences that are more challenging than conventional (face-to-face) learning models [4].

The purpose of this study is to find out how much impact Covid-19 to the effectiveness of online learning for students at Vocational High School 1 Kaligondang Purbalingga. In this study, the sample was also divided into 3 forces, namely class of 2017, 2018, and 2019 in Vocational High School 1 Kaligondang Purbalingga which affected by the Covid-19 Pandemic in 2020, so that from the sample, a measurement was carried out that varied in the place where each student was located.

## METHOD

This research is quantitative descriptive [8] using survey methods. The purpose of this study is to describe the effectiveness of online learning during the Covid-19 pandemic. The research data collection technique uses the methodology that we provide to the students. The sample in this study was 90 students consisting of class of 2017, 2018 and 2019 with sample criteria of purposive sampling [8]. The research time was carried out from May-June 2020. Questionnaire is given to students as a research subject using Google form. The subject will be given a link to fill out the questionnaire. Subjects can fill it through their respective computers or cell phones. The questionnaire grids provided include, the effectiveness of online learning, obstacles faced when learning online, students' level of understanding when doing online learning, teachers in conducting online learning, as well as suggestions about good online learning. From the data obtained from the questionnaire that has been filled in by students, the calculation was carried out using percentage statistical data.

## DISCUSSION

The results of research on the impact of online learning during the Covid-19 pandemic will be described in the form of a diagram in accordance with each question asked to the research subject. The research subjects who responded to the questionnaire provided were 90 students of Vocational High School 1 Kaligondang Purbalingga. Shown in the figure 1, that the most answered questionnaires out of the total of 90 students were the class of 2019 as many as 32%, the class of 2017 as many as 23%, and the class of 2018 as many as 43%.

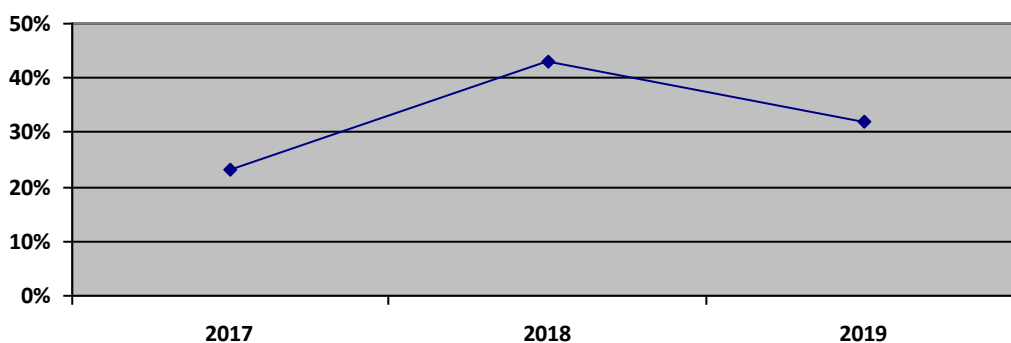


Figure 1. Percentage of Respondents (Class of 2017, 2018, 2019)



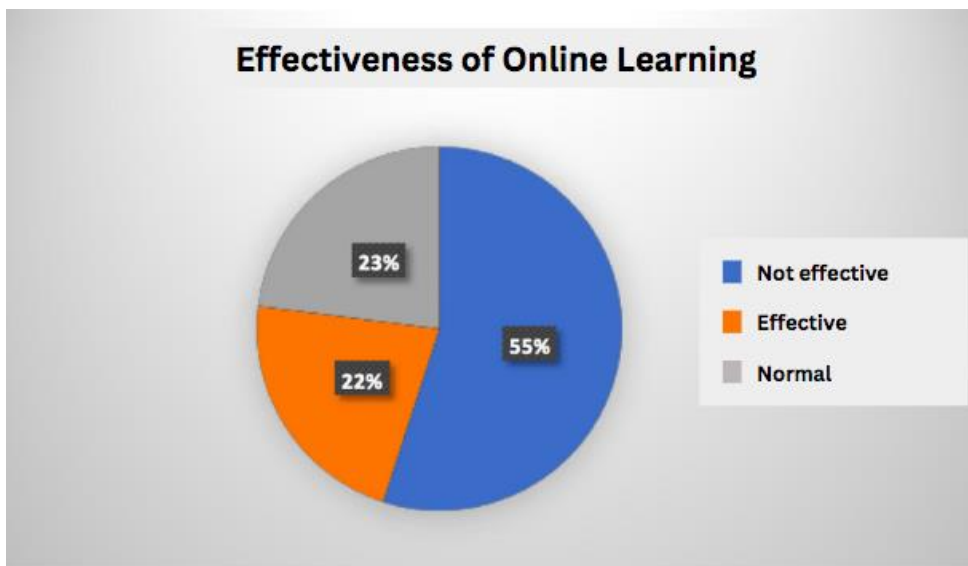


Figure 2. Percentage of effectiveness of online learning

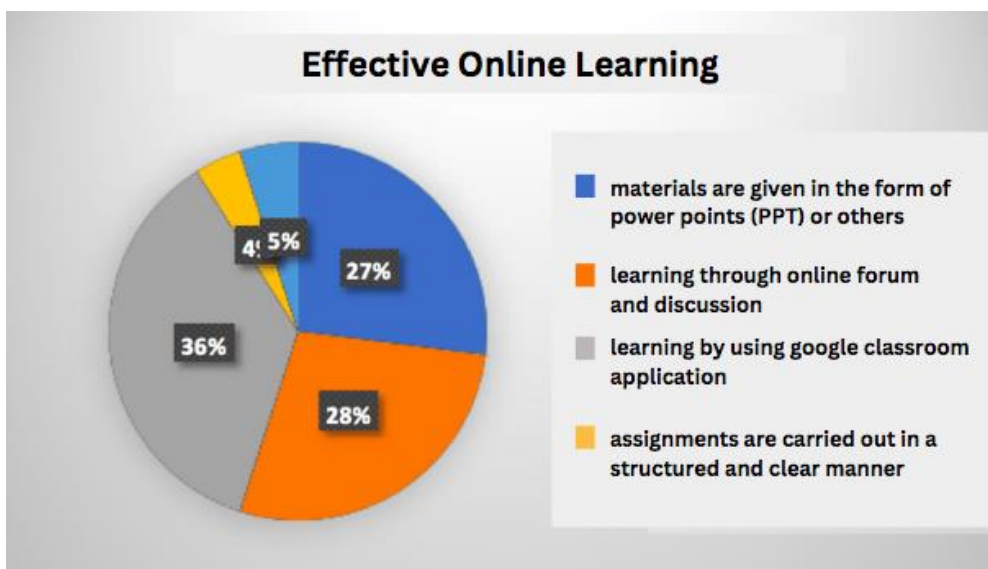


Figure 3. Percentage of effective online learning

In Figure 2, it can be seen about the effectiveness of online learning during learning. As many as 55% of students still feel that online learning has not been effective during the covid-19 pandemic, as many as 23% consider it normal or there is no improvement in learning done and as many as 22% of students consider that online learning has been efficient during the covid-19 pandemic.

In Figure 3, according to students, as many as 36% of effective online learning uses applications such as google classroom or the like. As many as 28% of students think that effective online learning of lesson should be done with online forums and discussions. As many as 27% of effective online learning material must be in the form of power points (PPT) or other such as videos. As many as 4% of students think online learning will be effective if assignments are carried out in a structured and clear manner. As many as 5% of students have different opinions such as clearly scheduled forms of learning, the use of applications that remain unchanged, and the provision of clear materials along with clear assignments in accordance with the material provided.

Online learning will inevitably encounter some obstacles. In Figure 4, it can be seen the obstacles faced by students while attending online lectures during the Covid-19 pandemic. As many as 43% of students mentioned that the constraints of the internet quota package were quickly exhausted. As many as 25% of students have difficulties in understanding the material. As many as 28% experienced problems in the form of signal quality when doing online learning. As many as 4% of the various obstacle faced such as the lack of teacher preparation in preparing for online learning, too many assignments rather than giving learning materials, uncertain schedules, and cost difficulties for purchasing internet quotas.



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The level of understanding of online learning materials can be seen in Figure 5. As many as 39% said it was difficult to understand the material conveyed. As many as 52% of students can sufficiently understand the material given during online learning and as many as 9% of students can understand the material given.

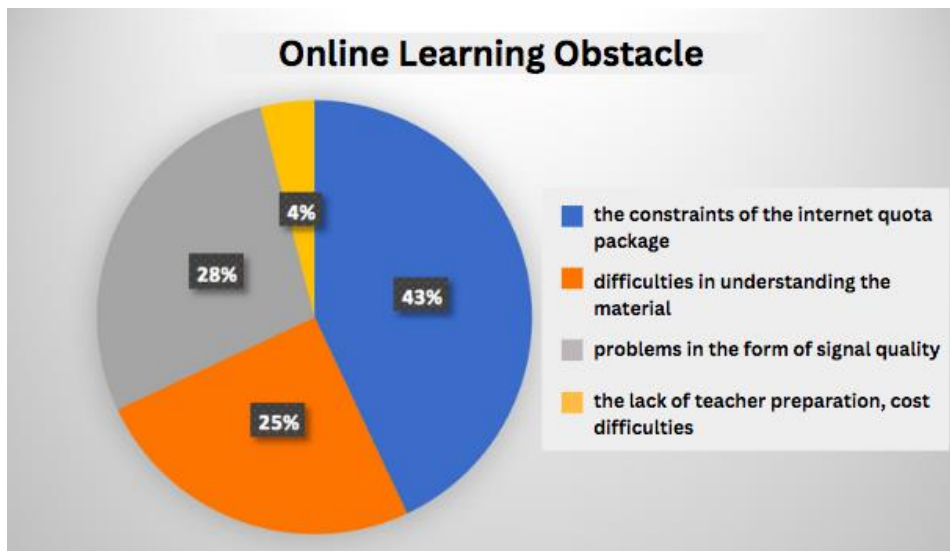


Figure 4. Percentage of online learning obstacle

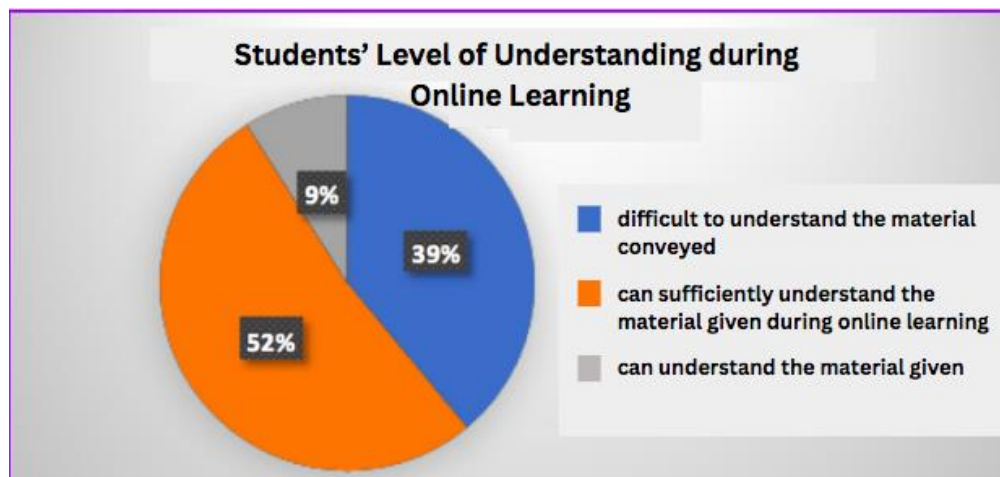


Figure 5. Percentage of students' level of understanding during online learning

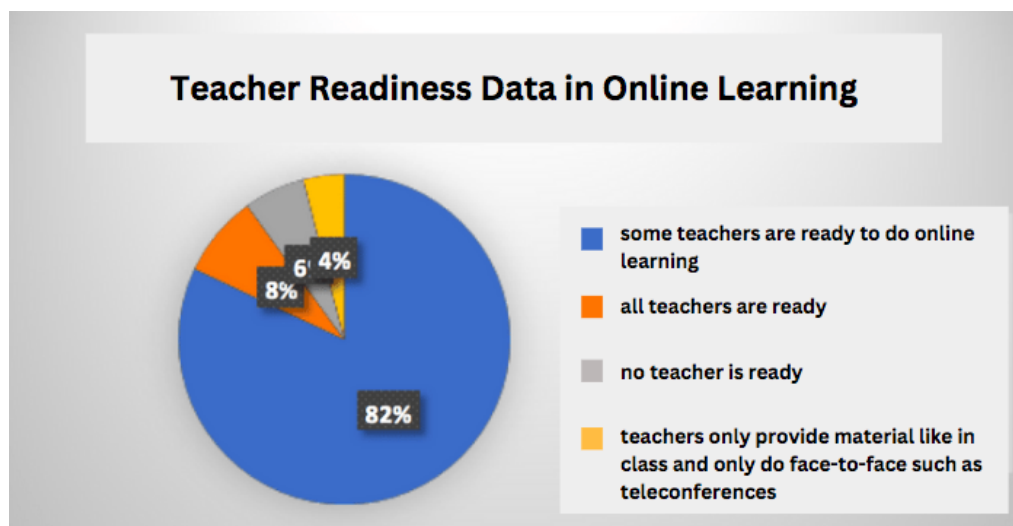


Figure 6. Percentage of teacher readiness data in online learning

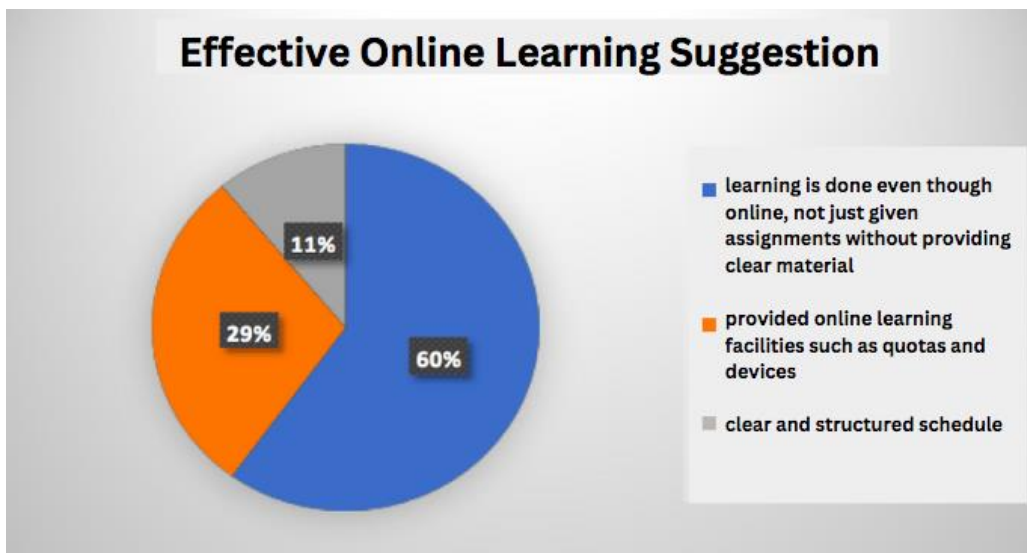


Figure 7. Percentage of suggestions for online learning effectiveness

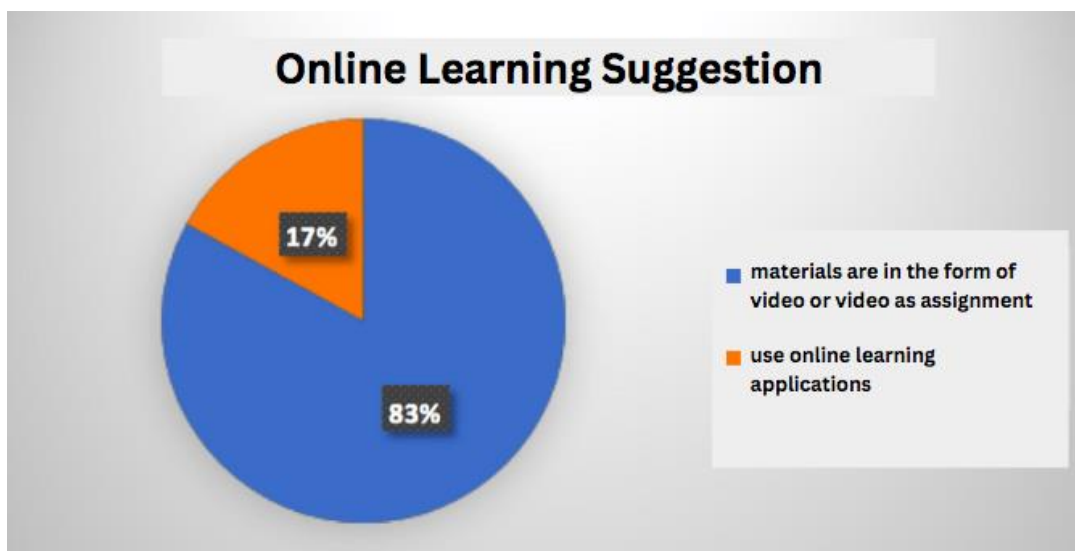


Figure 8. Percentage of suggestions during online learning

The results of research on teacher readiness in online learning can be seen in Figure 6. It can be concluded that as many as 82% of some teachers are ready to do online learning. As many as 8% of students answered that all teachers are ready. As many as 6% answered that no teacher is ready. And as many as 4% answered that teachers only provide material like in class and only do face-to-face such as teleconferences.

Figure 7 shows the suggestions given by students so that learning goes more effectively. As many as 60% of students give suggestions to keep lectures going even through online or not just giving assignments without providing clear material. A total of 29% of students suggested that online learning facilities such as quotas and devices be provided. As many as 11% of students provide suggestions for a clear and structured schedule in online learning.

Students' suggestions when online learning takes place can be seen in Figure 8. 83% of students suggest video material because most sports require practice instead of theory alone. A total of 17% suggested using applications for online learning. In the era of the 4.0 revolution, the development of technology required schools to provide digital learning services [9].

Universities have a strategic function in developing and exploring the potential of society to be quality and useful individuals for society [10]. This is certainly a challenge for all schools in Indonesia to be able to produce individuals who master science and technology in tandem. Schools must be able to facilitate the teaching and learning process in order to achieve the desired goals. Several studies have been conducted to see the potential of online learning to deal with the Covid-19 pandemic [2] [5] [6] [7] [11] [12].

## **The Impact of Covid 19 Pandemic on Online Learning in Sport, Health and Physical Education in Vocational High School 1 Kaligondang Purbalingga**

Online learning conducted on Vocational High School 1 Kaligondang Purbalingga students is not yet effective because almost 55% of students answered that. This is different from some previous studies [1]. This is confirmed by the difference between the major and the material delivered. Sometimes vocational school students must be accompanied by practice so that the results are more optimal. This shows that online learning is only effective for theoretical and not practical learning [5]. Because in practice students must immediately try and practice the theory that has been obtained in the learning material that has been given by the teacher concerned. It causes that sometimes students do not understand the material given by the teacher, and feel that the tasks given are not in accordance with the material given.

Effective learning must have interaction from students and teachers. According to students of Vocational High School 1 Kaligondang, effective online learning must use applications for online learning such as google classroom or other platform similar to it.

Selection of the right application will help teachers and students conduct the learning process. Many applications can be used for the online learning process such as Google Classroom , WhatsApp Group, Youtube , Instagram , and Zoom [1].

Online learning itself can help increase students' motivation to take lessons. Previous research shows that 41% of students agree that online learning provides motivation to participate in learning [7]. Motivation to take part in online learning can increase because there are no teachers present directly making students not feel awkward to ask and express their ideas [3].

Online learning itself has obstacles or obstacles that must be faced. Some obstacles such as difficult internet signals, fast internet quotas, lack of understanding of the material provided. This is also the same as some previous studies [5]. The Internet is key in this online learning. With the internet, learning can be done easily and can be done anywhere [6]. However, internet speed and availability different in each region. This is because students who are in the far corners have difficulty attending lectures online.

In online learning, teachers must be ready to live the challenges that are being faced. Every teacher must increase creativity in designing an effective online learning for his students. A teacher must also determine the right tasks and be clearly structured. The thing to remember is that this online learning is not an online assignment. Online learning has its own challenges, differences in the place or location of students and teachers cause a lack of direct supervision of students' activities in the learning process which causes the absence of information that students are serious in participating in the online learning process [3].

Some strategies that can be used to increase the effectiveness of online learning activities are (1). Strengthening the interaction between students/students and teachers/teachers, (2) By utilizing interaction between each student while learning takes place, (3) Planning several exams/quizzes online [13].

Some suggestions for the efficient implementation of online learning from the survey results show that in the learning process it must use applications that are easy to get and use. The learning process must be clearly scheduled. Teachers should not determine the learning schedule unilaterally. Sometimes students who are on the far side have to find a good internet signal first to do learning. The material provided must also be clear so that students understand the material provided.

From the results of other findings, namely the lack of adequate skills and knowledge of the educators participating in the study to integrate technology and identify the right approach to promote learning, whether it is technological or pedagogical, and the inadequacy of distance learning programs for students' individual needs, affirm the need to advance online learning, teacher knowledge and skills and the integration of technology into the learning process. Therefore, as in other countries, the created state can be considered an advantage in improving the quality of education, the performance of students and teachers, while helping to achieve the goals of the education strategy, which aims to provide equal opportunities for the education of all individuals [14].

### **CONCLUSION**

From this study, it can be concluded that the impact of covid-19 makes learning change from conventional to online learning. Online learning at Vocational High School 1 Kaligondang has been running quite effectively because there are some teachers who have implemented online learning even though there are still some obstacles such as fast internet quotas, signal difficulties and lack of containment of the material provided. For more effective online learning, the researchers suggest the school to provide facilities for online learning and the teachers need to improve their creativity and interaction with students.

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## Analysis of Differences Financial Performance Between Government Bank and National Private Bank Listed on Indonesia Stock Exchange on 2018-2021 using the RGEC Method



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**ABSTRACT:** This study aims to determine the differences in the financial performance of state banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 using the RGEC method. In addition, this study aims to determine the comparison between state banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 which have better (healthier) financial performance using the RGEC method based on regulations set by the government. The sample used in this study is a sample taken by purposive sampling technique, the criteria used are banks that are included in the *Top 500 Most Valuable Bank Brands 2021*. There are 9 banks that meet the criteria consisting of 4 state banks and 5 national private banks. This study uses four aspects of the RGEC method, namely the risk profile (NPL & LDR), the GCG aspect which is measured using a composite rating, aspects of earnings (ROA), and aspects of capital (CAR). The results of the analysis of this study indicate that during 2018-2021, there are significant differences in financial performance in terms of NPL & CAR, while LDR, GCG, ROA show no significant differences in the financial performance of the two banks. National private banks have better (healthy) financial performance compared to state banks in 2018-2021.

**KEYWORDS:** Financial Performance, Risk Profile, Corporate Governance, Earning, Capital, Private Banking, Government Banking

### I. INTRODUCTION

This 21st century or what is called the Neo-Digital era is an era in which the banking industry is faced with sources of vulnerability threats from various directions, starting from rapid changes in technology, global geopolitics that affect the domestic economy, increasing uncertainty, increasingly complex business and interconnected, as well as the increasingly tight competition climate is a big challenge that must be faced by banks. Banks like it or not have to make adjustments to keep up with the times. because the banking industry is considered to be such a strong backbone of a country's economy (Vyawahare dan Nerlekar, 2021). The increasing climate of banking competition can be seen from the development of banking companies in Indonesia with the availability of digital-based banking services. Changes in customer behavior and high public adoption of digital technology developments have prompted the Financial Services Authority (OJK) to issue a policy to deal with this phenomenon by enacting the Financial Services Authority Regulation Number 12/POJK.03/2018.

The entry of 10 Indonesian banks into the list Top 500 Most Valuable Bank Brands 2021 by Brand Finance who is an appraisal consultant brand and strategy leading in the world and the results of the evaluation are published in the magazine "The Banker". The assessment of these banks is based on brand value consisting of Brand Strength Index (BSI), Brand Royalty Rate (BRR), and overall banking financial performance. In addition to the domination between state banks and Indonesian private national banks that entered the Top 500 Most Valuable Bank Brands 2021, phenomenon the competition between the two types of government banking groups and national private banking can be seen from the large number of banks operating in Indonesia, besides that in terms of the aspect of the size of the quality of assets, lending and financing, and collection of third party funds (Mointi Renny, 2019). Banking industry must be able to maintain its performance in order to become a healthy industry because the function of banking is as an Agent of Trust, where trust is the key to the sustainability of a banking industry. Discussion on financial performance in the banking industry is increasingly interesting to discuss, because one of the key factors in the downturn of banks during the crisis was the weakness of GCG and risk management in the banking industry.



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There were cases that hit banks in Indonesia, Bank Indonesia issued Bank Indonesia Circular Letter (SEBI) No.13/24/DPNP dated 25 October 2011 which regulates guidelines for assessing the current level of bank soundness using the RGEC approach (Risk Profile, Good Corporate Governance, Earnings, Capital) in order to create a healthy banking industry.

The assessment of the soundness level of a bank using the RGEC method is further strengthened by the enactment of POJK No. 4/POJK.03/2016 Concerning Assessment of Bank Soundness Level. The presence of these regulations is expected to affect the stability and profitability of banks as well as resilience in dealing with macroeconomic and internal banking dynamics. Assessment of the soundness of a bank will be useful in implementing GCG and for dealing with risks that arise due to future uncertainties (Akhyar et al., 2018:587). The method of assessing the soundness of a bank, especially for shareholders, will encourage them to make investment decisions.

Research about the differences of financial performance in banking industry conducted by Oktaviani & Nugroho (2016) regarding the measurement of the soundness level of banks using the RGEC method between state-owned banks and state-owned private banks states that the overall ratio used in assessing the soundness of banks, commercial banks owned by private companies is higher than commercial banks. dibandingkan bank umum milik negara. Different results in research conducted by Zain et al. (2019) PT. Bank Mandiri (Persero) Tbk as a state-owned bank and PT Bank Sinarmas Tbk which is a national private bank generally have differences in financial performance, but the financial performance of state-owned banks is better than the financial performance of national private banks. Unlike the research conducted by Faroza et al. (2021) states that in general there are no significant differences in financial performance between state-owned banks and national private banks.

Based on the background described above, the question that arises in this research is whether there are differences in financial performance between state-owned banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of risk profile aspects?; Are there differences in financial performance between state-owned banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of good corporate governance aspects?; Are there differences in financial performance between state-owned banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of the earning aspect?; Are there differences in financial performance between state-owned banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of capital aspects?; Which bank performs better (healthier) using the RGEC method based on Bank Indonesia Circular Letter No.13/24/DPNP between state banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021?

## **II. HYPOTESIS**

The hypotheses in this study include:

- There are significant differences in financial performance between state-owned banks and national private banks in terms of aspects risk profile.
- There are significant differences in financial performance between state-owned banks and national private banks when viewed from the GCG aspect.
- There are significant differences in financial performance between state-owned banks and national private banks in terms of aspects earning.
- There is a significant difference in financial performance between state-owned banks and national private banks in terms of aspects capital.

## **III. METHOD**

### **Research Design**

The type of research used in this research is quantitative research. This research is classified as comparative research. The comparative comparative research in question is to use a comparison of bank soundness levels to describe the financial performance of state-owned banks, namely and national private banks listed on the Indonesia Stock Exchange in 2018-2021.

### **Population and Sample**

The population used in this study is all commercial banks that have listing on the Indonesia Stock Exchange (IDX) during the 2018-2021 period. The sample used in this study is a sample taken by non-probability technique regularly Purposive. The criteria in this study are the banking that goes into Top 500 Most Valuable Bank Brands 2021. Based on predetermined criteria, the sample to be used is 9 banks (4 state banks and 5 national private banks).



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## Data Types and Sources

The type of data based on the nature used in this study is quantitative data. This research is reviewed from the source of its collection using secondary data sources. The research obtained data from the Indonesian Stock Exchange website ([www.idx.co.id](http://www.idx.co.id)), Brand Finance ([www.brandirectory.com](http://www.brandirectory.com)), Financial Services Authority ([www.ojk.go.id](http://www.ojk.go.id)), and their respective official banking channels. Next, the data collection technique in this study is the documentation technique. In carrying out this documentation technique, researchers collected data on financial reports, annual reports, and GCG reports of government banks and national private banks listed on the Indonesia Stock Exchange for 2018-2021.

## Data Analysis Method

The data analysis technique used in this study is a financial statement analysis technique by applying the RGEC approach. Testing the hypothesis in this study using *Independent Sample T-Test* for normally distributed and *Mann Whitney U-Test* for data that is not normally distributed. Testing the normality of this research data uses a test *Shapiro Wilk* with the help of IBM SPSS 26.

## IV. RESULT AND DISCUSSION

### Descriptive Statistical Analysis

Based on the results of descriptive statistics in this research, risk profile assessment aspect used the average of NPL ratio the result is national private banks have better NPL ratios than government banks' NPL ratios. Based on Loan to Deposit Ratio (LDR) the average value of national private banks is higher than government banks. Based on Good Corporate Governance (GCG) aspect, the average composite value of national private banks is better than state-owned banks.

The next RGEC assessment aspect is earning which is proxied by the variable ROA (Return on Asset). Furthermore, the average ROA ratio for the two banks is not much different, government banks have an average value of 2.023%, while national private banks have an average ROA ratio of 2.306%. Based on the average value of the ROA ratio, national private banks have a better ratio than government banks. Next is CAR (Capital Adequacy Ratio), the average CAR ratio of national private banks is greater than that of government banks.

### Data Normality Test

This study uses a type of normality test Shapiro-Wilk or known as W-Test. The data normality test stage, when the data is declared normally distributed if the significance level is  $>0.05$  and abnormally distributed if the significance level is  $<0.05$ . There were two research variables that were not normally distributed, namely the LDR ratio on the assessment aspect risk profile and GCG, this is because these variables have a significance value of  $<0.05$ , ratio Loan to Deposit Ratio (LDR) has a significance value of 0.000 as well Good Corporate Governance (GCG) which has a significance value of 0.000. Then for LDR and GCG in hypothesis testing will use Mann-Whitney Test. As for the other three variables, a hypothesis test will be carried out using Independent T-Test because the data is normally distributed, the NPL ratio is  $0.738 > 0.05$ . ROA has a significant value of  $0.776 > 0.05$ . Meanwhile, CAR has a significance value of  $0.667 > 0.05$ .

### Hypothesis Testing

The hypothesis test or comparative test used in this study is Independent Sample T-test and Mann-Whitney U-test. Test decision making technique is when the value of Sig.  $t < 0.05$  then  $H_0$  rejected. Independent T-test almost the same with Mann-Whitney U-test, but Mann-Whitney does not have a requirement for data to be normally distributed. Aspect risk profile (NPL proxy) using Independent Sample T-Test resulted in a probability of 0.895, because probability  $> 0.05$ , it can be concluded that  $H_0$  rejected there is a difference which is significant in the financial performance between state-owned banks and national private banks in terms of aspects risk profile with a proxy ratio of NPL. The LDR ratio that has been tested using Mann-Whitney the resulting probability value is greater than 0.05 ( $0.849 > 0.05$ ) so that  $H_0$  accepted, it can be concluded that not available significant differences in financial performance between state-owned banks and national private banks in terms of aspects risk profile which is proxied by the LDR ratio.

Based on the results of the hypothesis test, the probability value of GCG significance is 0.52, the probability value is smaller than the confidence level of 0.05. Therefore, then  $H_0$  accepted or in other words not available significant differences in financial performance between state-owned banks and national private banks when viewed from the GCG aspect during 2018-2021.

Based on the results of the hypothesis testing that has been carried out, it appears that the probability value for ROA is 0.253. Value  $p > 0.05$  then  $H_0$  accepted or it can be interpreted that the two variances are the same. Furthermore, because the two variants are the same, the basis is used Equal variances assumed and it can be seen that the t-count for the ROA ratio is -

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0.825 with a probability value of 0.415. Because the p value (0.415) > 0.05 then H<sub>0</sub> accepted, it can be concluded that not available significant differences in financial performance between state-owned banks and national private banks in terms of aspect searning which is proxied by the ROA ratio.

The results of testing the fourth hypothesis in this study are based on the results of the Independent T-Test. It can be seen that t is calculated for the CAR ratio with Equal variance assumed is -4.71 with a probability of 0.000. Because the probability value <0.05 then H<sub>0</sub> rejected, it can be concluded that there is a difference which is significant in the financial performance between state-owned banks and national private banks in terms of aspects capital with CAR proxies.

### **Differences in Financial Performance in Risk Profile Aspects Between Government Banks and National Private Banks**

Based on the results of hypothesis testing it was concluded that there is a difference which is significant in the financial performance between state-owned banks and national private banks in terms of aspects risk profile with a proxy ratio of NPLs. The results of this study are in line with research (Suciani dan Triadiarti 2021); (Mariana dan Manda 2021); (Lisa dan Hermanto 2020); (Hamza, 2017) that in risk profile aspect measured using NPL proxies, national private banks and government banks have significant differences in financial performance.

Based on the statistical tests conducted, it was found that the average NPL of national private banks was higher than state-owned banks. The higher the NPL level, the bank will experience losses due to the high rate of return on bad loans, conversely if the lower the NPL, the bank will experience more profits (Amelia et al., 2019:120). It can be interpreted that national private banks gain greater profits in terms of lending when compared to state banks. According to the Ikatan Bankir Indonesia (2016:28–29) there are several possible causes for the difference in the NPL ratio in the two types of banking, namely the higher inherent risk of state-owned banks compared to national private banks which are not accompanied by risk control which can cause the level of non-performing loans to state banks to be higher when compared to national private banks.

In addition, several factors that make national private banks superior are bank credit profiles that are stronger against changes in economic factors, stable credit strategies and business models, better credit quality, national private banks are more careful in the lending process so that Anticipating this risk results in fairly good banking efficiency and reduces the level of bad loans related to the ability of debtors to repay their loans. In accordance with the opinion of Kasmir (2009:119) that the higher the quality of the credit given or indeed it is feasible to distribute, the less the risk of the possibility of the credit being problematic.

In accordance with Central Bank of Indonesia No.13/2/PBI/2011 that if there is an increase in the NPL ratio above 5%, it indicates that the bank is not successful in managing non-performing loans, because the average bank's NPL ratio is still within the category set by Bank Indonesia, so both types of banking are still in the category of healthy banking or have "good" financial performance.

The good prevention of these two types of banking in preventing the soaring number of non-performing loans due to the Covid-19 pandemic cannot be separated from the role of the OJK in issuing OJK Regulation Number 11 of 2020 concerning Economic Stimulus Due to the Covid-19 Pandemic by lowering interest rates, extending the term, and reducing arrears. principal to prevent a spike in NPL increase due to Covid-19. The restructuring of credit due to the pandemic has improved bank credit risk, in addition to reducing borrowing costs.

Financial performance in terms of aspects risk profile as measured using the LDR ratio shows that not available significant differences in the financial performance of state-owned banks and national private banks. The results of this study are in line with research by (Faroza et al., 2021);(Anjani dan Pakpahan 2020); (Mutiasari, 2019); (Rohaida, 2019); (Mewengkang, 2013) which states that there is no significant difference between state banks and national private banks in the liquidity ratio. According to Sudarmanto et al., (2021:97) liquidity risk indicates the inability of a bank to carry out or fulfill obligations that are due. The difference in the average LDR ratio that is not far adrift indicates that there is no significant difference and this result indicates that the ability of banks to provide funds to their debtors with capital owned by banks or DPK (Third Party Funds) does not have a significant difference.

### **Differences in Financial Performance in Good Corporate Governance Aspects Between Government Banks and National Private Banks**

Based on the results of hypothesis testing it was found that there is no significant difference on the financial performance between state banks and national private banks when viewed from the GCG aspect during 2018-2021. The results of this study are in line with research conducted by (Djakaria & Kristianingsih, 2021); (Faroza & Susanti, 2021) (Zain & Mandasari, 2019) which states that there is no significant difference in Good Corporate Governance (GCG) between national private banks and state-owned banks, both conventional and Islamic banks.

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There is no significant difference because the governance of the two banks has good management to direct and control the company's business activities, the two banks have both implemented and complied with the principles and business activities of commercial banks to run their business properly. In addition, based on the regulations set by the government, the two banks must carry out each semester a self-assessment GCG and monitored by OJK.

### **Differences in Financial Performance in Earning Aspects Between Government Banks and National Private Banks**

Based on the results of the hypothesis testing carried out, it was found that not available significant differences in financial performance between state-owned banks and national private banks in terms of aspect earning which is proxied by the ROA ratio. This research is in line with previous research conducted Faroza & Susanti (2021) and Firdaus & Qumaira (2020). The ROA ratio shows a measure of management's success in generating profits.

The absence of a significant difference can be seen from the results of the descriptive statistical test, it was found that the difference or difference in the average ROA variable was not too far between the two types of banks. The average ROA ratio of government banks and national private banks is not too far apart because the two banks are successful in generating profits and one of them is through credit which indicates that the two banks have good credit quality. In addition, both types of banks are equally good at managing assets to increase income and reduce costs or in other words, both bank management are very good at estimating or controlling the costs of sources of funds and operational costs, determining appropriate strategies, and careful risk management.

### **Differences in Financial Performance on Capital Aspects Between Government Banks and National Private Banks**

The higher the CAR value, the better the bank's capital adequacy, then the two banks are included in the PK-1 category of very healthy banks. This is in accordance with the explanation of the Indonesian Bankers Association (2016: 200) through Bank Indonesia Regulation No. 10/15/PBI/2018 stipulates a minimum CAR value of 8%.

The results of testing the fourth hypothesis in this study are based on the results of the Independent T-Test concluded that there is a difference which is significant in the financial performance between state-owned banks and national private banks in terms of aspects capital with CAR proxies. The results of this study are in line with previous studies conducted by (Faroza & Susanti, 2021) and (Firdaus & Qumaira, 2019) which stated that there were significant differences between state banks and national private banks, both conventional and Islamic types of banks.

This significant difference in financial performance aside from the results of hypothesis testing Independent Sample T-test It can also be seen from the results of the descriptive statistical tests which explain that the average CAR ratio of national private banks is higher than state banks. The results of the hypothesis test indicate that there is a significant difference because national private banks are more capable of carrying out their obligations in managing national private bank capital better when compared to state banks, so that public trust in carrying out credit and other transactions at national private banks is getting bigger. With the increase in credit at national private banks, the income at these banks will increase and the share price of national private banks will increase

### **Bank Soundness Level Analysis**

In accordance with the purpose of this study, namely to find out which state banks and national private banks are listed on the Indonesia Stock Exchange in 2018-2021 which banking has better (healthier) financial performance using the RGEC method based on SEBI No.13/24/DPNP, the results of the assessment of the soundness of a bank that has been carried out explain that national private banks in assessing the soundness of banks using the RGEC method as a whole are superior to state banks. National private banks are ranked 1st because the average bank rating has a weight of 88% or very healthy. Meanwhile, state banks are in PK-2 which has an average weight of 83%, not far from national private banks.

The soundness level of the bank is obtained from the results of the assessment on each criterion based on the regulations set by the government regarding the assessment of the soundness level of the bank. Each bank annually evaluates the four aspects of RGEC in this study using five ratios (NPL, LDR, GCG, ROA, CAR). Next, the value criteria for each of these ratios are given by means of each checklist multiplied by a predetermined score, PK-1 for a score of 5, PK-2 for a score of 4, PK-3 for a score of 3, PK-4 for a score of 2, PK-5 for a score of 1.

Based on the results of the analysis performed. The soundness level of national private banks is superior when measured using the average value for each aspect of the RGEC assessment. Each aspect assessment checklist is given a score of 1-5 and an average total weight of national private banks is 88%. National private banks have advantages in several aspects compared to government banks. Assessing the soundness level of a bank, it can be seen that in terms of NPL, GCG, ROA, and CAR, national private banks have better ratings than government banks.

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The average of aspect risk profile with the national private bank's NPL ratio being superior to that of state-owned banks, the national private bank is in PK-2 or "good" with an average weight of 2.18%. Meanwhile, in terms of LDR ratio, state-owned banks are superior to national private banks, state-owned banks have LDRs with PK-3 or "good enough" with an average weighted LDR ratio of 90.76%. Next, for the GCG aspect, state banks are superior because according to the results of the tests conducted, it was found that the GCG aspects of national private banks have an average weight of 1.65% which is included in the PK-2 or "Good" category.

The third aspect is earning. Aspect earning in national private banks are still superior to government banks, national private banks have an average weighted ROA of 2.31% which is in the PK-1 or "Very good" category. The last aspect of assessment is capital, the ROA ratio of national private banks is still better than that of government banks. The average ratio of state banks has a value of 23.76% which is in the PK-1 or "Very good" category. So, in this assessment it can be concluded that 4 ratios of bank soundness assessments, national private banks are superior or dominate. Based on the description above, it can be reiterated that national private banks have better (healthier) financial performance as assessed using the RGEC method.

### V. CONCLUSIONS

According to the results of the analysis that has been obtained, it can be concluded that in this research there are significant differences in financial performance between government banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of risk profile when proxied by the NPL ratio (Non Performing Loan), whereas when viewed from the ratio of LDR (Loan to Deposit Ratio) there is no significant difference in financial performance.

There is no significant difference in financial performance between government banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of good corporate governance. There is no significant difference in financial performance between government banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of earning. There are significant differences in financial performance between government banks and national private banks listed on the Indonesia Stock Exchange in 2018-2021 in terms of capital. National private banks have better (healthier) financial performance than state-owned banks when assessed using the RGEC method based on Bank Indonesia Circular Letter No.13/24/DPNP.

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## The Role of Socialization of Education for Career Industrialization and Modernization in Vietnam



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**ABSTRACT:** The socialization of education is a major policy of our Party and State. Initially, certain results have been achieved in mobilizing social resources to meet the increasing needs of all classes of people. This policy has the main objective of promoting the strength of the entire people, creating better changes in the quality of higher education. In the cause of innovation, industrialization and modernization (industrialization and modernization), the country aims at a rich people, a strong country, a democratic, fair and civilized society in the context of globalization and industrial development. In 4.0 today, people and resources are considered as the most important factors, deciding fast, effective and sustainable development. Therefore, the detection, fostering, training, use and treatment of human resources, especially high-quality human resources, have been paid great attention by the Party and State. It is necessary to build and develop a team of skilled workers, experts and scientists, culturalists, entrepreneurs, leaders and managers. In this article, the author focuses on clarifying the guidelines and policies of the Party and State on the socialization of education along with clarifying the advantages and limitations in the work of educational socialization in the past time. from which to propose solutions to enhance the role of educational socialization to contribute to the cause of industrialization and modernization of the country.

**KEYWORDS:** Education socialization, industrialization, modernization, human resources.

### 1. MAKE A PROBLEM

Since the mid-1990, in Vietnam, the participation of non-state actors in the provision of certain types of public services has been institutionalized. According to Resolution No. 90/CP of the Government dated August 21, 1997 on the direction and policy of socialization of educational, medical and cultural activities: "Socialization of educational, medical, Culture means mobilizing and organizing the broad participation of the people and the whole society in the development of such causes in order to gradually raise the level of enjoyment in education, health care, culture and development physical and mental health of the people...".

In order to fundamentally and comprehensively renovate higher education, improve the quality of human resources, and meet the urgent requirements of development, it is necessary to: mostly higher education institutions" such as Resolution No. 19-NQ/TW dated October 25, 2017 of the Sixth Conference of the 12th Central Executive Committee on continuing to renovate the organizational and management system, improve the quality and operational efficiency of the public non-business units mentioned above, and at the same time, "Complete mechanisms and policies to promote socialization of education and training in the right direction and effectively" as the Document The 13th National Party Congress has determined. The socialization of higher education, with the nature of which the State mobilizes and manages the participation in various forms of the whole society in improving the quality of education, is an effective method for implementing innovation. basic and comprehensive education. It is necessary to promote the socialization of education in order to promote the social meanings of this activity, and at the same time to multiply its positive impacts on the current educational reform in order to contribute to the successful implementation of the education reform. industrialization and modernization in Vietnam today.

### 2. RESEARCH CONTENT AND RESULTS

#### 2.1. The Concept and Role of Educational Socialization

##### 2.1.1. The Concept of Educational Socialization

Socialization is a process by which an individual is integrated into society or into a group of people through learning the rules and values for each of those social groups. Socialization is also understood as a dialectical process in which each member of a group takes action and maintains it to re-emerge into society. Simply put, in a nutshell, socialization is the use of the means of

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production to exchange value into public property. The meaning of socialization is to increase the community, minimize individualism in all areas of society.

Education socialization: according to the 2018 revised and supplemented Law on Higher Education, it defines: "Socialization of education is educational development, building a learning society is the cause of the State and of the whole people. ; to diversify types of schools and forms of education; encourage, mobilize and create conditions for organizations and individuals to participate in the development of the cause of education" (National Assembly, 2018).

According to Resolution 90/CP dated August 21, 1997, the content of educational socialization includes: "Creating a movement of deep learning in the whole society in many forms; mobilize the entire population, first of all those of working age, to implement lifelong learning to make our society a learning society; Mobilize the entire population to take care of the young generation, create a healthy educational environment, closely coordinate education in schools with education at home and education in the society; strengthen the responsibility of Party committees, authorities, mass organizations and enterprises for the cause of education; Raise the sense of responsibility and participation of the whole people in education in order to consolidate and enhance the effectiveness of the education system to better serve the people's learning (Government, 1997).

Continuing the policy of the VIII National Party Congress, the Resolution of the IX Party Congress affirmed: "Social policies are conducted in the spirit of socialization, upholding the responsibility of governments at all levels, and mobilizing resources. power among the people and the participation of mass organizations and social organizations". The X and XI Congresses of the Party affirmed: "continue to promote the policy of socialization, mobilize the material and intellectual resources of the society to take care of the cause of education. Close coordination between the education sector and other departments, branches and socio-political organizations in all three aspects: mobilizing resources in society; promote the supervisory role of the community; encouraging learning and talent promotion activities, building a learning society, creating conditions for people to have lifelong learning, focusing on building a learning and lifelong learning society.

The 12th National Congress of Delegates set out requirements for the development of high-quality human resources to meet the requirements of socio-economic development; The 13th National Congress of Delegates concretized the development of high-quality human resources to meet the requirements of the Fourth Industrial Revolution and international integration. That is: "Building a Vietnamese people with comprehensive development, with good health, capacity, qualifications, sense and high responsibility for themselves, their families, society and the Fatherland. Promote the development of human resources, especially high-quality human resources, to meet the requirements of the Fourth Industrial Revolution and international integration. Need to "develop a team of leading experts and scientists; focus on technical human resources, digital human resources, technology management human resources, management human resources, corporate governance; human resources to manage society and organize life and take care of people". Pay attention to "renovating the mode of recruitment, use, and respect for talents in management, state governance, science, technology and innovation" - this is a new point in the matter of respect and treatment. , using talents (Tran Khanh Duc, 2010).

### **2.1.2. The practice of educational socialization in our country**

The reality of educational socialization in our country has made certain progress, bringing education deeply into people's lives. However, there are also limitations that need to be overcome. Here are the advantages and disadvantages of this work in our country today.

Advantages: It is undeniable that the socialization of education in our country in recent years has achieved many successes. This is a solid foundation for us to continue to build and develop in the next stages:

Through the implementation of educational socialization, we have achieved achievements in diversifying types of training, training scale, diversifying the school system from kindergartens, kindergartens to high schools, universities. study and graduate school nationwide. Regularly renewing the content of the training program framework, methods and training conditions to be more suitable with the trend of international integration.

Vietnam has a large number of highly qualified staff, which has contributed to improving the quality of education and training. The content of the educational program is gradually improved, in line with the world training program, well combined with the relationship of production, business, training and scientific research (Nguyen Thi Tuyet Van, 2013).

Over the years, our country has gradually diversified the type of training schools that combine tradition and modernity to create an expanded and convenient Education and Training system both in terms of space and time. forming a flexible, interconnected, specialized, specialized, and credit-accumulating mechanism. Diversifying in terms of quality, quality programs and management methods in terms of training funding sources in line with the trend of accelerating international integration.

Limit: Besides the achievements, the socialization of education still has mistakes that need to be overcome:

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The overall structure in education is not really synchronous from kindergarten to university and graduate level: Education and training have not achieved the desired results, not suitable with the requirements of integration, there are differences between levels, regions and even between schools (Nguyen Dinh Vy, Nguyen Dac Hung, 2002)

The form of education is in danger of creating passive people, studying at odd jobs, running after industries that are easy to apply for jobs, with high salaries, etc. leading to an imbalance in academic disciplines; The structure of education levels is not suitable for the development of the country, while the understanding of society and political history is still very low, and the quality of education is not high. Most Vietnamese graduates are not qualified to integrate when working in domestic joint venture companies because of their poor foreign language skills, communication skills, and labor techniques.

### 2.1.3. The role of educational socialization

The socialization of education is a long-term process. We often hear about "socialization of education" but few people understand the role of education socialization. Specifically, the socialization of education has the following roles:

**Firstly**, the socialization of education is a strategic thought on education, directing the process of building and developing education in order to create a profound and revolutionary change in practical activities, transform the educational activities in the country. specialized education (professional and professional) in a field, an educational institution (education sector), becomes a broad and profound learning activity rooted in the fields of material life. the spirit of the society. Ensuring education is the cause of the entire Party, the people and the whole society.

**Second**, the socialization of education creates a deep learning movement in the society in many forms, implementing lifelong learning so that people can work better, earn higher incomes, and live a better life. make our country a learning society.

**Third**, the socialization of education will promote all potentials in society in terms of material, intellectual, scientific and technical, mobilizing the participation of the whole society in the cause of education with different levels to help education reaches a large scale, high speed and high quality to meet the needs of educational development and progress.

**Fourth**, implementing educational socialization is an important solution to implement social justice policy in the socio-economic strategy of the Party and State. Equity is not only in enjoyment (people are taken care of by the State and society) but also in contributing and dedicating to society according to the actual ability of each person in each locality.

### 2.2. Some solutions to improve the quality of education socialization contribute to the successful implementation of the cause of national industrialization and modernization

**First**, It is necessary to understand why it is necessary to socialize education and what it is to socialize education in our country today. Education is an activity with a purpose, orientation, organization, content and requirements in order to create the young generation into the next generation of the new workforce with political, ethical, and professional qualities. culture, science and technology, capable of undertaking and completing tasks of national construction, protection and development in the future. Educational activities are conducted in the context of globalization of all areas of social life.

The socialization of education is a new concept to us, although it has been mentioned many times in different forms, its content also has different interpretations. Because of that different understanding, there are many different ways of doing things, leading to different qualities and effects. Educational socialization is to make educational activities of the society mobilized into the educational process in an active and effective way. The socialization of education also means that society participates in appropriately solving educational problems. Socialization of education is the diversification of types of education; is to expand the scale to meet the educational requirements of the society; is to build a reasonable structure of disciplines and levels of study; is to control the quality of training comprehensively and improve it (Ngo Thi Thu Ha, 2014).

**Second**, It is necessary to solve the problems posed by the process of educational socialization in our country today. The current socialization of education in our country needs to thoroughly observe and implement the following main specific issues:

Socialization of education in terms of educational content and programs. Education is an activity that follows the law of human perception from low to high, from narrow to wide, from shallow to deep... the construction of educational program content needs to follow that cognitive law. The modernization of education is a collection card, equipping learners with modern knowledge and knowledge, but must be based on the law of perception. Therefore, not being conservative, stagnant or introducing anything new into education in a non-selective way makes it not only impractical and ineffective but also counterproductive. Socialization of education is the development of appropriate, practical and effective educational content and programs for each type of object in society, and society promotes its role in the educational process well.

Socialization of education in the organizational system of educational institutions, levels of education, majors of study, financial and social mobilization. In many countries around the world, people socialize education in this field by mobilizing financial

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contributions of the society through taxes and other revenue sources for the State to directly manage and invest in. for education. Therefore, they implemented a unified, state-funded, full-time education system for every school.

Socialization of education in the mode of educational activities. Socialization of education is building a learning society, people in society of all ages and positions are self-conscious, passionate, and have learning needs that the world is now becoming a popular trend. . In our country, this form of educational socialization should be encouraged, with appropriate policies, mechanisms and sanctions to encourage people to self-study.

**Third**, it is necessary to study more deeply and comprehensively on socialization in order to clarify the theoretical basis of the development of legal documents and regulations on ownership, capital contribution, property inheritance, and distribution. distribution, use, profit, etc. the State's support policies for non-public educational and training institutions, the issue of equitization of public education and training institutions. Reviewing the entire system of promulgated legal documents related to education and training, in order to detect inappropriate contents that need to be edited, supplemented, and drafted and issued new documents. towards creating favorable conditions for promoting socialization of education.

**Fourth**, Formulate and plan the development of socialization of education, make plans to transform public education and training institutions into operating under the service provision mechanism or into a non-public type with the following: appropriate steps, specifying targets, solutions and transformation roadmap in each industry and each locality.

### 3. CONCLUSION

Socialization of education is a new factor that has been promoting its strength to the cause of education development, training quality human resources for the cause of industrialization and modernization of the country. It is the socialization of education that creates conditions and factors that cause the emergence of new factors in the ascent of the educational movement. Experiences are drawn from the practical implementation of educational socialization, on that basis, improve the innovation of educational thinking, promptly solve the problems posed by the cause of education development and training. create. The socialization of education is one of the major undertakings and strategic ideas to develop Vietnam's education, meeting the development and integration requirements of the country. Education socialization is the process of mobilizing all resources of the community to join with the State in building and developing a sustainable education in order to ensure democracy and fairness in contributing to and enjoying education. to contribute to raising people's intellectual level, training human resources, contributing to the successful implementation of the cause of industrialization and modernization of the country.

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## The Party's Policy on Society-Economic Development in the Southeast Region



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**ABSTRACT:** The Government has just issued Resolution No. 154/NQ-CP Action Program to implement Resolution No. 24-NQ/TW of the Politburo on socio-economic development and assurance of national defense and security in the Southeast region. Ministry to 2030, vision to 2045. The action program aims to concretize the goals, tasks and solutions mentioned in Resolution No. 24-NQ/TW of the Politburo in order to exploit and promote the efficiency, potential and advantages of each locality. in the region in particular and of the Southeast region in general, contributing to the socio-economic development of the country.

**KEYWORDS:** Development, key economic regions, planning, economy.

### 1. MAKE A PROBLEM

The Southeast region and the Southern Key Economic Zone have a particularly important strategic position in terms of economy, politics, culture, society, national defense, security and foreign affairs; an area of over 30.5 thousand square kilometers (9.2% of the country's area); population of about 21.9 million people (22% of the country's population); GRDP accounts for more than 35% of the whole country; contribute over 40% of total budget revenue; per capita income is 1.58 times higher, urbanization is 1.8 times higher than the national average. Resolution No. 53 and Conclusion No. 27 of the Politburo to evaluate objectively, frankly, honestly, focus on discussion and clarify a number of key contents. Accordingly, evaluating and highlighting the achieved results, shortcomings and limitations in all fields, pointing out the current bottlenecks and bottlenecks in the region and causes, especially subjective causes. , Lessons Learned; analyze the domestic and international context and situation, the impact on the development of the region and the whole country, the influencing factors, opportunities and challenges for the development of the region; identify and clarify different potentials, outstanding opportunities and competitive advantages of the region; propose the right, successful and breakthrough views, goals, tasks, solutions, and specific proposals to meet the regional development requirements and be suitable to the actual situation. (Resolution No. 24)

### 2. RESEARCH CONTENT AND RESULTS

#### 2.1. Action Program on Socio-Economic Development in the Southeast Region

The Southeast region includes Ho Chi Minh City and 5 provinces directly under the Central Government: Tay Ninh, Binh Phuoc, Binh Duong, Dong Nai and Ba Ria-Vung Tau. This is an area with wide and open terrain, very convenient for agricultural, industrial and urban development, building a transportation system.

To promote the region's particularly important position and role, on August 29, 2005, the IX Politburo issued Resolution No. 53-NQ/TW and on August 2, 2012, the Politburo term XI issued Conclusion No. 27-KL/TW on Socio-economic development directions and assurance of national defense and security in the Southeast region and the Southern key economic region up to 2010 and the period 2011- 2020. In the region, Ho Chi Minh City is the largest economic, financial and commercial center, the driving force to attract and promote the development of the whole country and especially the southern region. Besides, the fields of culture, society, science and technology, and innovation achieved some outstanding results.(Thuy Hien, 2022)

The action program aims to concretize the goals, tasks and solutions mentioned in Resolution No. 24-NQ/TW of the Politburo in order to exploit and promote the efficiency, potential and advantages of each locality. in the region in particular and of the Southeast region in general, contributing to the socio-economic development of the whole country. At the same time, promote the Government's constructive and coordinating role according to the principle of clear, centralized, democratic assignment of responsibilities, close coordination associated with the responsibilities of each ministry, central agency, and locality. in the Southeast region and ensure feasibility. (Resolution No. 24)



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To step up the decentralization and decentralization of powers to ministries, central agencies and localities in the Southeast region in association with monitoring, inspection and supervision in order to strongly promote the spirit of initiative and creativity. self-reliance and self-reliance of localities in the region. The resolution sets a target to strive for a number of specific targets by 2030, the average economic growth rate (GRDP) in the 2021-2030 period will reach about 8-8.5%. By 2030, per capita GRDP at current prices will reach about 380 million VND, equivalent to 14,500 USD; the proportion of the service sector accounts for 41.7% of the GRDP, the industry and construction sector accounts for 45.3% (only the manufacturing and processing industry 33%), the agriculture, forestry and fishery sector accounts for 2.3 %, product tax minus subsidies 10.7%; the share of the digital economy in the GRDP is about 30-35%; urbanization rate is about 70-75%; 100% of communes meet new rural standards.

In the period of 2021-2030, the labor productivity growth rate will reach about 7%; The contribution of total factor productivity (TFP) to growth is about 56%. By 2030, the proportion of trained workers with certificates will reach about 40-45%; unemployment rate remained below 3%; 32 hospital beds and 11 doctors per 10,000 people; health insurance coverage rate reaches over 95%.

By 2030, the forest coverage rate will reach about 19.6%; the percentage of urban residents using clean water from the centralized water supply system is 100%; the rate of using clean water and hygienic water in rural areas is 95%; 100% rate of industrial parks and export processing zones operating with centralized wastewater treatment systems meeting environmental standards; reach 95% of the rate of municipal solid waste collected and treated according to regulations; reaching 98% of the rate of hazardous waste collected, transported and treated according to regulations.(Vietnam News Agency, 2022)

### **2.2. Concentrating Resources to Develop the Southeast Region to New Heights**

In order to successfully implement the above specific objectives and targets, the Government requires ministers, heads of ministerial-level agencies, government-attached agencies, and chairmen of the People's Committees of the provinces and cities in the region. The Southeast focuses on directing the implementation of the following key tasks and solutions:

Thoroughly grasp, propagate and create consensus in building and organizing the implementation of programs and action plans to implement Resolution No. 24-NQ/TW of the Politburo.

Along with that, rapid and sustainable development creates breakthroughs and spillovers in regional and inter-regional economic development; accelerate the restructuring of the regional economy towards modernity, taking science-technology, innovation, digital transformation, digital economy, sharing economy, green economy, circular economy as the focus; taking the lead in developing high-tech, digital technology, high-quality and high-class service industries; focus on restructuring the industry in depth, creating breakthroughs in productivity, quality, efficiency and competitiveness.

The resolution clearly states the focus on perfecting institutions and policies and promoting the development of regional linkages; create high unity at all levels and sectors on urgent requirements - to promote cooperation and linkage within and between regions, create a unified economic space, overcome bottlenecks, mobilize and effectively use resources, improve regional competitiveness; develop science and technology, innovate and perfect infrastructure and urban areas.

Science and technology development, innovation and digital transformation will become the main driving force for regional economic growth. Actively promote research and development of high technology, clean technology, digital technology, biology, automation and new materials. Improve the quality of science and technology research team, especially leading experts and scientists.

At the same time, firmly ensure national defense and security, improve the efficiency of foreign affairs; strengthening national defense, security and foreign affairs in combination with economic, cultural and social development, ensuring economic security in the new situation; maximize the position and advantages of geographical and political position in foreign affairs to promote and constantly improve the efficiency of socio-economic development cooperation and international exchanges with countries around the world. the world, especially the countries of the Mekong sub-region, ASEAN countries; focus on building and correcting the Party and political system; focus on implementing the Resolution of the 13th Party Congress and the resolutions, conclusions and regulations of the Party Central Committee, the Politburo and the Secretariat on Party building, in association with the implementation of Directive No. 05- Program/TW on studying and following Ho Chi Minh's ideology and morality, creating strong and substantive changes in the construction and rectification of the Party and the political system of localities in the region.

### **2.3. Situation of Society- Economic Development in the Southeast Region**

In 2020, the scale of gross domestic product in the Southeast region will increase by 4.9 times compared to 2005 and 2.6 times compared to 2010, exceeding the set target. The Southeast region has contributed 32% of the country's GDP, 44.7% of the total state budget revenue. Per capita income in 2020 is the highest in the country. Urbanization of the Southeast region reached

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67%; urban appearance is increasingly renewed and modern. The number of communes meeting the new rural standard is 79.5%, ranking second among regions of the country.

As the nucleus of the Southeast economic region, Ho Chi Minh City, where training institutions, scientific research and medical centers are concentrated, which has abundant and skilled human resources, is a hub for services and trade of regional and international stature, therefore it is an attractive investment environment. In the region, a satellite urban network has been formed, in an open and airy space, linked together through the axis and belt routes under construction.

Dong Nai province is considered a gateway to the Southern key economic region, the most dynamic and developed economic region in the country. Regarding regional linkage, Dong Nai has actively coordinated with central ministries and branches to accelerate the implementation of projects in the regional development planning; coordinate with your localities to organize investment and trade promotion conferences...

Secretary of the Dong Nai Provincial Party Committee Nguyen Hong Linh said that for effective regional linkage, there must be a regional "commander" who has real power and creates unity. At the same time, the region must have good planning to promote the comparative advantages of each locality.

Located in a position adjacent to localities with fast and dynamic economic development, Tay Ninh is considered as a province that plays an important role in the development of the southern key economic region.

In the 2016-2020 period, the province's average GRDP growth rate will reach 7.3%. The structure of the economy in 2020, the service sector accounts for 30.1%, reaching the set target; the industry and construction sector accounted for 43.3%, acting as a driving force for the growth of the economy.

Starting from a purely agricultural province, Binh Duong has strongly risen to become one of the localities with the highest and most dynamic industrial development speed in the Southern Key Economic Region.

Up to now, the province has established 29 industrial parks, with a total planning area of over 12,700 hectares. 27 industrial parks have been put into operation with a total area of 10,624.66 ha, industrial parks have leased land over 6,836 ha, the occupancy rate is 90%. Two industrial parks under construction are VSIP 3 and Cay Truong with a total land area of 1,700ha.

As a province with many potentials and advantages for investment, Binh Phuoc has the great advantage of being the largest land area in the Southeast region. This is an important advantage in terms of development space; Transportation infrastructure is quite convenient. In recent years, Binh Phuoc province has always actively invested in developing modern and synchronous technical infrastructure, building a relatively complete intra-regional and inter-regional transport system. (Vietnam News Agency, 2022)

From the perspective of synchronous, fast, economical, efficient and sustainable development, Ba Ria-Vung Tau province consistently approaches in the direction of optimizing allocated resources and development opportunities, linking with local and inter-regional localities, focusing resources to bring into play the best strengths of the province in order to contribute together with members in the region concentric, synergistic, creating comparative advantages, developing Vietnam in comparison to other regions. with other countries in the world.

### **2.4. Society-Economic Development Solutions in the Southeast Region**

Resolution No. 24-NQ/TW sets out quite complete, synchronous and new solutions, meeting the requirements of the new development stage, including groups of tasks and solutions for rapid and sustainable development. , creating a breakthrough in the regional economy; focus on perfecting development institutions and policies and promoting regional linkages; develop science and technology, innovate, develop human resources and perfect urban infrastructure; develop culture, society, improve people's material and spiritual life; firmly ensure national defense and security; on building and rectifying the Party and the political system.

Firstly, to complete the planning of specialized plans for the socio-economic development space, especially the land use planning to create a clean land fund to attract investment; pay attention to doing well the planning of sectors, fields and urban development planning.(Han Nguyen, 2022)

Consolidate the system of modern facilities, up to regional standards. The road, waterway and road transport networks are not linked with the belt system of clusters, industrial parks and processing zones, creating a modern industrial environment, creating favorable conditions for businesses to reduce costs. production and increase competitiveness.

Second, in the context that the international economic cooperation space is expanded, with Vietnam's efforts to improve the business investment environment at the same time as joining a series of new-generation international commitments. will facilitate many new methods of attracting foreign investment such as M&A in the fields of technology, finance, real estate, etc.

Public Private Partnership (PPP) in the field of infrastructure development and Start-up model for small and medium enterprises that can access foreign capital.

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Third, in the context of socio-economic development at a high level for many years, the remaining resource space for the region's development (such as land, human resources, etc.) will have to be concentrated on manufacturing industries. high-tech production, biotechnology, pharmaceuticals...; along with the development of services in finance, technology, intellectual property, transportation services, logistics, business travel services, healthcare, education, supporting industries, maritime services... High added value will be the key priority sectors to attract investment in the coming period.

Fourth, build a system of human resource training with professional qualifications reaching regional and international levels. Ensure the region abundantly supplies high-quality human resources at competitive costs for supporting, processing and manufacturing industries. This must be considered as a breakthrough solution both in the short and long term to ensure the sustainable development of the Southeast Economic Zone.

Fifth, strengthen regional cooperation activities to expand market access; focus on linking with provinces, especially the Mekong Delta, Central - Central Highlands provinces to form a supply chain of products and services with added value and high efficiency; create strength and spread to develop faster and more effectively. ( Integrated world)

### 3. CONCLUSION

Implement Resolution No. 24-NQ/TW, ministries, branches and localities in the region to continue researching and perfecting policies and laws on land, investment, planning, urban development, and urban planning. architecture and construction, in the direction of ensuring a synchronous and harmonious combination between urban renovation, embellishment and reconstruction with the development of new urban centers, ensuring modern urban architecture, rich in identity and elements. Characteristic cultural elements are preserved and promoted. Based on the Resolution of the 13th Party Congress and the requirements of reality, the formulation of a new Resolution is necessary, more in line with the realities of regional development. The Politburo's promulgation of Resolution No. 24-NQ/TW shows special attention and is a policy of strategic significance in order to maximize the mobilization of resources and effectively exploit the potential and advantages of the country. Southeast region to develop quickly, stably and sustainably, take the lead in the cause of industrialization and modernization, actively contributing to the general development of the southern region and the whole country.

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## Mapping the Intergeneration Family Business Potential of SMEs in Sustainable Urban Agriculture Communities



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**ABSTRACT:** Surabaya as a metropolis city faces challenges in building a smart city, which synergizes sustainability. One of which is by understanding the intergeneration family business potentials in SMEs as one of the support systems of the city economy. This research is phenomenological research by collecting data in the urban agricultural community. The subjects were 193 SMEs in the urban agricultural community. Data was collected through questionnaires which were used to map intergeneration family business potentials. Research shows that the highest potential showed on women graduated from senior high school. Here proved by their experiences in conducting start-up business for 1 to 5 years. The business type was food industry which mostly employed family members. The business would be inherited by their children and later managed by the women of the family (wives).

**KEYWORDS:** intergeneration family business, SMEs, Sustainable urban agricultural community

### I. INTRODUCTION

(Every metropolis city faces the problem of structuring society, including in developed countries such as Japan and America (Winarsih, 2018). In several previous articles J. T. Surabaya (n.d.) and B. P. L. H. K. Surabaya (2006) stated that in Surabaya, one of the main problems is flooding and garbage, while from an economic standpoint, the problem faced is the growth of SMEs (UKM, 2020; Surjanti et al., 2020). Surjanti et al., (2020) found that economic problems regarding SMEs in urban areas are often related to decreased product demand, capital difficulties, raw material difficulties, and distribution barriers. In addition, Surjanti et al., (2021) in another study found that sustainable business development has not been measured in culinary SMEs, so it is still difficult to predict the level of potential that exists. Budhiputra & Putra (2016), UKM (2020), Surjanti et al. (2020), Chen (2020) suggest smart cities as a solution to improve the quality of life and solve urban problems through community participation in development. The same thing was conveyed by Tommasetti et al. (2018) which states that an important key to maintaining market share is through sustainability. Bian et al. (2018) suggest utilizing suburban agricultural land as a solution to provide a variety of ecological services in suburban areas. This opinion supports the research conducted by Allaby et al. (2021) regarding the problems of actors in the local food system in urban areas. These opinions support the importance of urban agricultural communities. Fauzi et al. (2016) which states that the low level of community participation, lack of land, and not optimal government support are the inhibiting factors in the development of urban agriculture in Indonesia. In response to this, Shin & Lee (2016) stated that the involvement of students as part of the planning, implementation, and development of urban agricultural communities will help in overcoming existing problems. This opinion is supported by Julian & Paramita (2017) who found in their research that the Japanese government's solution to social and environmental problems was through the integration of social, environmental and economic aspects. This is also a highlight of the need for urban agricultural communities as one of the driving factors that support the provision of food sources in urban areas.

Inter-generational family business mapping (BPS, 2019) is a map that can be used to see an overview of the distribution and possibilities for business development. One of the important functions of this map is to predict future demographics so that it can be a reference in designing good economic policies by looking at business opportunities that can increase the pace of the people's economy. From several previous studies, results were obtained which stated that women (Surjanti et al., 2020) and young people (Hung, 2004) have a major role in the development of sustainable businesses and the local economy. This opinion is supported by Pattin (n.d.) and Julian & Paramita (2017) who state that there is an integral role that can be played by youth as agents of change in building a sustainable community. Carbone et al. (2016) and Shin & Lee (2016) also mention that the involvement of urban agricultural communities and educational institutions can overcome the emergence of social problems,

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regeneration and sustainable work processes. The existence of this demographic map can be used as a supporting tool to create solutions to problems that arise in urban areas. This opinion is in line with Gilioli et al. (2014) who agree that continuous monitoring and assessment can efficiently move a socio-ecological system towards a socially acceptable standard of living. This supports the opinion put forward by Mmbengwa et al. (2013) regarding the importance of understanding the key success factors to ensure sustainability for the organization. Jamaludin (2017) states that the city is an organization that is created from the results of creativity, taste, intention, and the most complicated work of humans throughout civilization. A city can be said to be a densely populated place inhabited by heterogeneous (diverse) people. Demographically, a city is a certain area that has groupings of people or residents in a certain size with various common procedures.

Based on previous studies, demographic mapping is often used as a reference for predicting the direction of community development and even the pace of the economy. However, these studies rarely discuss how this demographic map can also be used as a means to see potential intergenerational effort that is seen especially for SMEs. Therefore, this research was conducted by mapping the potential of urban agricultural communities, especially related to intergenerational business potential. The implication of this research is to make the results of this research a reference for policy makers in order to be able to design appropriate policies so that they can encourage the potential of family-based SMEs to be better and can become a driving force for the local economy.

## II. LITERATURE REVIEW

### A. Urban Agriculture Community

Romero & Harris (2019) claim that food produced outside the company system can improve people's welfare. From these claims, several questions arise, such as how do members of the alternative food movement define "community"? And who is included and excluded from this definition? Answering these questions, Romero & Harris (2019) define this community as a response that arises from a pressure of need (threat), so that individuals will be interested in forming groups in response to this threat. Urban farming communities according to Fauzi et al. (2016) are groups or communities formed from urban communities to optimize the use of land and natural resources in cities by using appropriate technology to bring food access closer and maintain environmental sustainability with green open spaces. The practice of urban agricultural communities can be seen from economic, ecological, social, aesthetic, educational and tourism aspects. In line with this opinion, Gusfarina & Irham (2019) stated that urban agriculture continues to develop in relation to environmental, economic, health and social issues in the field of environmentally friendly multifunctional agricultural practices as a supplier of healthy food for families, as a place for recreation and a place for socializing and self-development so that spare time becomes more productive.

Moreover, Whittinghill & Sarr (2021) state that as urban populations increase, there is a growing interest in developing innovative technologies, sustainable urban farming practices, policy measures, and other strategies to overcome key constraints in urban agriculture that impede improvements in food security and urban livelihoods. This was supported by Likitswat (2021) who states that although growing food in cities is quite challenging, it is possibly done world widely. Urban farming practices require special knowledge depending on the location and limited availability of land or space in a city. Under tropical climate conditions, despite the extensive growing season, there is an investment and business model of urban greenhouse agriculture within the city limits. Interestingly from the opinions mentioned above, the Urban Agricultural Society can be interpreted as a community of people who manage their environment through the Reduce, Reuse, Recycle or 3R environmental program and tackle flooding (Winarsih, 2018) as well as to fulfil their own food needs (Urban, n.d.). In terms of understanding, urban agricultural communities are agricultural activities carried out in urban areas that are carried out by utilizing narrow urban land for agricultural activities. The existence of urban agriculture made it possible to grow, harvest and distribute food from urban areas. Thus, urban agriculture can meet food needs in urban areas, and can increase the income of urban farmers. This is in accordance with one of the goals of urban agriculture, namely meeting food needs with local food production.

The Organization for Economic Co-operation and Development (OECD) found that women's participation in the labor market tends to develop more in sectors traditionally dominated by women, such as small and medium enterprises, health, education and social services (Observing the Role of Women in the Future of Work in Indonesia, 2020). In addition, Surjanti et al. (2020) mentioned that women are able to grow eco-feminism in sustainable business. Hence, these conditions indicate a meeting of interests in urban agriculture, saving the environment, and economic empowerment (Winarsih, 2018). Similarly, other studies found that urban agriculture community are mostly managed by women aged  $\geq 40$  years so they have limited mastery of technology (Kumpanan, 2018; UKM, 2020; Surjanti et al., 2020).

### B. Inter-generation family business

According to Breton-miller & Miller (2018), family business is the main driver of growth which can have socio-economic consequences. Gottschall & Woods (2020) found an important point about the importance of moderating the level of family



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human capital. Similarly, Chrisman et al. (2010) stated that family businesses often have family-centered non-economic goals that can influence company behavior. This opinion supports Basly & Saunier (2020) who found that every family SME pursues socio-emotional goals. These opinions are in line with the findings of Upton et al. (2001) who suggested that the accelerated growth of family businesses is in line with their business practices and strategic planning. Ramalho et al. (2018) found that in metropolitan areas family ownership influences decisions positively, but outside metropolitan areas, there is no clear effect on family ownership. Stavrou et al. (2005) found transitional success was determined by the leader's personality and corporate culture. Family businesses that put more emphasis on the family and the business as a whole have better family outcomes and similar business results when compared to companies that limit governance to just the business, within a company it is important to pay equal attention to managing the subsystems is an effective route for company management family (Basco, 2009).

Family Enterprise Matters (2019) defines companies whose majority ownership is held by members of the same family, by explaining the role of the first generation of entrepreneurs who tend to identify companies as family companies. Maria et al. (2013) found that family firms make fewer innovation efforts and are less likely to turn to external sources of innovation—such as technological collaboration—than non-family firms. Finally, family firms are more likely to achieve incremental than radical innovation. Regarding inter-generational business, the thing that is most needed is digitalization, such as research conducted by Ferraro & Cristiano (2021) which states that family businesses pursue a dual goal, namely to explore possible scenarios for the evolution of family businesses in the digitalization era, highlighting their roles and objectives and to determine assessment approaches that can be applied to them. According to Benesik, Csikos, and Juhes in BPS (2019), the difference in generations is drawn from the year of birth. Accordingly, they divide generations into several groups, including: Veterans Generation (1925-1946), Baby boom Generation (1946-1960), Generation X (1960-1980), Generation Y (1980-1995), Generation Z (1995-2010), and Generation Alpha (2010+). Meanwhile, in her research Adiawaty (2019) found a positive meaning in the generation Y (Gen Y) as the millennial generation who have a view of their self-development who do not only pursue satisfaction but also self-development. Yet, Azzaini (2022) mentions each generation has its own uniqueness, strengths and characteristics that stand out and require good management to prevent the emergence of "generation tension" which can damage team performance.

### III. METHOD

This research is qualitative phenomenological research with a descriptive qualitative approach. Data were collected by questionnaire, observation, and interviews. Data analysis techniques were done by data reduction, presentation, interpretation, and conclusion. The subjects of this research were 220 individuals who were included in Urban Agriculture Community Jambangan located in Surabaya, Indonesia. However, of 220 obtained data, only 193 were feasible and met the criteria for the research analysis. The research object was a mapping potential of an inter-generational family business of SMEs in urban agriculture communities. Data were excluded/ removed from as many as 27 questionnaires from respondents because they did not meet the standards/measures as the respondents were observed with incomplete criteria. Furthermore, the data is processed using percentages to be able to observe trends in phenomena that exist in the community in order to observe the potential of it.

### IV. RESULT AND DISCUSSION

The results from 193 SMEs in Urban Agriculture Community (UAC) Jambangan District were later divided into several criteria, namely: subject description (Table 1), Business Background (Table 2), and Business Management (Table 3). Each description had several items which used to explain the data obtained.

TABLE 1. INDIVIDUAL BACKGROUND

No.	Description	Total	
		N	Percentage
1	Sex		
	Female	163	84.46%
	Male	30	15.54%
2	Education Background		
	Elementary School	17	8.81%
	Junior High School	22	11.40%
	Senior High School	116	60.10%



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	Diploma	2	1.04%
	Undergraduate Program	35	18.13%
	- No information	1	0.52%
3	Working Experience		
	with work experience	91	47.15%
	without work experience	100	51.81%
	no information	2	1.04%
4	Start-up Business Duration		
	less than 1 year	114	59.07%
	1 to 5 years	42	21.76%
	5 to 10 years	23	11.92%
	no information	10	5.18%

The Surabaya UAC was dominated by women as much as 84.46% who had an education background mostly at the high school level (60.10%). These subjects had no experience (51.81%) and had business duration from 1 to five years (59.07%). These conditions indicate that the potential for SMEs in this UAC was owed by women, with high school education, without work experience, and with 1 to 5 years of business duration. These conditions can be used as a consideration in SME development policies for UAC.

**TABLE 2. BUSINESS BACKGROUND**

No.	Description	Total	
		N	Percentage
1	<b>Type of Business</b>		
	Processed food	113	58.55%
	Fast food	62	32.12%
	Frozen food	4	2.07%
	Unspecific	5	2.59%
	Processed and fast foods	4	2.07%
	Processed and frozen foods	2	1.04%
	No information	3	1.55%
2	<b>Working on Food Industry</b>		
	Business owner	187	96.89%
	Business manager	6	3.11%
	No business	0	0.00%
	No information	0	0.00%
3	<b>Number of employees</b>		
	0	81	41.97%
	1 - 5 persons	93	48.19%
	more than 5 persons	4	2.07%
	more than 100 persons	1	0.52%
	No information	14	7.25%
4	<b>Partnership</b>		
	No partner (individual)	74	38.34%
	Children	43	22.28%
	Husband (spouse)	38	19.69%
	Family (spouse & children)	5	2.59%
	Relative	21	10.88%
	Friends	12	6.22%
	No information	0	0.00%

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From the data above, it can be seen that the business types are dominated by the processed food business (58.55%). Moreover, of the data obtained, it can be seen that 96.89% business industry was related to processed food (including those who had business in both processed and fast foods). These businesses employed people other than the owner/manager (48.19%) and only 38.34% were managed by the owner. In addition, 44.56% of the business involves family members (spouses and children). So the potential map in the business activities drawn was the popular business in the food industry which involved family members and had employees. Accordingly, from the intergenerational involvement point of view, it can be seen that children's involvement (22.28%) was higher than spouses' involvement (19.69%), meaning that the involvement of family members is considered low (weak). However, this result differed from the smart city expected by Budhiputra & Putra (2016), UKM (2020), Surjanti et al. (2020), and Chen (2020) about the standard of smart city.

**TABLE 3. BUSINESS MANAGEMENT**

No.	Description	Total	
		N	Percentage
1	<b>Position in business</b>		
	Manager and owner	166	86.01%
	Manager	18	9.33%
	Owner	6	3.11%
	No information	3	1.55%
2	<b>Position in Family</b>		
	Head of family	35	18.13%
	Wife	148	76.68%
	Child	10	5.18%
3	<b>Intergeneration relationship</b>		
	Gen Baby Boom	26	13.47%
	Gen X	98	50.78%
	Gen Y	55	28.50%
	Gen Z	9	4.66%
	No information	5	2.59%

An overview of the management of family businesses built from SMEs in UAC showed that the majority of SMEs are managed by their owners (86.01%) who were housewives (76.68%) as well as grouped as Gen X (50.78%), Gen Y (28.50%), and Gen Z (4.66%). This result showed the existence of a generational shift in all generation groups in the management of SMEs in UAC indicated by the existence of subjects in each generation (from Z to X).

## V. CONCLUSION

The result of this research showed the map of the potential of SMEs at Surabaya UAC in Surabaya as managed by women with a high school education level, without experience, with start-up businesses duration from 1-5 years, working on the food industry, with employees, and family members' involvement (spouses and children), privately owned business, managed by housewives and transferred intergeneration. Accordingly, from this map, it is recommended to the government design policies on the smart city which structures should be directed at activities that are able to improve community experience in women's groups, especially women by involving the interests of generational transfer for the benefit of sustainable business development.

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# A Study on Network Graph-PW, Network Symmetric Digraph-PW, Change Network Graph-PW and Change Network Symmetric Digraph- PW



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**ABSTRACT:** Networks play an important role in electrical and electronic engineering. It depends on what area of electrical and electronic engineering, for example, there is a lot more abstract mathematics in communication theory and signal processing and networking, etc. Networks involve nodes communicating with each other. Graph theory has found considerable use in this area. In this paper, we introduce some new Networks such as Graph-PW, Network Symmetric Digraph-PW, Change Network Graph-PW, and Change Network Symmetric Digraph- PW. Moreover, several theorems and results of these networks have been studied.

**KEYWORDS:** Graph-PW, Network Symmetric Digraph-PW, Change Network Graph-PW, Change Network Symmetric Digraph- PW.

## INTRODUCTION

For more detail on Graphs, Digraphs, and network Digraphs one. The networks (Graph- PW and symmetric Digraph- PW) and network changes (Graph-PW and symmetric Digraph-PW) can be the source of many algorithms of practical importance. It is flexibly adaptable to suit the needs of the application, so it can be used in areas such as syntactic analysis, fault detection, and diagnosis in computer, therefore the graphical of this representation of the object and the binary relation on them is a convenient form of expression. In this paper, we give some definitions and results of network Graphs-PW and symmetric Digraphs-PW and networks changes (Graph-PW and symmetric Digraph-PW) [1,2], we refer to the interested reader to [3-30].

### 1. Networks (Graph-PW And Symmetric Digraph-PW):

**Definition (1.1):** A **Graph-PW** is a triple  $G_{PW} = (V, E^*, \Phi)$  consists of a non-empty set  $V = \{v_1, v_2, \dots, v_n\}$  of objects called vertices, points, nodes, or just dots, together with undirected pairs set of vertices

$$E^* = \left\{ \begin{array}{l} e_{ij} = v_i v_j = v_j v_i : i \neq j \\ \text{or } i = j, n(e_{ij}) = v_i * v_j = \rho\omega \end{array} \right\}$$

is called edges, arcs or lines, satisfy  $PW = \max(n(e_{ij}) = v_i * v_j = \rho\omega)$ , where  $P$  (non-negative integer) is the maximum numbers of  $\rho$ -edges or loops between any pairs of vertices and  $W$  is the uniform weighted with  $PW = \max \rho\omega$  depended on  $\omega$  uniform sign weighted in  $E^*$ , and incident function  $\Phi$  from  $E^*$  to the set  $P_2(V)$  of all 2-elements or parts subsets of  $V$ , that is,  $\Phi: E^* \mapsto P_2(V)$ . The **adjacency function matrix**  $Am(G_{PW})$  define as

$$Am(G_{PW}) = \begin{cases} n(e_{ij}) \text{ if } \rho > 0 \wedge \omega > 0 \wedge v_i \text{ joined to } v_j; \\ 0 \text{ or } \infty \text{ if } \rho\omega = 0 & ; \\ -n(e_{ij}) \text{ if } \rho > 0 \wedge \omega < 0 \wedge v_i \text{ joined to } v_j. \end{cases}$$

clear that it is if  $P = W = 1$ , then the Graph-PW is natural **Graph-1**, and if  $P > 0, W = 1$  the Graph-PW is **mullet Graph-P**, and if  $P = 1, W \in \mathbb{R}^+$  the Graph-PW is **weighted Graph-W** and  $\Phi$  in Graph-PW satisfy  $\forall e_{ij} \in E^* \exists \{v_i, v_j\} \in P_2(V) \ni \Phi(e_{ij}) = \{v_i, v_j\}$ ,  $\Phi$  is **one-to-one** if and only if  $\Phi(e_{ij}) = \Phi(e_{rs}) \Rightarrow e_{ij} = e_{rs}$  or  $e_{ij} \neq e_{rs} \Rightarrow \Phi(e_{ij}) \neq \Phi(e_{rs})$ , **onto** if  $\forall \{v_i, v_j\} \in$

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$P_2(V) \exists e_{ij} \in E^* \ni \Phi(\{v_i, v_j\}) = e_{ij}$  or  $\Phi(P_2(V)) = E^*$ , and if  $\Phi$  one-to-one and onto is called **corresponding** then there is an inverse  $\Phi^{-1}$  of  $\Phi$ .

The **operation** \* is modules, plus, product, max, min or ... and the **examples** are only define the operation \* by these operations. In the following definitions and theorems  $PW$ , incident function and adjacency function matrix define as well as.

**Definition (1.2):** In the **network Graph- PW**, the weight  $\omega$  is called **flow function** for each edges of  $\rho \in n(e_{ij})$  with  $\omega_i \leq \omega_{i+1}$  and  $\rho = \sum_{i=1}^{\rho} \omega_i$  between any adjacent two pair vertices is called **capacity constraint** with  $\omega \leq \rho = \sum_{i=1}^{\rho} \omega_i$  and the total flow function for any vertex is  $\omega(e) = \sum_{i=0} \omega_{i+1}$ , and the total capacity constraint for any vertex is  $\rho(e) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j$  with  $\omega(e) \leq \rho(e)$ . If  $\omega(e) = \sum_{i=0} \omega_{i+1} = PW$  then  $PW$  is called **value flow**, therefore, for any intermediate vertex if the total flow is  $PW$  of these vertices called **flow conservation**.

By these arguments the name **Graph- PW** and **network Graph- PW** are the same.

**Definition (1.3):** The **complement** of  $G_{PW}$  is  $\bar{G}_{PW} = (V, \bar{E}^*, \bar{\Phi})$  with  $V(G_{PW}) = V(\bar{G}_{PW})$ , and  $\bar{E}^* = \{e_{ij} = v_i v_j \wedge \bar{n}(e_{ij}) = PW - n(e_{ij}) \forall v_i, v_j \in V(G_{PW})\}$ , and  $\bar{\Phi}: \bar{E}^* \rightarrow P_2(V)$ .

Therefore  $G_{PW} \cup \bar{G}_{PW} = K_{|V|} - PW$  is called **complete Graph- PW**.

**Definition (1.4):** The **regular** of  $G_{PW}$  is  $R_{PW} = (V, E^*, \Phi)$  with

$$E^* = \{e_{ij} = v_i v_j : \deg v_i = \deg v_j \wedge n(e_{ij}) = v_i * v_j = \rho\omega = PW \forall v_i, v_j \in V(G_{PW})\}.$$

$G_{PW}$  is **semi-regular** if one or two vertices have the equal degree different of all vertices, that is,

$$(\deg v_1 = \deg v_2) \neq (\deg v_i = \deg v_j) \forall i, j \wedge n(e_{ij}) = v_i * v_j = PW$$

**Theorem (1.1):** If a Graph- PW  $G_{PW} = (V, E^*, \Phi)$  or  $\bar{G}_{PW}$  has an isolated vertex, then  $G_{PW} - v$  or  $G_{PW} \cup \bar{G}_{PW}$  has not an isolated vertex.

**Proof:** Since  $G_{PW} = (V, E^*, \Phi)$  define on operations, then the operation module has only isolated vertex, and the operation of product has an isolated vertex, if one of vertex is zero, and the other operations  $\bar{G}_{PW}$  has an isolated vertex, therefore  $G_{PW} - v$  or  $G_{PW} \cup \bar{G}_{PW}$  has not an isolated vertex.

Now, by these theorem  $G_{PW}$ ,  $\bar{G}_{PW}$  and  $G_{PW} \cup \bar{G}_{PW}$  well define are connected and we can be taken these networks.

**Definition (1.5):** In the value flow of the networks, if  $\sum_{i=0} \omega_{i+1} > PW$ , then there is  $\sum_{j=0} \omega_{j+1}$  such that  $\sum_{i=0} \omega_{i+1} - \sum_{j=0} \omega_{j+1} = PW$ , and  $PW \leq \rho(e) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j$ .

**Definition (1.6):** A **sub-Graphs- PW** of a Graph- PW is  $H_{pw}$  or  $\hat{G}_{PW} = (V, E^*, \Phi) \subseteq G_{PW}$  with  $V(H_{pw}) \subseteq V(G_{PW})$  or  $V(\hat{G}_{PW}) = V(G_{PW})$ ,  $E^*(H_{pw})$  or

$$E^*(\hat{G}_{PW}) \subseteq E^*(G_{PW}), \text{ and } \Phi(H_{pw}) \text{ or } \Phi(\hat{G}_{PW}) \subseteq \Phi(G_{PW}).$$

Now, let  $H_{pw} = (V(H), E^*(H), \Phi(H))$ ,  $Y_{pw} = (V(Y), E^*(Y), \Phi(Y)) \subseteq G_{PW} = (V, E^*, \Phi)$  with  $V(Y) = V(G_{PW}) - V(H)$ ,  $E^*(Y) = \{e_{ij} = v_i v_j : n(e_{ij}) = v_i * v_j = \rho\omega \notin E^*(H)\}$ . Then  $H_{pw} \cup Y_{pw} \subseteq G_{PW}$ , and  $H_{pw} + Y_{pw} = G_{PW}$ , where  $V(H) \cup V(Y) = V(G_{PW})$  and  $E^*(H) \cup E^*(Y) \cup \{e_{ij} = v_i v_j : v_i \in V(H), v_j \in V(Y) \forall v_i, v_j, n(e_{ij}) = v_i * v_j = \rho\omega\}$ .

Let  $H_{pw} = (V(H), E^*(H), \Phi(H))$ ,  $Y_{pw} = (V(Y), E^*(Y), \Phi(Y)) \subseteq \hat{G}_{PW} = (V, E^*, \Phi) \subseteq G_{PW}$  with  $V(Y) = V(\hat{G}_{PW}) - V(H)$ ,  $E^*(Y) = \{e_{ij} = v_i v_j : n(e_{ij}) = v_i * v_j = \rho\omega \notin E^*(H)\}$ . Then  $H_{pw} \cup Y_{pw} \subseteq \hat{G}_{PW}$ , and

$$H_{pw} \cup Y_{pw} = \hat{G}_{PW} \text{ iff}$$

$$E^*(H) \cup E^*(Y) \cup \{e_{ij} = v_i v_j : v_i \in V(H), v_j \in V(Y) \wedge n(e_{ij}) = v_i * v_j = \rho\omega \in E^*(\hat{G}_{PW})\}.$$

Now, we can give the following results on the network Graph- PW on flow function, value flow and capacity constraint.

**Theorem (1.2):** If  $H_{pw} = (V(H_{pw}), E^*(H_{pw}), \Phi(H_{pw})) \subseteq G_{PW} = (V, E^*, \Phi)$  of network Graph- PW, with  $pw = PW$ , then  $H_{pw} + G_{PW} - V(H_{pw}) = G_{PW}$ .

**Proof:** By definition (1.6) the result follows.

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**Theorem (1.3):** Let  $\omega(e) = \sum_{i=0} \omega_{i+1}$ ,  $\rho(e) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j > PW$  be total flow function and capacity constraint of networks Graph- PW. Then there is

$\sum_{r=0} \omega_{i+1}(e), \rho(e) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r \in H_{pw}$  or  $G_{PW} - V(H_{pw}) \subseteq G_{PW} = (V, E^*, \Phi)$  such that

- I.  $\omega(e) - \sum_{r=0} \omega_{r+1} = PW$ , and
- II.  $\rho(e) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j - \rho(e) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r = PW$ .

**Proof:** I. Since  $\sum_{r=0} \omega_{i+1} \in H_{pw}$  or  $G_{PW} - V(H_{pw})$ , then  $\sum_{r=0} \omega_{r+1} \in G_{PW}$ , and by definition (1.5) the result follows, and

- II. Since  $\rho(e) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r \in H_{pw}$  or  $G_{PW} - V(H_{pw})$ , then  $\rho(e) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r \in G_{PW}$ , and the result follows.

**Theorem (1.4):** Let  $\omega(e) = \sum_{i=0} \omega_{i+1}$ ,  $\rho(e) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j$  be total flow function and capacity constraint of networks Graph- PW have value flow and let,  $\omega_j(e), \rho_j(e)$  be total flow function and capacity constraint of sub-graph- pw from  $H_{pw}$  to  $G_{PW} - V(H_{pw})$ . Then  $PW = \omega_j(e) - \omega_r(e), PW = \rho_j(e) - \rho_r(e)$ , where  $\omega_r(e), \rho_r(e)$  are the total flow function and capacity constraint from  $G_{PW} - V(H_{pw})$  to  $H_{pw}$ . Moreover,  $W \leq \rho_j(e)$ .

**Proof:** I. Since  $\omega(e) = \sum_{i=0} \omega_{i+1}, \rho(e) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j \in G_{PW}$ , then the total flow

function and capacity constraint from  $H_{pw}$  or  $G_{PW} - V(H_{pw})$  to  $G_{PW}$  equal the total flow  
function and capacity constraint from  $G_{PW}$  to  $H_{pw}$  or  $G_{PW} - V(H_{pw})$ , and

$H_{pw} + G_{PW} - V(H_{pw}) = G_{PW}$ , then  $PW = \omega_j(e) - \omega_r(e), PW = \rho_j(e) - \rho_r(e)$

Moreover,  $\omega_j(e) - \omega_r(e) \leq \omega_j(e) \leq \rho_j(e)$ .

**Definition (1.7):** Let  $\hat{G}_{PW} = (V, E^*(\hat{G}_{PW}), \Phi), \check{G}_{PW} = (V, E^*(\check{G}_{PW}), \Phi(\check{G}_{PW})) \subseteq G_{PW}$

be sub - Graph -  $\hat{PW}$  and sub - Graph -  $\check{PW}$  of network Graph - PW with

$V = \{v_i: i = 1, 2, 3, \dots, n\}$ , and

$E^*(\hat{R}_{PW}) = \{e_{ij} = v_i v_j: \deg v_i = \deg v_j \forall i, j \wedge n(e_{ij}) = v_i * v_j = \hat{PW}\}$ , and

$E^*(\check{R}_{PW}) = \{e_{ij} = v_i v_j: \deg v_i = \deg v_j \forall i, j \wedge n(e_{ij}) = v_i * v_j = \check{PW} \notin E^*(\hat{G}_{PW})\}$ .

Then  $\hat{G}_{PW}$  and  $\check{G}_{PW}$  are called **Regulars sub-graph- $\hat{PW}$**  and **sub - Graph -  $\check{PW}$**  denoted by

$\hat{R}_{PW}$  and  $\check{R}_{PW}$ .  $\hat{G}_{PW}$  and  $\check{G}_{PW}$  are **semi - reglars** if one or two vertices have the equal degree different of all vertices, that is,  $(\deg v_1 = \deg v_2) \neq (\deg v_i = \deg v_j) \forall i, j \wedge n(e_{ij}) = v_i * v_j = \hat{PW} \vee \check{PW}$ .

**Theorem (1.5):**  $\hat{R}_{PW} = (V, E^*, \Phi)$  is regular sub - graph -  $\hat{PW}$  iff  $\hat{R}_{PW}$  or  $\hat{R}_{PW} \cup \check{R}_{PW}$  are regulars.

Moreover, if  $\hat{R}_{PW}$  is semi - reglar sub - Graph -  $\hat{PW}$ , then  $\hat{R}_{PW} \vee \check{R}_{PW} \cup \check{R}_{PW}$  are semi - reglars or regulars.

Therefore,  $\hat{R}_{PW} = \check{R}_{PW}$  iff  $\hat{PW} = \check{PW}$ .

**Proof:** See definition (1,7).

**Definition (1.8):** Let  $\hat{G}_{PW}, \check{G}_{PW} \subseteq G_{PW}$  be Graph -  $\hat{PW}$  and Graph -  $\check{PW}$  of network

Graph - PW with  $V(\hat{G}_{PW}) = V(\check{G}_{PW}) = V(G_{PW}), E(\hat{G}_{PW}) \cap E(\check{G}_{PW}) = \emptyset$ , and

$\hat{G}_{PW} \cup \check{G}_{PW} = G_{PW}$ . Then  $\bar{G}_{PW} = (V(G_{PW}), E^*(\bar{G}_{PW}), \bar{\Phi})$  where

$E^*(\bar{G}_{PW}) = E^*(\hat{G}_{PW}) \cup \{\bar{n}(e_{ij}): \bar{n}(e_{ij}) = \hat{PW} - n(e_{ij}), n(e_{ij}) \in E^*(\hat{G}_{PW})\}$ , and

$\bar{G}_{PW} = (V(G_{PW}), E^*(\bar{G}_{PW}), \bar{\Phi})$  where

$E^*(\bar{G}_{PW}) = E^*(\check{G}_{PW}) \cup \{\bar{n}(e_{ij}): \bar{n}(e_{ij}) = \check{PW} - n(e_{ij}), n(e_{ij}) \in E^*(\check{G}_{PW})\}$ .

**Theorem (1.6):**  $\bar{G}_{PW} \cup \bar{G}_{PW} = (V(G_{PW}), E^*(\bar{G}_{PW}) \cup E^*(\bar{G}_{PW}), \bar{\Phi} \cup \bar{\Phi})$ .

**Proof:** By definition (1.8) the result follows.



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**Theorem (1.7):** 1.  $\overline{\hat{G}_{PW} \cup \check{G}_{PW}} = \bar{G}_{PW} = \bar{\hat{G}}_{PW} \cap \bar{\check{G}}_{PW}$ , with  $\hat{G}_{PW} \cup \check{G}_{PW} = G_{PW}$   
 2.  $\bar{\hat{G}}_{PW} \cup \bar{\check{G}}_{PW} = G_{PW} = \overline{\hat{G}_{PW} \cap \check{G}_{PW}}$ , with  
 $E^*(\bar{\hat{G}}_{PW} \cup \bar{\check{G}}_{PW}) = \{\max(n(e_{ij}), \bar{n}(e_{ij})) : n(e_{ij}) \in E^*(\hat{G}_{PW}) \text{ or } E^*(\check{G}_{PW}) \text{ and } \bar{n}(e_{ij}) \in E^*(\bar{\hat{G}}_{PW}) \text{ or } E^*(\bar{\check{G}}_{PW})\}$ .

**Proof:** 1. Since  $\hat{G}_{PW} \cup \check{G}_{PW} = G_{PW}$ , then  $\overline{\hat{G}_{PW} \cup \check{G}_{PW}} = \bar{G}_{PW}$ , and by Morgan laws  $\overline{\hat{G}_{PW} \cup \check{G}_{PW}} = \bar{\hat{G}}_{PW} \cap \bar{\check{G}}_{PW}$ , and

2.  $\bar{\hat{G}}_{PW} \cup \bar{\check{G}}_{PW} = G_{PW} = \overline{\hat{G}_{PW} \cap \check{G}_{PW}}$  (by Morgan laws).

**Definition (1.9):** Let  $\hat{H}_{PW}, \check{H}_{PW} \subseteq G_{PW}$  be Graph –  $\hat{P}\hat{W}$  and Graph –  $\check{P}\check{W}$  network

Graph –  $PW$  with  $V(\hat{H}_{PW}) = V(\check{H}_{PW}), E(\hat{H}_{PW}) \cap E(\check{H}_{PW}) = \varphi$ , and

$\hat{H}_{PW} \cup \check{H}_{PW} = G_{PW}$ . Then  $\hat{H}_{PW} = (V(G_{PW}), E^*(\hat{H}_{PW}), \Phi(\hat{H}_{PW}))$  where

$$E^*(\hat{H}_{PW}) = E^*(\check{H}_{PW}) \cup \{\bar{n}(e_{ij}) : \bar{n}(e_{ij}) = \max(\hat{P}\hat{W}, \check{P}\check{W}) - n(e_{ij}), n(e_{ij}) \in E^*(\check{H}_{PW})\}$$

and  $\check{H}_{PW} = (V(G_{PW}), E^*(\check{H}_{PW}), \Phi(\check{H}_{PW}))$  where

$$E^*(\check{H}_{PW}) = E^*(\hat{H}_{PW}) \cup \{\bar{n}(e_{ij}) : \bar{n}(e_{ij}) = \max(\hat{P}\hat{W}, \check{P}\check{W}) - n(e_{ij}), n(e_{ij}) \in E^*(\hat{H}_{PW})\}$$

**Theorem (1.8):**  $\hat{H}_{PW} \cup \check{H}_{PW} = G_{PW} \cup \bar{G}_{PW}$ .

**Proof:** By definition (1.3) and (1.9), the result follows.

**Definition (1.10):** Let  $\hat{Y}_{PW}, \check{Y}_{PW} \subseteq G_{PW}$  be Graph –  $\hat{P}\hat{W}$  and Graph –  $\check{P}\check{W}$  of network

Graph –  $PW$  with  $\hat{Y}_{PW} = (V(G_{PW}), E^*(\hat{Y}_{PW}), \Phi(\hat{Y}_{PW}))$ ,

$E^*(\hat{Y}_{PW}) = \{\bar{n}(e_{ij}) : \bar{n}(e_{ij}) = \hat{P}\hat{W} - n(e_{ij}) \forall v_i, v_j \in V(G_{PW})\}$  and

$$\check{Y}_{PW} = (V(G_{PW}), E^*(\check{Y}_{PW}), \Phi(\check{Y}_{PW})),$$

$E^*(\check{Y}_{PW}) = \{\bar{n}(e_{ij}) : \bar{n}(e_{ij}) = \check{P}\check{W} - n(e_{ij}) \forall v_i, v_j \in V(G_{PW})\}$ .

**Theorem (1.9):**  $\hat{G}_{PW} \cup \hat{Y}_{PW}$  and  $\check{G}_{PW} \cup \check{Y}_{PW}$  are complete Graph –  $\hat{P}\hat{W}$  and Graph –  $\check{P}\check{W}$ .

**Proof:** By definition (1.3) and (1.10)  $\hat{G}_{PW} \cup \bar{\check{G}}_{PW} = \hat{G}_{PW} \cup \hat{Y}_{PW}$  or  $\check{G}_{PW} \cup \bar{\hat{G}}_{PW}$  with  $PW = \hat{P}\hat{W}$  and  $PW < \check{P}\check{W}$  or  $PW = \check{P}\check{W}$  and  $PW < \hat{P}\hat{W}$  which are completes.

**Definition (1.11):** Let  $\hat{G}_{PW} = (V, E^*, \Phi) \subseteq G_{PW}$  be connected Graph –  $\hat{P}\hat{W}$  with loops and

$V(\hat{G}_{PW}) = V(G_{PW})$  and let  $\hat{G}_{PW}^2 = (V, E_2^*, \Phi_2)$  define as well as  $\hat{G}_{PW}$  with joint two vertices  $v_i, v_j$  non-adjacency by  $n(e_{ij}) = v_i * v_j$  with  $n(e_{ir})$  and  $n(e_{rj})$  adjacency by  $v_r$ , that is, equivalence  $1 \leq d(v_i, v_j) \leq 2$ , where  $v_i$  is adjacent to  $v_j$  in  $\hat{G}_{PW}$ ,  $d(v_i, v_j)$  is the minimum numbers of vertices except first or last vertex between  $v_i, v_j$ . We can continuous to define  $\hat{G}_{PW}^3 = (V, E_3^*, \Phi_3), \dots$ , then,  $\hat{G}_{PW}^r = (V, E_r^*, \Phi_r)$  is called a **Power Graph- $\hat{P}\hat{W}$** .

**Theorem (1.10):**  $\hat{G}_{PW}^r = G_{PW}$  iff  $r = \max d(v_i, v_j)$

**Proof:** Since  $\hat{G}_{PW} = (V, E^*, \Phi) \subseteq G_{PW}$  with the loops, then  $\hat{G}_{PW}^2 \subseteq G_{PW}$ , and so on  $\hat{G}_{PW}^{r-1} \subseteq G_{PW}$ , and  $\hat{G}_{PW}^r = G_{PW}$  iff  $r = \max d(v_i, v_j)$ .

Now,  $\hat{R}_{PW}, \bar{\hat{G}}_{PW}, \bar{\check{G}}_{PW}, \hat{H}_{PW}, \check{H}_{PW}, \hat{Y}_{PW}, \check{Y}_{PW}$ , and  $\hat{G}_{PW}^r$  well define connected network Graph –  $\hat{P}\hat{W}$  and Graph –  $\check{P}\check{W}$ .

**Definition (1.12)** A **network symmetric Directed Graph- $PW$**  is triple  $SD_{PW} = (V, A^*, \Phi)$  consists of a non-empty Set  $V = \{v_1, v_2, \dots, v_n\}$  of objects called vertices, points, nodes, or just dots, together with directed pairs set of vertices

$$A^* = \left\{ \begin{array}{l} a = (a_{ij} = (v_i, v_j) \cup (v_j, v_i) = a_{ji}) : i \neq j \text{ or } i = j \wedge \\ n(a_{ij}) = v_i * v_j = v_j * v_i = \rho\omega \end{array} \right\}$$

is called edges, arcs or lines, satisfy  $PW = \max(n(a) = v_i * v_j = \rho\omega)$ , where  $P$  (non-negative integer) is the maximum numbers of  $\rho$ -arcs or loops between any pairs of vertices and  $W$  is the uniform weighted with  $PW = \max \rho\omega$  depended on  $\omega$  uniform sign weighted in  $\omega$  in  $A^*$ , and incident function  $\Phi$  from  $A$  to the set  $V^2$ , that is,

$\Phi: A^* \mapsto V^2$ . The **adjacency function matrix  $Am(SD_{PW})$**  define as

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$$Am(SD_{PW}) = \begin{cases} n(a) & \text{if } P > 0 \wedge w > 0 \wedge v_i \text{ joined to } v_j; \\ o \text{ or } \infty & \text{if } \rho\omega = 0 ; \\ -n(a) & \text{if } P > 0 \wedge w < 0 \wedge v_i \text{ joined to } v_j. \end{cases}$$

clear that it is if  $P = W = 1$ , then the symmetric Digraph-  $PW$  is natural **symmetric Digraph-1**, and if  $P > 0, W = 1$  the symmetric Digraph-  $PW$  is **mullet symmetric Digraph- P**, and if  $P = 1, W \in \mathbb{R}^+$  the symmetric Digraph-  $PW$  is **weighted symmetric Digraph- W** and  $\Phi$  in symmetric Digraph-  $PW$  satisfy

$\forall a \in A^* \exists \{(v_i, v_j), (v_j, v_i)\} \in P_2(V) \ni \Phi(a) = \{(v_i, v_j), (v_j, v_i)\}$ ,  $\Phi$  is one -to-one if and only if  $\Phi(a_i) = \Phi(a_j) \Rightarrow a_i = a_j$  or  $a_i \neq a_j \Rightarrow \Phi(a_i) \neq \Phi(a_j)$ , onto if  $\forall \{(v_i, v_j), (v_j, v_i)\} \in P_2(V) \exists a \in A^* \ni \Phi(\{(v_i, v_j), (v_j, v_i)\}) = a$  or  $\Phi(P_2(V)) = A^*$ , and if  $\Phi$  one-to-one and onto is called corresponding then there is an inverse  $\Phi^{-1}$  of  $\Phi$ .

In the following definitions and theorems, incident function and adjacency function matrix define as well as.

**Definition (1.13):** In the **network symmetric Digraph- PW**, the weight  $\omega$  is called **symmetric flow function** for each arcs of  $\rho \in n(a)$  with  $\omega_i \leq \omega_{i+1}$  and  $\rho = \sum_{i=1}^{\rho} \omega_i$  between any adjacent two pair vertices is called **symmetric capacity constraint** with  $\omega \leq \rho = \sum_{i=1}^{\rho} \omega_i$  a and the total symmetric flow function for any vertex is

$\omega(a) = \sum_{i=0} \omega_{i+1}$ , and the total symmetric capacity constraint for any vertex is  $\rho(a) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j$ , with  $\omega(a) \leq \rho(a)$ .

If  $\omega(a) = \sum_{i=0} \omega_{i+1} = PW$  then  $PW$  is called **value symmetric flow**, therefore, for any intermediate vertex if the total symmetric flow is  $PW$  of these vertices is called **symmetric flow conservation**.

By these arguments the name **symmetric Digraph- PW** and **network symmetric Digraph- PW** are the same.

**Definition (1.14):** The **complement** of  $SD_{PW}$  is  $S\bar{D}_{PW} = (V, \bar{A}^*, \bar{\Phi})$  with

$V(SD_{PW}) = V(S\bar{D}_{PW})$ , and

$\bar{A}^* = \{a = (v_i v_j) \cup (v_j v_i) \wedge \bar{n}(a) = PW - n(a) \forall v_i, v_j \in V(SD_{PW})\}$ , and

$\bar{\Phi}: \bar{A}^* \rightarrow V^2$ . Therefore  $SD_{PW} \cup S\bar{D}_{PW} = K_{|V|} - PW$  is called **complete symmetric Digraph- PW**.

**Definition (1.15):** The **regular** of  $SD_{PW}$  is  $SR_{PW} = (V, A^*, \Phi)$  with

$A^* = \{a = (v_i v_j) \cup (v_j v_i): \deg v_i = \deg v_j \wedge n(a) = v_i * v_j = \rho\omega = PW \forall v_i, v_j \in V(SD_{PW})\}$

and  $SD_{PW}$  is **sime – regular** if

$(indeg v_1 = indeg v_2) \neq (indeg v_i = indeg v_j) \forall i, j \wedge n(a) = v_i * v_j = PW$

**Theorem (1.12):** If a symmetric Digraph-  $PW$   $SD_{PW} = (V, A^*, \Phi)$  or  $S\bar{D}_{PW}$  has an isolated vertex, then  $SD_{PW} - v$  or  $SD_{PW} \cup S\bar{D}_{PW}$  has not a isolated vertex.

**Proof:** Since  $SD_{PW} = (V, A^*, \Phi)$  is defined on operations, then the operation module has only isolated vertex, and the operation of product has isolated vertex, if one of vertex is zero, and the anther operations  $S\bar{D}_{PW}$  has isolated vertex, therefore  $SD_{PW} - v$  or

$SD_{PW} \cup S\bar{D}_{PW}$  has not an isolated vertex.

Now, by these theorem  $SD_{PW}, S\bar{D}_{PW}$  and  $SD_{PW} \cup \bar{G}_{PW}$  well define are connected and we can be taken these network.

**Definition (1.16):** In the value flow of the networks, if  $\sum_{i=0} \omega_{i+1} > PW$ , then there is  $\sum_{j=0} \omega_{j+1}$  such that  $\sum_{i=0} \omega_{i+1} - \sum_{j=0} \omega_{j+1} = PW$ , and  $PW \leq \rho(a) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j$ .

**Definition (1.17):** A **sub-symmetric Digraphs-  $\dot{P}W$**  of a symmetric Digraph-  $PW$  is  $SH_{pw}$  or  $S\dot{D}_{PW} = (V, A^*, \Phi) \subseteq SD_{PW}$  with  $V(SH_{pw}) \subseteq V(SD_{PW})$  or

$V(S\dot{D}_{PW}) = V(SD_{PW}), A^*(SH_{pw})$  or

$A^*(S\dot{D}_{PW}) \subseteq A^*(SD_{PW})$ , and  $\Phi(SH_{pw})$  or  $\Phi(S\dot{D}_{PW}) \subseteq \Phi(SD_{PW})$ .

Now, let  $SH_{pw} = (V(SH), A^*(SH), \Phi(SH))$  and

$S\dot{Y}_{pw} = (V(SY), A^*(SY), \Phi(SY)) \subseteq SD_{PW} = (V, A^*, \Phi)$  with

$$V(SY) = V(SD_{PW}) - V(SH),$$

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$A^*(Y) = \{a = (v_i, v_j) \cup (v_j, v_i) : n(a) = v_i * v_j = \rho\omega \notin A^*(SH)\}$ . Then

$SH_{pw} \cup SY_{pw} \subseteq SD_{PW}$ , and  $SH_{pw} + SY_{pw} = SD_{PW}$ , where  $V(SH) \cup V(SY) = V(SD_{PW})$  and  $A^*(SH) \cup A^*(SY) \cup \{a = (v_i, v_j) \cup (v_j, v_i) : v_i \in V(H), v_j \in V(Y) \forall v_i, v_j, n(a) = v_i * v_j = \rho\omega\}$ .

Let  $SH_{pw} = (V(SH), A^*(SH), \Phi(SH))$ ,

$SY_{pw} = (V(SY), A^*(SY), \Phi(SY)) \subseteq SD_{PW} = (V, A^*, \Phi) \subseteq SD_{PW}$  with

$$V(SY) = V(SD) - V(SH),$$

$A^*(Y) = \{a = (v_i, v_j) \cup (v_j, v_i) : n(a) = v_i * v_j = \rho\omega \notin A^*(SH)\}$ . Then

$SH_{pw} \cup SY_{pw} \subseteq SD_{PW}$ , and  $SH_{pw} \cup SY_{pw} = SD_{PW}$  iff

$$A^*(SH) \cup A^*(SY) \cup \{a = (v_i, v_j) \cup (v_j, v_i) : v_i \in V(SH), v_j \in V(SY) \wedge$$

$n(a) = v_i * v_j = \rho\omega \in A^*(SD_{PW})\}$ .

Now, we can give the following results on the network symmetric Digraph- PW on symmetric flow function, value symmetric flow and symmetric capacity constraint.

**Theorem (1.13):** If  $SH_{pw} = (V(SH_{pw}), A^*(SH_{pw}), \Phi(SH_{pw})) \subseteq SD_{PW} = (V, A^*, \Phi)$  of network symmetric Digraph- PW, with  $pw = PW$ , then

$$SH_{pw} + SD_{PW} - V(SH_{pw}) = SD_{PW}.$$

**Proof:** By definition (1.17) the result follows.

**Theorem (1.14):** Let  $\omega(a) = \sum_{i=0} \omega_{i+1}$ ,  $\rho(a) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j > PW$  be total symmetric flow function and symmetric capacity constraint of networks symmetric Digraph- PW. Then there is

$\sum_{r=0} \omega_{i+1}$ ,  $\rho(a) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r \in SH_{pw}$  or  $SD_{PW} - V(SH_{pw}) \subseteq SD_{PW} = (V, A^*, \Phi)$  such that

$$I. \omega(a) - \sum_{r=0} \omega_{r+1} = PW, \text{ and}$$

$$II. \rho(a) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j - \rho(a) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r = PW.$$

**Proof:** I. Since  $\sum_{r=0} \omega_{i+1} \in SH_{pw}$  or  $SD_{PW} - V(SH_{pw})$ , then  $\sum_{r=0} \omega_{r+1} \in SD_{PW}$ , and by definition (1.5) the result follows, and

II. Since  $\rho(a) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r \in SH_{pw}$  or  $SD_{PW} - V(SH_{pw})$ , then

$\rho(a) = \sum_{r=1} (\sum_{i=1}^{\rho} \omega_i)_r \in SD_{PW}$ , and the result follows.

**Theorem (1.15):** Let  $\omega(a) = \sum_{i=0} \omega_{i+1}$ ,  $\rho(a) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j$  be total symmetric flow function and symmetric capacity constraint of networks symmetric Digraph- PW have value symmetric flow and let,  $\omega_j(a), \rho_j(a)$  be total symmetric flow function and symmetric capacity constraint of sub- symmetric Digraph- pw from  $SH_{pw}$  to  $SD_{PW} - V(SH_{pw})$ . Then  $PW = \omega_j(a) - \omega_r(a)$ ,  $PW = \rho_j(a) - \rho_r(a)$ , where  $\omega_r(a)$   $\rho_r(a)$  are the total symmetric flow function and symmetric capacity constraint from  $G_{PW} - V(H_{pw})$  to  $H_{pw}$ . Moreover,  $\leq \rho_j(a)$ .

**Proof:** Since  $\omega(a) = \sum_{i=0} \omega_{i+1}$ ,  $\rho(a) = \sum_{j=1} (\sum_{i=1}^{\rho} \omega_i)_j \in G_{PW}$ , then the total

symmetric flow function and symmetric capacity constraint from  $SH_{pw}$  or

$SD_{PW} - V(SH_{pw})$  to  $SD_{PW}$  equal the total symmetric flow function and

symmetric capacity constraint from  $SD_{PW}$  to  $SH_{pw}$  or  $SD_{PW} - V(SH_{pw})$ , and

$SH_{pw} + SD_{PW} - V(SH_{pw}) = SD_{PW}$ , then  $PW = \omega_j(a) - \omega_r(a)$ ,  $PW = \rho_j(a) - \rho_r(a)$

Moreover,  $\omega_j(a) - \omega_r(a) \leq \omega_j(a) \leq \rho_j(a)$ .

**Definition (1.18):** Let  $SD_{PW} = (V, A^*(SD_{PW}), \Phi)$  and

$$SD_{PW} = (V, A^*(SD_{PW}), \Phi(SD_{PW})) \subseteq SD_{PW}$$

be sub - symmetric Digraph - PW and sub - symmetric Digraph - PW of network

symmetric Digraph - PW with  $V = \{v_i : i = 1, 2, 3, \dots, n\}$ , and

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$$A^*(SR_{PW}) = \{a = v_i v_j : deg v_i = deg v_j \forall i, j \wedge n(a) = v_i * v_j = \dot{P}\dot{W}\}, \text{ and}$$

$$A^*(S\ddot{R}_{PW}) = \{a = v_i v_j : indeg v_i = outdeg v_j \forall i, j \wedge$$

$$n(a) = v_i * v_j = \dot{P}\dot{W} \notin E^*(SD_{PW})\}.$$

Then  $S\dot{D}_{PW}$  and  $S\ddot{D}_{PW}$  are called **Regulars sub- symmetric Digraph- $\dot{P}\dot{W}$**  and **sub – symmetric Digraph –  $\dot{P}\dot{W}$**  denoted by  $S\dot{R}_{PW}$  and  $S\ddot{R}_{PW}$ .  $S\dot{D}_{PW}$  and  $S\ddot{D}_{PW}$  are **semi – regular** if one or two vertices have the equal degree different of all vertices, that is ,

$$(indeg v_1 = indeg v_2) \neq (indeg v_i = indeg v_j) \forall i, j \wedge n(a) = v_i * v_j = \dot{P}\dot{W} \vee \dot{P}\dot{W}.$$

**Theorem (1.15):**  $\dot{R}_{PW} = (V, A^*, \Phi)$  is regular sub – symmetric Digraph –  $\dot{P}\dot{W}$  iff  $S\dot{R}_{PW}$

or  $S\dot{R}_{PW} \cup S\ddot{R}_{PW}$  are regulars. Moreover, if  $S\dot{R}_{PW}$  is semi – regular sub – symmetric Digraph –  $\dot{P}\dot{W}$ , then  $S\ddot{R}_{PW}$  or  $S\dot{R}_{PW} \cup S\ddot{R}_{PW}$  are semi – regulars or regulars. Therefore,  $S\dot{R}_{PW} = S\ddot{R}_{PW}$  iff  $\dot{P}\dot{W} = \dot{P}\dot{W}$ .

**Proof:** See definition (1,7).

**Definition (1.19):** Let  $S\dot{D}_{PW}, S\ddot{D}_{PW} \subseteq SD_{PW}$  be Graph –  $\dot{P}\dot{W}$  and Graph –  $\dot{P}\dot{W}$  of network

$$\text{Graph – PW with } V(S\dot{D}_{PW}) = V(S\ddot{D}_{PW}) = V(SD_{PW}), A^*(S\dot{D}_{PW}) \cap A^*(S\ddot{D}_{PW}) = \varphi, \text{ and}$$

$$S\dot{D}_{PW} \cup S\ddot{D}_{PW} = SD_{PW}. \text{ Then } S\bar{\dot{D}}_{PW} = (V(SD_{PW}), A^*(S\bar{\dot{D}}_{PW}), \bar{\Phi}) \text{ where}$$

$$A^*(S\bar{\dot{D}}_{PW}) = A^*(S\dot{D}_{PW}) \cup \{\bar{n}(a) : \bar{n}(a) = \dot{P}\dot{W} - n(a), n(a) \in A^*(S\dot{D}_{PW})\}, \text{ and}$$

$$S\bar{\ddot{D}}_{PW} = (V(SD_{PW}), A^*(S\bar{\ddot{D}}_{PW}), \bar{\Phi}) \text{ where}$$

$$A^*(S\bar{\ddot{D}}_{PW}) = A^*(S\ddot{D}_{PW}) \cup \{\bar{n}(a) : \bar{n}(a) = \dot{P}\dot{W} - n(a), n(a) \in A^*(S\ddot{D}_{PW})\}.$$

**Theorem (1.16):**  $S\bar{\dot{D}}_{PW} \cup S\bar{\ddot{D}}_{PW} = (V(SD_{PW}), A^*(S\bar{\dot{D}}_{PW}) \cup A^*(S\bar{\ddot{D}}_{PW}), \bar{\Phi} \cup \bar{\Phi})$ .

**Proof:** By definition (1.8) the result follows.

**Theorem (1.17):** 1.  $\overline{S\dot{D}_{PW} \cup S\ddot{D}_{PW}} = S\bar{\dot{D}}_{PW} = S\bar{\dot{D}}_{PW} \cap S\bar{\ddot{D}}_{PW}$ , with  $S\dot{D}_{PW} \cup S\ddot{D}_{PW} = SD_{PW}$

$$2. S\bar{\dot{D}}_{PW} \cup S\bar{\ddot{D}}_{PW} = SD_{PW} = \overline{S\dot{D}_{PW} \cap S\ddot{D}_{PW}}, \text{ with}$$

$$A^*(S\bar{\dot{D}}_{PW} \cup S\bar{\ddot{D}}_{PW}) = \{\max(n(a), \bar{n}(a)) : n(a) \in A^*(S\dot{D}_{PW}) \text{ or } A^*(S\ddot{D}_{PW}) \text{ and}$$

$$\bar{n}(a) \in A^*(S\bar{\dot{D}}_{PW}) \text{ or } A^*(S\bar{\ddot{D}}_{PW})\}.$$

**Proof:** 1. Since  $S\dot{D}_{PW} \cup S\ddot{D}_{PW} = SD_{PW}$ , then  $\overline{S\dot{D}_{PW} \cup S\ddot{D}_{PW}} = S\bar{\dot{D}}_{PW} = S\bar{\dot{D}}_{PW} \cap S\bar{\ddot{D}}_{PW}$

(by De-Morgan laws), and so 2.

**Definition (1.20):** Let  $S\dot{H}_{PW}, S\ddot{H}_{PW} \subseteq SD_{PW}$  be sub – symmetric Digraph –  $\dot{P}\dot{W}$  and sub –

symmetric Digraph –  $\dot{P}\dot{W}$  of network symmetric Digraph – PW with

$$V(S\dot{H}_{PW}) = V(S\ddot{H}_{PW}), E(S\dot{H}_{PW}) \cap E(S\ddot{H}_{PW}) = \varphi, \text{ and}$$

$$S\dot{H}_{PW} \cup S\ddot{H}_{PW} = SD_{PW}. \text{ Then } S\dot{H}_{PW} = (V(SD_{PW}), A^*(S\dot{H}_{PW}), \Phi(S\dot{H}_{PW})) \text{ where}$$

$$A^*(S\dot{H}_{PW}) = A^*(S\dot{H}_{PW}) \cup \{\bar{n}(a) : \bar{n}(a) = \max(\dot{P}\dot{W}, \dot{P}\dot{W}) - n(a), n(a) \in A^*(S\dot{H}_{PW})\} \text{ and}$$

$$S\ddot{H}_{PW} = (V(SD_{PW}), A^*(S\ddot{H}_{PW}), \Phi(S\ddot{H}_{PW})) \text{ where}$$

$$A^*(S\ddot{H}_{PW}) = A^*(S\ddot{H}_{PW}) \cup \{\bar{n}(a) : \bar{n}(a) = \max(\dot{P}\dot{W}, \dot{P}\dot{W}) - n(a), n(a) \in A^*(S\ddot{H}_{PW})\}$$

**Theorem (1.18):**  $S\dot{H}_{PW} \cup S\ddot{H}_{PW} = SD_{PW} \cup S\bar{\dot{D}}_{PW}$ .

**Proof:** By definition (1.3) and (1.9), the result follows.

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**Definition (1.21):** Let  $S\check{Y}_{PW}, S\check{Y}_{PW} \subseteq SD_{PW}$  be sub – symmetric Digraph –  $\check{P}\check{W}$  and sub – symmetric Digraph –  $\check{P}\check{W}$  of network

symmetric Digraph – PW with  $S\check{Y}_{PW} = (V(SD_{PW}), A^*(S\check{Y}_{PW}), \Phi(S\check{Y}_{PW}))$ ,

$A^*(S\check{Y}_{PW}) = \{\bar{n}(a): \bar{n}(a) = \check{P}\check{W} - n(a) \forall v_i, v_j \in V(SD_{PW})\}$  and

$S\check{Y}_{PW} = (V(SD_{PW}), A^*(S\check{Y}_{PW}), \Phi(S\check{Y}_{PW}))$ ,

$A^*(S\check{Y}_{PW}) = \{\bar{n}(a): \bar{n}(a) = \check{P}\check{W} - n(a) \forall v_i, v_j \in V(SD_{PW})\}$ .

**Theorem (1.19):**  $S\check{D}_{PW} \cup S\check{Y}_{PW}$  and  $S\check{D}_{PW} \cup S\check{Y}_{PW}$  are complete symmetric Digraph –  $\check{P}\check{W}$  and symmetric Digraph- $\check{P}\check{W}$ .

**Proof:** By definition (1.3) and (1.10) we have

$SD_{PW} \cup S\check{D}_{PW} = S\check{D}_{PW} \cup S\check{Y}_{PW}$  or  $S\check{D}_{PW} \cup S\check{Y}_{PW}$  with

$PW = \check{P}\check{W}$  and  $PW < \check{P}\check{W}$  or  $PW = \check{P}\check{W}$  and  $PW < \check{P}\check{W}$  which are completes.

**Definition (1.22):** Let  $S\check{D}_{PW} = (V, A^*, \Phi) \subseteq SD_{PW}$  be connected sub – symmetric

Digraph –  $\check{P}\check{W}$  with loops and  $V(S\check{D}_{PW}) = V(SD_{PW})$  and let  $S\check{D}_{PW}^2 = (V, A_2^*, \Phi_2)$  define as-well-as  $S\check{D}_{PW}$  with joint two vertices  $v_i, v_j$  non-adjacency by  $n(a_{ij}) = v_i * v_j$  with  $n(a_{ir})$  and  $n(a_{rj})$  adjacency by  $v_r$ , that is, equivalence  $1 \leq d(v_i, v_j) \leq 2$ , where  $v_i$  is adjacent to  $v_j$  in  $S\check{D}_{PW}$ ,  $d(v_i, v_j)$  is the minimum numbers of vertices except first or last vertex between  $v_i, v_j$ . We

can continuous define  $S\check{D}_{PW}^3 = (V, A_3^*, \Phi_3), \dots$ , then,  $S\check{D}_{PW}^r = (V, A_r^*, \Phi_r)$  is called a **Power symmetric Digraph- $\check{P}\check{W}$** .

**Theorem (1.20):**  $S\check{D}_{PW}^r = SD_{PW}$  iff  $r = \max d(v_i, v_j)$

**Proof:** Since  $S\check{D}_{PW} = (V, A^*, \Phi) \subseteq SD_{PW}$  with the loops, then  $S\check{D}_{PW}^2 \subseteq SD_{PW}$ , and so on

$S\check{D}_{PW}^{r-1} \subseteq SD_{PW}$ , and  $S\check{D}_{PW}^r = SD_{PW}$  iff  $r = \max d(v_i, v_j)$ .

Now,  $S\check{R}_{PW}, S\check{D}_{PW}, S\check{D}_{PW}, S\check{H}_{PW}, S\check{H}_{PW}, S\check{Y}_{PW}, S\check{Y}_{PW}$ , and  $S\check{D}_{PW}^r$  well define connected network symmetric Digraph- $\check{P}\check{W}$  and symmetric Digraph- $\check{P}\check{W}$ .

**Theorem (1.21):**  $G_{PW} = SD_{PW}$  iff  $V(G_{PW}) = V(SD_{PW})$ , and  $D_{PW} = D_{PW}^{-1}$

**Proof:**  $G_{PW} = SD_{PW}$  iff  $SD_{PW} = D_{PW} \cup D_{PW}^{-1}$  satisfy  $V(G_{PW}) = V(SD_{PW})$ ,

$e = \{v_i, v_j\} = a = (a_{ij} = (v_i, v_j) \cup (v_j, v_i) = a_{ij}^{-1}) \forall i \neq j, i = j$ , and

$\deg_{v_i \in V(G_{PW})} v_i = \text{indeg}_{v_i \in V(SD_{PW})} v_i = \text{oudeg}_{v_i \in V(SD_{PW})} v_i$ , and

$\deg_{n(e_{ij}) \in E^*} n(e_{ij}) = \text{indeg}_{n(a) \in A^*} n(a) = \text{oudeg}_{n(a) \in A^*} n(a)$

Moreover  $E^* = A^*$  iff  $E^* = (A(D_{PW}) = A(D_{PW}^{-1}))$ , and  $P_2(V) = V^2$  iff  $G_{PW} = (D_{PW} = D_{PW}^{-1})$ .

### 2. Networks Change Graph-PW and Change Symmetric Digraph-PW:

**Definition (2.1):** Let  $G_{PW} = (V, E, \Phi)$  be Graph-PW. Then we can define the **change Graph-PW** as  $L(G_{PW}) = (V(E^*), E^*(L), L(\Phi))$  with  $V(E^*) = \{n(e_{ij}): n(e_{ij}) \in E^*(G_{PW})\}$ ,

$E^*(L) = \{e_{ij} = n(e_{ir})n(e_{rj}): n(e_{ij}) = n(e_{ir}) * n(e_{rj}) = \rho\omega\}$ ,

$E^*(L) = \{e_{ij} = n(e_{ir})n(e_{rj}): n(e_{ij}) = v_i * v_j = \rho\omega\}$ ,

$E^*(L) = \{e_{ij} = n(e_{ir})n(e_{rj}): n(e_{ij}) = v_r * v_r = \rho\omega\}$  or

$E^*(L) = \{e_{ij} = n(e_{ir})n(e_{rj}): n(e_{ij}) = v_r = \rho\omega\}$ , that is,

the set  $n(e_{ij})$ -edges of  $E^*(G_{PW})$  is vertices in  $L(G_{PW})$ , and the  $e_{ij}$  in  $E^*(L)$  if and only if  $n(e_{ir})$  and  $n(e_{rj})$  are adjacency of vertex  $v_r$ ,

$L(\Phi): E^*(L) \rightarrow P_2(V(E^*))$ , and

$PW = \max \rho\omega = \max n(e_{ij}) * n(e_{rj}), v_i * v_j, v_r * v_r$  or  $v_r = \rho\omega$ .

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Moreover, we can be found  $L^2(G_{PW}) = L(L(G_{PW})), \dots, L^n(G_{PW}) = L(L^{n-1}(G_{PW}))$ .  
Applied all definitions in the definition(1.1) and definition (1.2) in the definition (2.1).

**Definition (2.2):** The complement of network change Graph-PW

$L(G_{PW}) = (V(E^*), E^*(L), L(\Phi))$  is  $\bar{L}(G_{PW}) = (V(E^*), \bar{E}^*(L), \bar{L}(\Phi))$  with

$\bar{E}^*(L) = \{e_{ij} : \bar{n}(e_{ij}) = PW - n(e_{ij}), i \neq j \text{ or } i = j\}$

$\bar{L}(\Phi) : \bar{E}^*(L) \rightarrow P_2(V(E^*))$ , and

$$PW = \max \bar{n}(e_{ij}).$$

Moreover,  $L(G_{PW}) \cup \bar{E}^*(L) = K_{|V(E^*)|} - PW$ .

**Definition (2.3):** Let  $G_{PW} = (V, E^*, \Phi)$  be network regular Graph-PW. Then we can define the network change regular Graph-PW as  $L(G_{PW}) = (V(E^*), E^*(L), \Phi(L))$  with

$V(E^*) = \{PW : PW \in E^*(G_{PW})\}$ ,

$$E^*(L) = \left\{ e_{ij} : n(e_{ij}) = \frac{|V|^2(|V| - 1)}{2} PW * PW = \rho\omega \right\},$$

$\Phi(L) : E^*(L) \rightarrow P_2(V(E^*))$ , and  $PW = \max \rho\omega$ .

**Definition (2.4):** Applied definitions (1.5) and (1.6) in the network change Graph-PW.

**Theorem (2.1):** Applied theorems (1.1),(1.2),(1.3) and (1.4) in the network change Graph-PW.

Clear that if  $G_{PW} = (V, E^*, \Phi)$  is connected Graph-PW. Then  $L(G_{PW}) = (V(E^*), E^*(L), L(\Phi))$  is connected change Graph-PW, if  $G_{PW} = (V, E^*, \Phi)$  has a soiled vertex, then  $\bar{G}_{PW} = (V, \bar{E}^*, \bar{\Phi})$  or  $G_{PW} \cup \bar{G}_{PW}$  are connected, so  $L(\bar{G}_{PW})$  and  $L(G_{PW} \cup \bar{G}_{PW})$ , moreover can be looking the change Graph-PW  $L(G_{PW} \cup \bar{G}_{PW})$  has only one vertex with the loops. If  $G_{PW} = (V, E^*, \Phi)$  has a soiled vertex, then

$L(G_{PW}) = (V(E^*), E^*(L), L(\Phi))$  is connected.

**Definition (2.5):** The definitions (1.7) define similar of definition (2.3) in the network change Graph-PW.

**Definition (2.6):** Applied the definitions (1.8), (1.9),(1.10) and (1.11) in the network change Graph-PW.

**Theorem (2.2):** Applied theorems (1.6), (1.7),(1.8), (1.9) and (1.10) in the network change Graph-PW.

Now, let  $\hat{G}_{PW}, \check{G}_{PW} \subseteq G_{PW}$  be Graph -  $\hat{P}W$  and Graph -  $\check{P}W$  with

$V(\hat{G}_{PW}) = V(\check{G}_{PW}), E(\hat{G}_{PW}) \cap E(\check{G}_{PW}) = \varphi$ , and  $\hat{G}_{PW} \cup \check{G}_{PW} = G_{PW}$ .

Clear that  $\hat{G}_{PW}$  is  $L(\hat{G}_{PW})$ , and  $L^2(\hat{G}_{PW}) = L(L(\hat{G}_{PW})), \dots, L^n(\hat{G}_{PW}) = L(L^{n-1}(\hat{G}_{PW}))$  and  $\check{G}_{PW}$  is  $L(\check{G}_{PW})$ , and  $L^2(\check{G}_{PW}) = L(L(\check{G}_{PW})), \dots, L^n(\check{G}_{PW}) = L(L^{n-1}(\check{G}_{PW}))$ .

**Theorem (2.3):**  $\bar{\hat{G}}_{PW}, \bar{\check{G}}_{PW}, \hat{H}_{PW}$  and  $\check{H}_{PW}$  have network change Graph-PW and

$$L(\bar{\hat{G}}_{PW}), L^2(\bar{\hat{G}}_{PW}) = L(L(\bar{\hat{G}}_{PW})), \dots, L^n(\bar{\hat{G}}_{PW}) = L(L^{n-1}(\bar{\hat{G}}_{PW})),$$

$$L(\bar{\check{G}}_{PW}), L^2(\bar{\check{G}}_{PW}) = L(L(\bar{\check{G}}_{PW})), \dots, L^n(\bar{\check{G}}_{PW}) = L(L^{n-1}(\bar{\check{G}}_{PW})),$$

$L(\hat{H}_{PW}), L^2(\hat{H}_{PW}) = L(L(\hat{H}_{PW})), \dots, L^n(\hat{H}_{PW}) = L(L^{n-1}(\hat{H}_{PW}))$  and

$L(\check{H}_{PW}), L^2(\check{H}_{PW}) = L(L(\check{H}_{PW})), \dots, L^n(\check{H}_{PW}) = L(L^{n-1}(\check{H}_{PW}))$ .

**Proof:** By the definition (2.1) the result follows.

**Theorem (2.4):** Every  $\hat{G}_{PW}^r = (V, E_r^*, \Phi_r)$  there is  $L(\hat{G}_{PW}^r), r = 1, 2, 3, \dots, \max d(v_i, v_j)$ .

Moreover,  $L^2(\hat{G}_{PW}^r) = L(L(\hat{G}_{PW}^r)), \dots, L^n(\hat{G}_{PW}^r) = L^{n-1}(\hat{G}_{PW}^r)$ .



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**Proof:** By theorem (1.10) and the definition (2.1) the result follows.

**Definition (2.7):** Let  $SD_{PW} = (V, A^*, \Phi)$  be Symmetric Digraph-PW. Then we can define the change symmetric Digraph-PW is

$L(SD_{PW}) = (V(A^*), A^*(L), L(\Phi))$  with

$V(A^*) = \{n(a) : a \in A^*(SD_{PW})\}$ ,

$A^*(L) = \{a_{ij} = n(a_{ir}) n(a_{rj}) : n(a_{ij}) = n(a_{ir}) * n(a_{rj}) = \rho\omega\}$ ,

$A^*(L) = \{a_{ij} = n(a_{ir}) n(a_{rj}) : n(a_{ij}) = v_i * v_j = \rho\omega\}$ ,

$A^*(L) = \{a_{ij} = n(a_{ir}) n(a_{rj}) : n(a_{ij}) = v_r * v_r = \rho\omega\}$  or

$A^*(L) = \{a_{ij} = n(a_{ir}) n(a_{rj}) : n(a_{ij}) = v_r = \rho\omega\}$ ,

that is, the symmetric set  $n(a_{ij})$ -arcs of  $A^*(SD_{PW})$  is vertices in  $L(SD_{PW})$ , and the  $a_{ij}$  in  $A^*(L)$  if and only if  $n(a_{ir})$  and  $n(a_{rj})$  are adjacency of vertex  $v_r$ ,

$$L(\Phi): A^*(L) \rightarrow V^2(A^*), \text{ and}$$

$$PW = \max \rho\omega = \max n(a_{ij}) * n(a_{rj}), v_i * v_j, v_r * v_r \text{ or } v_r = \rho\omega.$$

Moreover, we can be found  $L^2(SD_{PW}) = L(L(SD_{PW})), \dots, L^n(SD_{PW}) = L(L^{n-1}(SD_{PW}))$ .

Applied all definitions in the definition (1.12) and definition (1.13) in the definition (2.7).

**Definition (2.8):** The complement of change symmetric Digraph-PW

$L(SD_{PW}) = (V(A^*), A^*(L), L(\Phi))$  is  $\bar{L}(SD_{PW}) = (V(A^*), \bar{A}^*(\bar{L}), \bar{L}(\bar{\Phi}))$  with

$\bar{A}^*(\bar{L}) = \{a_{ij} : \bar{n}(a_{ij}) = PW - n(a_{ij}), i \neq j \text{ or } i = j\}$

$\bar{L}(\bar{\Phi}): \bar{A}^*(\bar{L}) \rightarrow V^2(A^*)$ , and

$$PW = \max \bar{n}(a_{ij}) = \max \rho\omega.$$

Moreover,  $L(SD_{PW}) \cup \bar{A}^*(\bar{L}) = K_{|V(A^*)|} - PW$

**Definition (2.9):** Let  $SD_{PW} = (V, A^*, \Phi)$  be regular symmetric Digraph-PW. Then we can define the change regular symmetric Digraph-PW is

$L(G_{PW}) = (V(E^*), E^*(L), \Phi(L))$  with  $V(E^*) = \{PW : PW \in E^*(G_{PW})\}$ ,

$$A^*(L) = \left\{ a_{ij} : n(a_{ij}) = \frac{|V|^2(|V| - 1)}{2} PW * PW = \rho\omega \right\}$$

$$\Phi(L): A^*(L) \rightarrow P_2(V(E^*)), \text{ and } PW = \max \rho\omega$$

**Definition (2.10):** Applied definitions (1.14) and (1.15) in the network change symmetric Digraph-PW.

**Theorem (2.5):** Applied theorems (1.12), (1.3), (1.14) and (1.15) in the network change symmetric Digraph-PW.

Clear that if  $SD_{PW} = (V, A^*, \Phi)$  is connected symmetric Digraph-PW, then

$L(SD_{PW}) = (V(A^*), A^*(L), L(\Phi))$  is connected change symmetric Digraph-PW, if  $SD_{PW} = (V, A^*, \Phi)$  has a soiled vertex, then  $S\bar{D}_{PW} = (V, \bar{E}^*, \bar{\Phi})$  or  $SD_{PW} \cup S\bar{D}_{PW}$  are connected, so  $L(S\bar{D}_{PW})$  and  $L(SD_{PW} \cup S\bar{D}_{PW})$ , moreover can be looking the change symmetric Digraph-PW  $L(SD_{PW} \cup S\bar{D}_{PW})$  has only one vertex with the loops. If  $SD_{PW} = (V, A^*, \Phi)$  has a soiled vertex, then  $L(SD_{PW}) = (V(A^*), A^*(L), L(\Phi))$  is connected.

**Definition (2.11):** The definition (1.16) define similar of definition (2.9) in the network change symmetric Digraph-PW.

**Definition (2.12):** Applied the definitions (1.17), (1.18), (1.19) and (1.20) in the network change symmetric Digraph-PW.

**Theorem (2.6):** Applied theorems (1.17), (1.18), (1.19), and (1.20) in the network change symmetric Digraph-PW.

Now, let  $\hat{G}_{PW}, \check{G}_{PW} \subseteq G_{PW}$  be Graph -  $\hat{P}W$  and Graph -  $\check{P}W$  with

$V(\hat{G}_{PW}) = V(\check{G}_{PW}), E(\hat{G}_{PW}) \cap E(\check{G}_{PW}) = \varphi$ , and  $\hat{G}_{PW} \cup \check{G}_{PW} = G_{PW}$ .

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Clear that  $\dot{G}_{PW}$  is  $L(\dot{G}_{PW})$ , and  $L^2(\dot{G}_{PW}) = L(L(\dot{G}_{PW}))$ , ...,  $L^n(\dot{G}_{PW}) = L(L^{n-1}(\dot{G}_{PW}))$  and  $\ddot{G}_{PW}$  is  $L(\ddot{G}_{PW})$ , and  $L^2(\ddot{G}_{PW}) = L(L(\ddot{G}_{PW}))$ , ...,  $L^n(\ddot{G}_{PW}) = L(L^{n-1}(\ddot{G}_{PW}))$

**Theorem (2.7):**  $S\bar{D}_{PW}, S\bar{D}_{PW}, S\dot{H}_{PW}$  and  $S\dot{H}_{PW}$  have network change symmetric Digraph-PW and

$$L(S\bar{D}_{PW}), L^2(S\bar{D}_{PW}) = L(L(S\bar{D}_{PW})), \dots, L^n(S\bar{D}_{PW}) = L(L^{n-1}(S\bar{D}_{PW})),$$

$$L(S\dot{H}_{PW}), L^2(S\dot{H}_{PW}) = L(L(S\dot{H}_{PW})), \dots, L^n(S\dot{H}_{PW}) = L(L^{n-1}(S\dot{H}_{PW})),$$

$$L(S\bar{D}_{PW}), L^2(S\bar{D}_{PW}) = L(L(S\bar{D}_{PW})), \dots, L^n(S\bar{D}_{PW}) = L(L^{n-1}(S\bar{D}_{PW})),$$

$$L(S\dot{H}_{PW}), L^2(S\dot{H}_{PW}) = L(L(S\dot{H}_{PW})), \dots, L^n(S\dot{H}_{PW}) = L(L^{n-1}(S\dot{H}_{PW})).$$

**Proof:** By the definition (2.7) the result follows.

**Theorem (2.8):** Every  $S\dot{D}_{PW}^r = (V, A_r^*, \Phi_r)$  there is  $L(S\dot{D}_{PW}^r), r = 1, 2, 3, \dots, \max d(v_i, v_j)$ .  
Moreover,  $L^2(S\dot{D}_{PW}^r) = L(L(S\dot{D}_{PW}^r)), \dots, L^n(S\dot{D}_{PW}^r) = L(L^{n-1}(S\dot{D}_{PW}^r))$ .

**Proof:** By theorem (1.20), by the definition (2.7) the result follows.

### 3. CONCLUSION

In this paper, we determined some new Networks. Furthermore, several theorems and results of these networks have been studied. In the future, we are interested in designing some new networks and then studying their topological indices which will be quite helpful in understanding their underlying topologies.

### 4. COMPLIANCE WITH ETHICAL STANDARDS

#### 4.1 AUTHORS' CONTRIBUTIONS

A. Alameri conceived of the presented idea, M. Alsharafi prepared the initial manuscript, W. A.M. Saeed developed the theory, A. Ghallab performed the computations, W. Yousef verified the analytical methods and A. Modabish supervised the findings of this work. All authors jointly worked on the results and they read and approved the final manuscript.

#### 4.2 AVAILABILITY OF DATA AND MATERIAL

No data were used to support this study.

#### 4.3 DECLARATION OF COMPETING INTEREST

The authors declare that they have no conflict of interest.

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## Factors Impacting the Environmental Consciousness of Students in Hanoi, Vietnam



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**ABSTRACT:** The environment is of particular importance to the existence and development of human life, living things and the economic, cultural and social development of the country. Currently, our living environment is being seriously polluted, it comes from many causes, the main one is human consciousness. This study aims to determine the factors that affect students' awareness of environmental protection in Hanoi city, thereby improving the education of students' awareness of environmental protection. In general, students of universities in Hanoi city in particular. Through the model PLS-SEM, the analysis results show that there are 5 main groups of factors affecting the awareness of environmental protection of students in Hanoi, including: (1) Education, (2) Culture, (3) Media, (4) Public awareness, (5) Community rules.

### 1. INTRODUCTION

In recent years, along with economic development, environmental pollution is becoming more and more serious. The greenhouse effect phenomenon has occurred frequently in recent years, the dust concentration is always 2-3 times higher than the allowable standard, the "fog" phenomenon covers many days, but it is actually smoke. dust from vehicles, from factories in and around the city; unconscious discharge of people and companies and businesses. In addition, there are other problems, such as water pollution, noise, sewage sludge, an increase in diseases related to the environment, many diseases with extremely dangerous developments that increase rapidly. This has caused frustration, reduced the quality of life of the people and caused great damage to the city's economy.

Environmental pollution is really an alarming problem, although our country has also taken measures to limit pollution. In addition, environmental protection education in schools has not been focused on teaching. The awareness of environmental protection has not been formed in the student community. Therefore, in order to protect the environment, in addition to the correct and unified direction of the government, we need to constantly educate to raise the awareness of environmental protection of the people in general and the generation of students. in particular.

In this study, we learn, evaluate and analyze the impact of factors affecting the awareness of environmental protection of students in Hanoi. This issue is of great significance, especially in the context that environmental pollution has been threatening biodiversity, climate change and many other consequences affecting the living environment and people. This study has two important contributions: (1) points out the important factors affecting students' awareness of environmental protection in Hanoi and (2) gives suggestions to help improve environment.

The structure of the study is as follows: Part 2 provides an overview of related studies; Section 3 describes the data and research methods; Section 4 presents the results of the analysis and discusses the results; Section 5 draws conclusions.

### 2. LITERATURE REVIEW

#### 2.1. Definition of Environmental Consciousness

Many researchers on environmental ethics have affirmed that the issue of protecting the living environment is the responsibility of each person, each nation, and the whole of humanity, human's attitude towards nature, consider it as the standard to evaluate human.

According to Krause (1993), environmental consciousness refers to certain psychological factors related to human tendencies to engage in pro-environmental behavior (Zelezny & Schultz, 2000). Meanwhile, Kollmuss and Agyeman (2002) define

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environmental consciousness as the level at which someone knows the impact of human actions on the environment. Judge and Krishnan (1994) stated a traditional idea that attention to environmental issues would negatively affect company performance because of spending more money. In addition, many companies whose environmental obligations are only to avoid sanctions for regulations that require them, rather than consciously caring about environmental issues. In the context of organization and business, Ahmed (1998) state that environmental consciousness is a perception held by an organization or individual about environmental concepts, such as environmental protection, policy, environmental management, and environmentalism.

The awareness of environmental protection has not been clearly formed among the people in general and students in particular. Schools with few or no trees are still common; Pupils and students throw garbage indiscriminately, and smoking when coming to school is still happening every day. Right inside some schools, although there are large trash cans, garbage is still thrown indiscriminately. Public places near schools: train stations, bus stations, markets... the phenomenon of indiscriminate littering is quite common. Wasteful use of electricity and water has also become "familiar" in schools (Chen, Huang, & Lin, 2019).

There are many different definitions of environmental protection behavior. Some well known concepts are Mai Thi Quynh Nhu (2019) explains that environmental protection behaviors are activities that keep the environment clean and beautiful, improve the environment, ensure ecological balance, prevent and overcome the consequences. harmful effects caused by humans and nature to the environment, exploitation, rational and economical use of natural resources. To understand in a simpler and more practical way, environmental protection is to protect water sources from being polluted, to protect the evils of loggers who cut down trees in violation of the law, to protect the fresh air without waste. harmful substances to the environment, etc. In short, environmental protection means protecting all that is necessary so that the environment can both meet the needs of the present generation and meet the living needs of future generations and for sustainable development. sustainability of man and human society.

### 2.2. Factors Affecting the Environmental Consciousness of Students in Hanoi, Vietnam

#### 2.2.1 Education

According to Kudryavtsev et al. (2012), the education, fostering and training of qualities and competencies to help students develop comprehensively their personality is a long and continuous process. , which takes place in many different environments, involves a lot of complex social relationships. Therefore, education always requires close coordination and cooperation of many social forces and especially requires the proper attention of schools and families.

According to Dao et al. (2019), currently, universities in Hanoi have shown interest and responsibility in educating the young generation about environmental protection awareness at universities. learn. The university lecturers also constantly improve their knowledge, professional qualifications and professional skills, and integrate the content of educating students on environmental protection awareness through each subject and lesson. In addition, students of universities in Hanoi, as a special subject in the self-education process, also make certain contributions to achieving the goal of environmental protection.

In order to educate students' sense of environmental protection, it requires a lot of attention from the University and the society. Because they are young people with enthusiasm, determination and dynamism of youth, they are the successors and future owners of the country. Educating students in a good sense of environmental protection is also protecting our lives against the harsh changes of the environment (Stapp et al., 1969).

Environmental protection activities must be regular, taking prevention as the main combination in combination with restoring pollution, degradation and improving environmental quality. Environmental protection must be consistent with regulations, natural characteristics, culture, history, level of socio-economic development of the country. Environmental protection education is a synthesis of measures to manage, maintain, use, improve, and effectively restore the natural environment, helping people and nature to have a suitable harmony (Dao et al., 2019)

*H1: The education of families and schools has a positive impact on the environmental consciousness of students in Hanoi.*

#### 2.2.2 Culture

According to Bao (2021), the Vietnamese people's sense of nature is reflected in the tradition of "harmony with nature". The traditional culture of the Vietnamese shows a strong love of nature; a dependent lifestyle and know how to take advantage of the values brought by nature, a thrifty and simple way of consumption; flexible response to all kinds of events.

The people have adapted their ways of life and behaviors to survive in their unique environment. Explain that different cultures develop different characteristics primarily because of adaptations to environments. Traditions often begin as people find rituals and routines that help them survive.

*H2: Culture has a positive impact on the awareness of environmental consciousness of students in Hanoi.*

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### 2.2.3 Media

According to Grønhøj and Thøgersen (2017), social media interactions can influence behavior. This study performed 3 interventions with messages to encourage food waste reduction. The study results showed that the media interventions as well as the e-newsletter and the control group all showed a significant reduction in customers' food waste during the study period.

Environmental communication is a two-way social interaction process that helps stakeholders understand key environmental factors, their interdependence, and how to influence issues that affect the environment. appropriately related to solving environmental problems (Grønhøj and Thøgersen, 2017)

*H3: The media has a positive impact on students' awareness of environmental protection in Hanoi.*

### 2.2.4 Public awareness

Environmental awareness is the process of acquiring knowledge and understanding through thoughts, experiences and senses. Cetin and Nisanci (2010) shows that most students are still not aware of environmental protection, thinking that the responsibility for environmental protection lies with the school and the authorities. There are some opinions that the process of environmental protection activities affects the time for study, entertainment and rest. This is partly due to the lack of documentation on environmental pollution. Therefore, it is necessary to strengthen training and raise awareness for students about the nature of environmental protection activities.

*H4: Awareness of the need to protect the environment has a positive impact on the awareness of environmental protection of students in Hanoi.*

### 2.2.5 Community Rules

Community rules refer to all rules that have been submitted by members of the open source community. A strong civil society and community rules are key agents for environmental protection (Schofer and Hironaka, 2005). Community organizations can 'push' for environmental protection and climate change. Society is demanding social responsiveness at a minimum, and the call for social responsibility seems to be getting louder and clearer.

*H5: Community rules have a positive impact on the awareness of environmental protection of students in Hanoi.*

## 3. CONCEPTUAL FRAMEWORK AND METHODOLOGY

### 3.1. Conceptual framework

From the above literature review, we build the research framework in Figure 1.

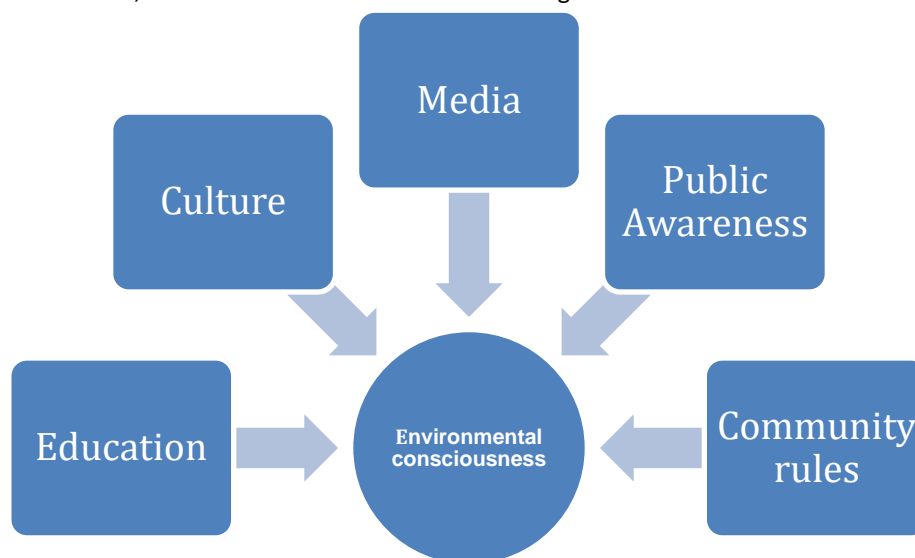


Figure 1. Research Framework

### 3.2. Sampling and analysis

The research sample was drawn from Hanoi students. Interviewees are randomly selected from the population for questionnaire administration. Face-to-face, drop-off, and phone-calling methods were employed to distribute the questionnaire. Among 725 send-out questionnaires, we receive 544 completed returns. The collected data was subsequently cleaned and analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with the aid of SmartPLS Software software.



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### 3.3. Measures

All the questionnaire items in this study were chosen from extant measures of the constructs which had proven reliabilities and validities (as reported in Section 4.2). The detailed constructs and items on our questionnaire are illustrated in the Appendix.

## 4. RESULTS AND DISCUSSIONS

### 4.1. Common Method Variance (CMV)

The bias generated by Common Method Variance (CMV), known as common method bias, appears when the estimated relationship between one construct and another might be inflated. In another word, CMV produces a systematic covariation above the true relationship between the scale items (Malhotra et al., 2017). To avoid this threat of biased outcomes in our data analysis, we employ Harman's single-factor test (Bell, 2019) to check for CMV in our data.

The results of the principal component factor analysis showed that the highest value of a single factor explained 29.68% of the total variance, which is less than the threshold of 50% (Doty and Astakhova, 2020). Hence, bias from CMV does not exist in our data and it is not a concern in our data analysis.

### 4.2. Reliability and Convergent Validity

Before studying the causal effects of variables, we first ensure the validity and reliability of the study model using the factor loadings, Cronbach's alpha (CA), factor loadings from Exploratory factor analysis (EFA), Average Variance Extracted (AVE), and Composite Reliability (CR).

Table 1 illustrates the measurement model. The CA met the recommended value higher than 0.70, the value ranges from 0.864 to 0.940. The CR ranging from 0.758 to 0.928 also fulfilled the criteria as it was above the minimum recommended value of 0.70 (Hair et al., 2019). The AVE value of the four variables was within the range 0.510 and 0.810, which fulfilled the recommended value above 0.50. The factor loadings satisfy the recommended value above 0.4 (Hair et al., 2019).

**Table 1. Reliability and Convergent Validity results**

Constructs	Items	Factor loading	Cronbach's alpha	Average Variance Extracted	Composite Reliability
Education (ED)	ED1	0.776	0.901	0.649	0.847
	ED2	0.966			
	ED3	0.812			
Culture (CU)	CU1	0.796	0.927	0.625	0.833
	CU2	0.965			
	CU3	0.775			
Media (ME)	ME1	0.762	0.864	0.592	0.813
	ME2	0.854			
	ME3	0.799			
Public Awareness (AW)	AW1	0.784	0.932	0.584	0.808
	AW2	0.871			
	AW3	0.894			
Community rules (CR)	CR1	0.883	0.939	0.624	0.833
	CR2	0.901			
	CR3	0.798			
Environmental consciousness (EC)	EC1	0.767	0.906	0.610	0.824
	EC2	0.892			
	EC3	0.840			

### 4.3 Structural Equation Modeling results

Table 2 shows the results for the path coefficient analysis of the hypotheses (H1 to H5). Among our five hypotheses in Section 2, all of them are supported by our empirical results.

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Table 2. Path Coefficient Analysis Results

Hypotheses	Causal relationships	Coefficients	S.E.	P-value
H1	ED → EC	0.089***	0.006	0.001
H2	CU → EC	0.059***	0.000	0.000
H3	ME → EC	0.118***	0.001	0.000
H4	AW → EC	0.111***	0.009	0.001
H5	CR → EC	0.030***	0.006	0.006

Note: \* is significant at 10%, \*\* is significant at 5%, \*\*\* is significant at 1%

Education has positive effects on the environmental consciousness of students in Hanoi, Vietnam. This result is consistent with findings of Özmen and Karamustafaoglu (2006). Although the environmental consciousness results from the interaction between the society and family, formal education given in this process is also important in increasing the environmental consciousness of the society. Environmental education goes beyond providing students with simple information about environmental issues. As defined in the National Project for Excellence in Environmental Education; “environmental education is a process that aims to develop an environmentally literate citizenry that can compete in our global economy, has the skills, knowledge, and inclinations to make well-informed choices, and exercises the rights and responsibilities of members of a community”.

Culture is also an important factor that drives the environmental consciousness of students. The specific cultural values of a country may determine whether concern about environmental issues actually leads individuals to engage in environmentally friendly behaviors. The results of Matthews (1995) suggest that (i) children who are without formal training and with limited access to maps are able to draw relatively sophisticated place representations and to recall their local environment in vivid terms; (ii) these maps and place descriptions are different to those of their age-sex-counterparts from Britain, which suggests that culture influences expressive style if not cognitive ability; and (3) they suggest that further studies, set within other cross-cultural contexts, are needed, if the importance of culture to environmental capability is to be understood.

Mass Media plays an important role in creating environmental awareness among people. As far as the environmental issues are concerned, media either as a risk communicator or as a promoter of data, information, and good practices of any kind, should smooth the progress of people to become more environmentally responsible and cultivate environmental awareness. Additionally, media could help people associate reasons and effects, thus to get informed and to reflect upon the given information, in order to understand the origins and the causes of the major environmental problems.

Public awareness and knowledge and society activities of environmental protection are crucial to avoid environmental pollutions. Lack of relevant scientific principles and lack of public awareness of environmental or other projects are hindrances to controlling environmental pollution. Promoting environmental awareness is a crucial part of being an environmental steward.

Community rules include empowerment of communities in matters of governance and providing them with a sense of belonging towards their community and their environment which helps foster greater sustainability of the environment and its products. Part of this involves schemes enabling communities to proactively seek to improve their local environment

### 5. CONCLUSION

This study analyzes the impact of factors affecting the awareness of environmental protection of students in Hanoi. Through the model PLS-SEM, the analysis results show that there are 5 main groups of factors affecting the awareness of environmental protection of students in Hanoi, including: (1) Education, (2) Culture, (3) Media, (4) Public awareness, (5) Community rules. The results of this study could help policy makers in enhancing the environmental consciousness of students.

### ACKNOWLEDGEMENT

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## Sustainability Report Disclosure: Analysis of the impact of company characteristics and Good Corporate Governance



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**ABSTRACT:** The value relevance of accounting information, including sustainability reports, is attractive to companies because of its impact on the company's competitiveness. Analyzing the potential factors that have an impact on the disclosure of sustainability reports can provide additional insight for stakeholders about the transparency of corporate actions to mitigate impacts and risks. Sustainability reporting in times of crisis due to the pandemic will be more important than ever to increase trust among all stakeholders. The purpose of this study is to obtain empirical evidence of the effect of company characteristics and good corporate governance on the disclosure of sustainability reports. The type of research used in this study is quantitative research that emphasizes theory testing through measuring research variables with numbers and analyzing data with statistical procedures for multiple linear regression analysis which is done with Eviews 10. The results of the study empirically prove that company size affects sustainability report disclosures while profitability, liquidity, audit committee, and the board of directors do not affect the sustainability report disclosure.

**KEYWORDS:** sustainability report, profitability, liquidity, audit committee, dan boards of directors

### 1. INTRODUCTION

The pandemic has made companies realize that the reality of the company's operating conditions has changed, while stakeholders are increasingly demanding transparency from corporate actions to mitigate impacts and risks. Sustainability reporting helps companies face the future and prepare for what will happen next. This is a positive side effect of the crisis – with companies better understanding their limitations, recognizing the need to look beyond the financial impact. Sustainability reporting will be more important than ever to increase trust among all stakeholders.

The most important thing that must be considered in reporting during and after the crisis is to ensure the reliability of the information presented. Stakeholders must be provided with transparent, balanced and complete information that is not window dressing. As the situation develops, the stakeholder's area of interest will inevitably shift. Companies that follow this change are more likely to succeed in rebuilding and retaining the trust of key stakeholders, in other words companies can sustain increased growth for their businesses.

Sustainability report is the practice of measuring, disclosing and accountability efforts of the organization's performance in achieving goals for sustainable development to stakeholders both internal and external to the company. In addition, the sustainability report is a reflection of organizational performance in economic, social and environmental dimensions which can be a medium for companies to inform their organizational performance to all stakeholders, which in turn can help organizations to set goals, measure performance and manage change in order to make the organization's operations continue. continuity. With the disclosure of the sustainability report, it is expected to steal attention in global business and is one of the criteria in assessing the social responsibility of a company. (Suharyani et al., 2019).

In Indonesia, the awareness of companies to disclose sustainability reports is still very low. Although OJK issued OJK Regulation No. 51/POJK.03/2017 in May 2017 regarding the obligation of issuers to issue sustainability reports for companies. However, the latest data from GRI and IDX shows that of 629 issuers as of April 23, 2019, only 110 sustainability reports were issued, and 815,717 small and medium enterprises (SMEs) at the Ministry of Cooperatives. Not yet registered regarding its contribution to economic, social and environmental development. (<http://www.liputan6.com/>). Especially in the Non-Banking sector where in the sectoral development of companies that disclose sustainability reports is still low. Sustainability Report,

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when viewed from the sample of this study, namely companies that are included in the LQ 45 group, there are 28.9% of companies that have not published a sustainability report during the 2016-2019 period.

Research on sustainability reports is starting to develop, indicating that many companies are starting to do sustainability reports. This is an interesting topic to research. Several previous studies have examined several factors that influence companies in the disclosure of sustainability reports. In testing several factors that affect the disclosure of sustainability reports, inconsistent results were found.

## 2. LITERATURE REVIEW AND HYPOTHESIS

### 2.1 Stakeholder Theory

Stakeholder theory explains that companies operate in an open system, interacting with various groups in society who have different demands (Rodolfo, 2012). Companies need to understand stakeholder requirements and communicate to meet the expectations of different community groups. Performance is expected to increase if the company maintains good relations with key stakeholders (Buallay et al., 2020). The business as usual expectation is that reporting will target key stakeholders, so that "stakeholders with higher power, urgency and legitimacy will be more aware of sustainability initiatives than stakeholders with lower power, urgency and legitimacy" (Peloza and Papania, 2008).

### 2.2 Legitimacy Theory

Legitimacy theory argues that companies must be seen as having values that align with society in order to operate successfully (Lindblom, 1994). Two common sustainability reporting strategies used by companies to achieve legitimacy are greenwashing and representative reporting (van Staden and Hooks, 2007). Greenwashing refers to the use of symbolic reporting to manage stakeholder perceptions without changing the underlying material. Representative reporting begins with substantive material changes in operations, with the role of sustainability reporting being to inform stakeholders of those changes. Legitimacy theory is related to stakeholder theory because companies seek legitimacy by preparing reports targeting the concerns of relevant stakeholders (Deegan, 2019).

From a business-as-usual perspective, implementing the GRI framework can add confidence to a company's sustainability report and identify key stakeholders and potential actions to strengthen legitimacy. The latest version of the GRI framework highlights the importance of materiality assessment, where companies define immaterial issues that can be omitted from their reports to justify partial reporting. In a crisis, the range of material topics changes, resulting in different topics covered in sustainability reports and variations in their performance appraisal standards. The concern is that materiality assessments allow excessive flexibility to determine what is relevant, potentially trading the needs of multiple stakeholders. Given the resources required to produce sustainability reports, the risk is that topics related to climate change could be set aside for the imminent issues related to COVID-19 (Zharfpeykan and Ng, 2021).

### 2.3 Sustainability Reporting

Sustainability reporting as promoted by the GRI Standards, is an organization's practice of publicly reporting on its economic, environmental, and/or social impacts, and therefore also including its contribution - positive or negative - to sustainable development goals. Through this process, an organization identifies its significant impacts on the economy, environment and/or society and discloses them according to globally accepted standards. The GRI Standards create a common language for organizations and their stakeholders, so that the economic, environmental and social impacts of those organizations can be communicated and understood. This standard is designed to improve global comparability and the quality of information on these impacts, thereby enabling greater organizational transparency and accountability.

Sustainability reporting based on the GRI Standards must provide a balanced and fair picture of the organization's positive and negative contributions to sustainable development goals. Information available through sustainability reporting enables internal and external stakeholders to form opinions and to make informed decisions about the organization's contribution to sustainable development goals. The urgency of the risks and threats to our shared sustainability, alongside increasing options and opportunities, will make transparency about economic, environmental and social impacts a key component of effective stakeholder relationships, investment policies and other market relationships. The Sustainability Report prepared based on the Global Reporting Initiative's Reporting Framework discloses the outputs and results that occurred in a certain reporting period in the context of the organization's commitment, strategy, and management approach. (Global Reporting Initiative, 2016b)

### 2.4 The Influence of Profitability on Sustainability Report Disclosures

Profitability ratio is one important indicator to assess the performance of a company. According to Sartono in (Tobing et al.,

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2019) profitability is the company's ability to earn profits in relation to sales, total assets and own capital. The high level of profitability (return on assets) in the company will increase the competitiveness between companies. High profitability will further increase the company's opportunity to disclose the sustainability report because they have more funds to carry out corporate social responsibility. The more social responsibility the company carries out, the more information the company can disclose in the sustainability report. (Fitri & Yuliandari, 2018). Research conducted by Oktaviani & Amanah (2019), Lucia & Panggabean (2018), and Tobing et al. (2019) have proven that profitability has a significant effect on the sustainability report :

H1: Profitability affects sustainability report disclosures

## 2.5 The Influence of Liquidity on Sustainability Report Disclosures

Liquidity is a ratio that measures a company's short-term ability to pay its maturing obligations. Short-term liabilities or debts can be met or closed from current assets that also rotate in the short term. A company with a high level of liquidity indicates that the company has strong economic performance (Fitri & Yuliandari, 2018). Thus the company provides good image to investors. The company is considered credible and trustworthy. This image will increase the number of investors who invest in the company so that it will increase the company's profit. The higher the company's profit, the higher the social responsibility activities that will be disclosed in the sustainability report in order to increase the firm's value (Fitri & Yuliandari, 2018). Research conducted by Tumewu (2017), Fitri & Yuliandari (2018) stated that the current ratio has positive effect on the sustainability report disclosures:

H2: Liquidity affects sustainability report disclosures.

## 2.6 The Influence of Company Size on Sustainability Report Disclosures

Large companies get more attention from the public. They are considered to have sufficient resources to prepare sustainability reports. Large companies face considerable pressure from stakeholders because they are expected to disclose more information. The bigger the company, it is expected the quality of the sustainability report disclosure will be better. (Dewi & Pitriasari, 2019). Research conducted by Herawati (2015), Afsari et al. (2017), Lucia & Panggabean (2018), Tobing et al. (2019), and Endiramurti et al. (2019) suggests that the company size has a significant effect on the sustainability report disclosures :

H3: Company size affects sustainability report disclosures

## 2.7 The Influence of Audit Committee on Sustainability Report Disclosures

Audit committee supervision encourages effective GCG implementation. It also encourages companies to comply with GCG principles. One of the GCG principles is transparency, where companies are required to disclose all business activities carried out and then report them. The more frequent the audit committee meetings, the more often the members of the audit committee will exchange ideas and knowledge about decisions that must be taken in the interest of all stakeholders. One example of a decision is a decision regarding corporate social disclosure. (Ria & Khafid, 2015)

H4: Audit Committee affects sustainability report disclosure

## 2.8 The Influence of Board of Directors on Sustainability Report Disclosures

The primary responsibility of the board of directors is to ensure the long-term viability of the company and to oversee management. The board of directors also has responsibility to ensure compliance with laws and regulations, including voluntary reports, namely issuing sustainability reports (Hasanah et al., 2015). Research by Tumewu (2017) and Oktaviani & Amanah (2019) states that the board of directors has a positive effect on the disclosure of sustainability reports. With the increasing frequency of meetings of the members of the board of directors, the focus of social responsibility disclosure will be more fulfilled.

H5: Board of directors affects sustainability report disclosures

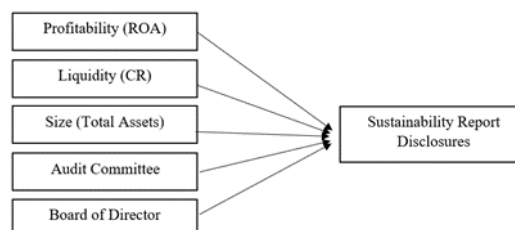


Figure 1. The Theoretical Model



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## 3. RESEARCH METHODOLOGY

This research uses causal research. This study aims to analyze the effect of company characteristics (using several financial performances) and corporate governance on Sustainability Report Disclosures. The data used is secondary data obtained from the annual reports of the LQ45 index company listed on IDX from 2016-2019 and Sustainability Reports from each company's website. Based on the results of the sample selection criteria, 18 samples were used from a total of 45 LQ45 companies.

**Table 1. Operational Variables and Measurement Scale**

Variables	Definitions and Measurements
Sustainability report disclosures (SRD)	SRD based on the Global Reporting Initiative Standards. This study uses a specific topic which consists of 77 disclosure items in the Sustainability Report, which consists of 3 topics, including 13 items on economic topics, 30 items on environmental topics and 34 items on social topics. $SRD = \frac{\text{Number items disclosed}}{77}$
Profitability (ROA)	Profitability of the company is measured using Return on Assets (ROA). The ROA is computed by dividing net income with average of total assets.
Liquidity (CR)	Liquidity of the company is measured using Current Ratio (CR). The CR is computed by dividing current assets with current liabilities.
Company size (SIZE)	The size of the company is measured using the natural logarithm of total assets of the company in the end of year t.
Audit committee	Number of audit committee meetings during the year
Board of directors (BoD)	Number of board of directors meetings during the year

The research period from 2016 to 2019 is 4 years, totals 72 data sample. The data analysis method used is multiple linear regression test which is done with Eviews 10. The model specification to test hypotheses is as follows:

$$SRD = \alpha + \beta_1ROA + \beta_2CR + \beta_3SIZE + \beta_4AUD + \beta_5BOD + e$$

## 4. DATA ANALYSIS AND HYPOTHESIS TESTING

Descriptive Test. Based on the results, the descriptive statistics shown in Table 2 were obtained.

**Table 2. Descriptive Statistics**

	SRD	ROA	CR	SIZE	AUD	BOD
<b>Mean</b>	0,291389	0,066111	1,683472	3228,722	17,13889	45,65278
<b>Median</b>	0,260000	0,030000	1,310000	3202,500	18,00000	37,00000
<b>Maximum</b>	0,860000	0,470000	4,620000	3489,000	45,00000	282,00000
<b>Minimum</b>	0,060000	-0,010000	0,280000	3039,000	4,000000	14,00000
<b>Std. Dev.</b>	0,168224	0,091475	0,993442	143,2056	10,84371	37,45163

The descriptive statistics of the data is shown on Table 2. It can be seen that the SRD has the average of 0.291389. This value shows that on average, the SRD of the sample companies is still very low at 29%. ROA on average has a value of 0.06611 or 6.6% this means that the effectiveness of the use of assets in generating profits is quite good, which is already above 5%. Audit Committee meeting has the average of 17 (minimum value of 4 in a year), this value shows that number of audit committee meetings are beyond the minimum value of 4 in a year.

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Table 3. Results of hypothesis test

Variable	Coefficient	Prob.
C	4,843783	0,0131
ROA	-0,361195	0,6862
CR	-0,070088	0,3728
SIZE	-0,001945	0,0009
AUD	0,006972	0,2848
BOD	0,001536	0,4111

The hypothesis test (the t-test) indicate that profitability (ROA) has a significance level of 0.6862, which is greater than 0.05. This shows that profitability does not have significant effect on SRD, so hypothesis 1 (H1) is rejected. Furthermore, liquidity (CR) has a significance level of 0.3728, which is greater than 0.05. This shows that profitability has no significant effect on SRD, so Hypothesis 2 (H2) is rejected. The company size (SIZE) has a significance level of 0.0009, which is less than 0.05. This shows that company size has a negative and significant influence on SRD, so hypothesis 3 (H3) is accepted. The audit committee (AUD) has a significance level of 0.2828, which is greater than 0.05. This shows that audit committee does not have significant effect on SRD, so hypothesis 4 (H4) is rejected. The board of directors (BOD) has a significance level of 0.4111, which is greater than 0.05. This shows that BOD has no significant effect on SRD, so Hypothesis 5 (H5) is rejected.

## 5. DISCUSSION

Based on the results of statistical tests in table 3 above, shows that the influence between the independent variables on the dependent variable is as follows:

*Profitability (ROA) does not affect SRD.* The results of this study are not in line with stakeholder theory which explains that high profitability can increase the extent of disclosure. This can be triggered because the disclosure of sustainability reports requires large costs but the benefits are not directly received by the company according to Saputro in (Indrianingsih & Agustina, 2020). When profitability is high, companies tend not to report SDR because of increasing company costs. In reaction to a decrease in profits, companies will reduce social activity and focus on increasing profits, thus causing less social and environmental information to be disclosed. This does not support stakeholder theory, which states that all stakeholders have the right to be given information about how organizational activities affect them because the company's survival is strongly influenced by the support provided by stakeholders. (Doktoralina, et. al., 2018).

*Liquidity (CR) has no effect on SRD.* Liquidity does not affect the practice of sustainability report disclosure because creditors focus more on financial performance than additional information on social and environmental activities through sustainability reports. The results of this study support research conducted by Lucia & Panggabean (2018) and Oktaviani & Amanah (2019).

The results of this study indicate that *the size of the company has an effect on the SRD*, but has a negative effect. Things like that can happen because large companies already have a good image in society and have gained legitimacy. This condition can mean that large companies will not always disclose more about their social and environmental performance to convince stakeholders and the community. (Diono et al., 2017). This is in accordance with research conducted by Diono et al. (2017), Hardika et al. (2018) and Hidayah et al. (2019).

The audit committee has no effect on SRD. The audit committee prioritizes its duties in terms of monitoring financial statements rather than disclosing social and environmental information, so that the audit committee does not affect the disclosure of sustainability reports. The task of the audit committee here is to analyze the accounting policies applied by the company, assess internal controls, analyze external reporting systems and compliance with regulations (Tobing et al., 2019). This result is in accordance with research conducted by Lucia & Panggabean (2018), Tobing et al. (2019), and Oktaviani & Amanah (2019).

The results of this study indicate that the board of directors has no effect on the SRD. Companies that apply GCG only to comply with regulations, not out of necessity. Thus, the frequency of board of directors meetings does not describe conversations discussing social responsibility, but discusses other company performance measures, especially financial performance (Indrianingsih & Agustina, 2020). This result is in accordance with research conducted by Lucia & Panggabean (2018) and Indrianingsih & Agustina (2020).

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## 6. CONCLUSION

Based on the results of hypotheses testing on the five independent variables, only company size affects SDR. The other four variables, profitability, liquidity, audit committee, and BOD do not have an effect on SDR. The author recommends that further research test other profitability factors, namely ROI and ROE. In addition, a greater number of samples and years could be examined. This reveals that company management appears not to be focused on social and environmental activities and requires further studies regarding variables that support the government's intent.

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## The Mind Map at the Service of Learning



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**ABSTRACT:** Mapping is a technique that helps students organize their knowledge about a topic or idea. This term, also known as heuristic diagram, cognitive map, the English psychologist Tony Buzan or Anthony Peter Buzan developed concept map or «mindmapping», during the 1970's.

This technique allows for a freer, non-linear organization of information, and is often suitable for students with a visual approach to data. It is also very useful for students with learning disabilities. In this subject, we distinguish two major concepts: "mind mapping" and "mind map".

In this work, we present a theoretical outline on the "mind mapping", the "mind map" and the difference between these two concepts, and then we are interested in the elements that can influence understanding, meaning and learning as well as the different mind map applications.

In the end, at the practical part, which concerned a sample of 38 students from the first year of the Scientific Baccaureate, we concluded in this research, that the visual convivial structuring aspects of mind maps help struggling students who have difficulty concentrating in class and understanding information presented in large blocks of text. However, in general, the mind map is a relevant tool for all students, since it allows them to very easily create review sheets.

**KEYWORDS:** mind map, learning, mind mapping, mind map.

### I. INTRODUCTION

Professor Abd El hakim Serge Danler Baumgartner; Organizer and facilitator of educational seminars; Specialized in cognitive development; Teacher of the mental map for more than 10 years answers us:

"A cognitive development tool, the mind map installs useful skills for studies, professional and personal life.

For about 10 years, pupils and students who have used it have been ahead in terms of learning efficiency compared to their peers. On a personal level, it allows you to build self-confidence because you feel in control of your subject and at ease during your presentation. The heuristic scheme is to be used in all circumstances. "

It is very difficult to learn and recover key knowledge and skills when only a limited amount of information is retained at a time. Working memory is an executive function that allows us to hold information in our minds while we use it. It is also crucial during the process of storing information in long-term memory. It plays a key role, too, in retrieving previously learned information from memory.

In fact, the majority of the "work" performed by memory takes place in "working" memory where information is managed, manipulated and transformed. The capacity of working memory differs from one individual to another.

Students with working memory problems retain less distinct information at a time. They listen to what is said, or see what is presented, but as additional information overwhelms their memory system, they forget the prior information they need to complete the task successfully. In addition, once the information is lost, it is unlikely to be recovered.

It is therefore easy to understand why the student becomes frustrated and ends up paying no attention. However, working memory problems are common among students with attention to the deficit hyperactivity disorder, learning disabilities, hearing loss, brain injury or mental health issues.

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How memory problems present for students:

- Having difficulty remembering facts and procedures such as new vocabulary words, or mathematical procedures.
- Demonstrate slowness in retrieving information.
- Proving unable to follow instructions despite their repetition.
- Paying little attention to detail, for example, starting to write a sentence and then having trouble remembering all the words, skipping words in sentences, or writing shorter sentences (to reduce load on working memory).
- Make mistakes in the order to be followed, by losing track of the steps completed or the steps that remain to be completed, by repeating steps unnecessarily or by constantly having to start over.
- Having difficulty starting a job.
- Having difficulty concentrating on a task, often to the point of abandoning it.
- Lose their personal effects.

The mind map is an interesting technique that helps students bring out and organize their knowledge on a subject matter or a main idea. This is the strategy of mental maps or "mindmapping". This term, also known as a mind map, cognitive map, or concept map, was developed in the 1970 by English psychologist Tony Buzan.

It is now established that using a mind map can help students organize their ideas and gain a better understanding of the concepts involved.

Indeed, mind mapping, allows a freer and non-linear organization of information, is often better suited to students who prefer a visual approach to data. Mind mapping is also recognized as being of great use for students with learning disabilities, In the literature, we find two concepts related to mental maps; the "mapping of the mind" and "the map of the mind", in English, "mind mapping" and "mind map" respectively.

In the theoretical part of this project, we present an overview of the theory relating to mind mapping, of the mind map, and the difference between these two terms, as well as the functioning of the brain. We are also interested in the elements and factors that can influence the understanding, the meaning and the learning resulting from all the theories presented.

## II. THE MIND MAP

According to Tony Buzan, the inventor of mind mapping, a mental map or "mind map" is a visual and graphical tool that can be applied to all cognitive functions, especially memory, creativity, learning and all thought forms. It is in a way the "Swiss army knife of the brain".



The mind mapping theorist, Tony Buzan, explained in the 1970s that the mental map favors the stimulation of the right hemisphere of the brain (linked to creativity, to the spirit of synthesis), as well as its cooperation with the hemisphere left (seat of rationality, logic and language).

### A. The difference between "mind mapping" and "mind map".

In the literature, the border is very blurred between the concept of mind map and that of mind mapping, their characteristics are often confused.

We take as a postulate that the mind mapping is in the action, the doing, the design while the mind map is the final product on.

Mind mapping is a technique, a process which follows development rules and which aims to produce a mind map.

In French, the mind map or heuristic map is a tool, which makes it possible to graphically represent ideas, concepts, and to show the relations as well as the hierarchy which exist between them.

The mind map is a graphic representation where words, ideas, drawings, colors, etc. are related.

It is reading done, starting from the center where the general theme is inscribed; it is developed in a tree structure.

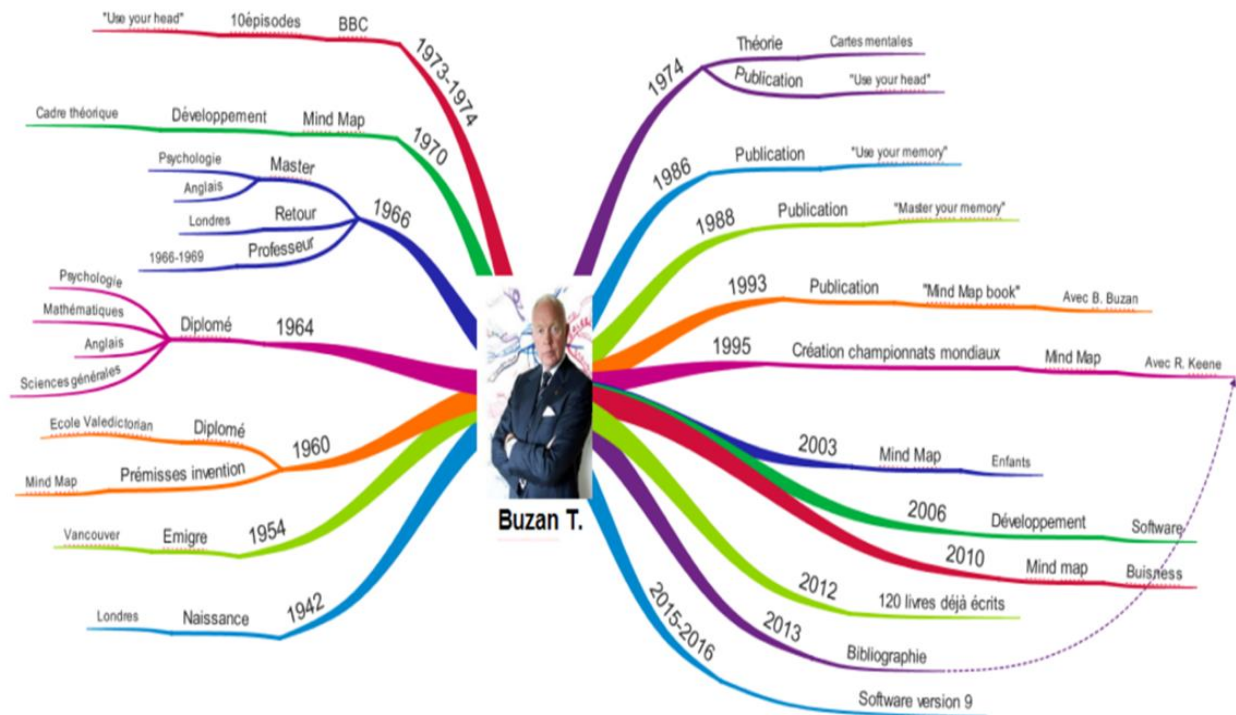
Its objective is to bring out the information and to structure it by creating links, by installing a hierarchy.

The mind map is both an analysis tool, because it highlights all the elements and links of the theme by organizing everything (left hemisphere) and a tool of synthesis allowing the reader an overview (hemisphere right).



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### B. The biography of Tony BUZAN in the form of a mental map.



### III. MIND MAPPING AND THE TWO HEMISPHERES.

#### A. The mental map and the brain: how to solicit the two hemispheres.

Located under the skull, the brain is the largest part of the nervous system. It weighs about 1.35 kg and consists of two hemispheres: left and right. For there to be optimal brain management in an individual, there must be a synergy between the two hemispheres.

Many folds or convolutions increase the outer surface of these hemispheres and constitute the cerebral cortex. Its thickness is barely 5 mm and its surface is around 0.1 m<sup>2</sup>.

Each hemisphere is divided into four lobes: the frontal lobe, the temporal lobe, the occipital lobe and the parietal lobe.

The left hemisphere controls the muscles on the right side of the body, the right hemisphere controls those on the left side: This is the principle of contra-laterality.

Equally distributed over the two hemispheres, primary sensory areas receive sensory information from the sense organs: hearing, sight, smell, taste and touch.

Near the primary sensory areas, associative areas integrate information from different sources. The sensory areas also follow the principle of contra-laterality. On the other hand, the two hemispheres distribute the main intellectual functions differently. The left hemisphere plays an important role in language. This hemisphere is also responsible for logical and mathematical operations. It will process verbal memories (rational).

As for the right hemisphere, it seems to specialize in image processing (recognition of images and shapes), spatial perception, artistic abilities as well as the emotional dimension of language and bodily expressions. It will process visual memories (intuitive).

The corpus callosum, located deeper, connects the two hemispheres. However, even if the two hemispheres have a recognized dominance in certain areas, they are both competent in all areas.

We thus note the importance of soliciting the two hemispheres during the same task, the same learning process in order to optimize the performance of the brain. The two hemispheres will thus work in synergy.

## The Mind Map at the Service of Learning

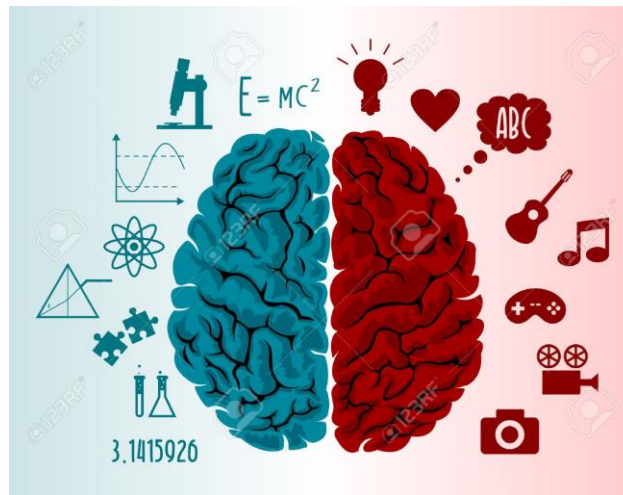


Fig 1. Two hemispheres

If the two hemispheres interact together, they will create a greater performance or even a "response" other than the sum of the performances produced separately by the hemispheres taken in isolation.

We can already sense that mind mapping can cause this synergy, the two hemispheres being solicited, during the development and memorization of the mental map.

### B. Links between characteristics of the two hemispheres, mind mapping, and the mental map.

The different links between the characteristics of the two hemispheres, mind mapping, and the mental map are:

- The primary sensory areas are distributed over the two hemispheres. This is where sensory information is received. In mind mapping, hearing and sight are very much in demand. In the mental map, the view is at the center of the activity, solicited by the tree-like presentation.
- Associative areas integrate information from different sources. In mind mapping and the use of the mental map, the links and the creation of meaning are essential and are made as one reads from the main branch to its sub-branches.
- The left hemisphere (words, logic, details, and links) is used more during mind mapping.
- The right hemisphere (drawings, overview, and presentation in tree form) is more solicited when reading the mental map.
- Mind mapping and the mental map solicit the two hemispheres to different degrees.

### C. Mind mapping and brain function

Sight is greatly solicited when "reading" a mental map or when memorizing it. This is why we wanted to understand how a student's brain works when processing visual information.

Let us take the example of a stimulus materialized by a red right-angled triangle. This visual information is routed via the neurons of the optic nerve and other complex pathways to the primary visual sensory area, which receives the impulse and makes a rough analysis: "We see a colored shape".

The influx is then routed to the adjacent associative area where the detailed analysis of the information will be done by comparison with the information stored in this area and which constitutes the visual memory:

- Analysis by information  $\implies$  It is a polygon with three sides triangle  $\implies$  Analysis by comparison: a right angle  $\implies$  A right triangle.
- Color analysis by comparison  $\implies$  its red.

The influx also ending in the associative areas of the other lobes, this will allow, "imagining" a red right-angled triangle.

In addition, visual information also travels to the prefrontal lobe, which may help plan the response in relation to visual stimulation.

- I see the red right triangle  $\implies$  I know it's a polygon, a red right triangle  $\implies$  I decide for example to draw an additional branch to the mind map or to memorize the main branch and the sub-branches

### D. Mind mapping and neurons

According to Buzan, the mental map mimics the functioning of the brain. This is made up of one hundred billion cells exclusively intended to circulate information: neurons. In this part, we therefore approach the structure of the neuron, its ability to circulate information: the influx. Finally, we will focus on the means of communication between neurons: the synapse. We want to highlight the fact that the mental map has been developed to imitate as much as possible the neuron whose essential role is to circulate information.

## The Mind Map at the Service of Learning

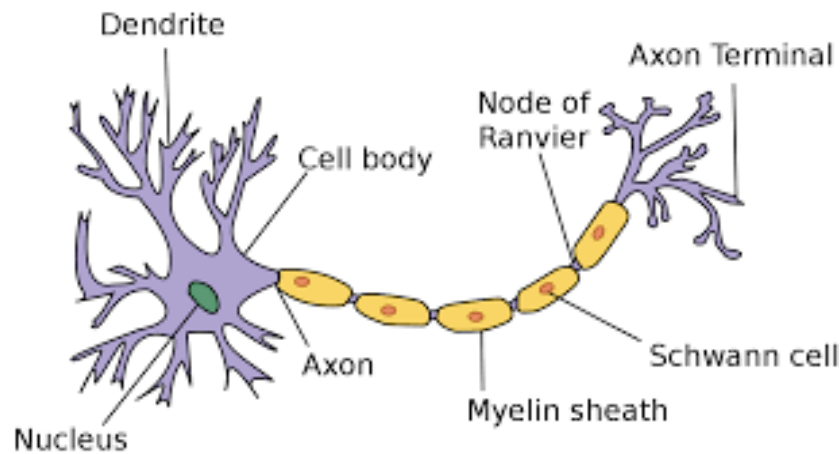


Fig 2. Structure of a neuron.

- **Nerve impulse**

When the membrane of the neuron undergoes a stimulus, movements of ions are triggered across this membrane at the stimulated site. Since ions move, there is therefore an electric current. The latter induces the same movement of ions step by step along the membrane to the ends of the neuron: this is the nerve impulse.

- **The synapse**

At the level of the terminal nerve corpuscles of a neuron, information is transmitted to another neuron by a specialized area called the synapse.

The synapse is made up of:

- From a terminal nerve corpuscle belonging to the presynaptic neuron and containing vesicles filled with neurotransmitters.
- From a synaptic cleft: free space between the two neurons.
- From a portion of the membrane of the post-synaptic neuron.

Information passes from the transmitting neuron (presynaptic neuron) to the receiving cell (post-synaptic neuron) via neurotransmitters. When the nerve impulse triggered at the level of the presynaptic neuron arrives at the terminal nerve corpuscle, it triggers the release of neurotransmitters at the level of the synaptic cleft.

These neurotransmitters then place themselves on receptors located on the post-synaptic membrane. This has the effect of triggering movements of ions on this neuron and therefore of propagating the impulse. The same mechanism of synaptic activity occurs at the level of other neurons, thus making it possible to establish more or less complex nervous circuits, along which one or more pieces of information circulate.

More than one hundred neurotransmitters have been listed and are involved in different types of synapses.

Acetylcholine is the most used neurotransmitter in learning and memorization mechanisms. Similarly, glutamic acid plays an important role in long-term memory.

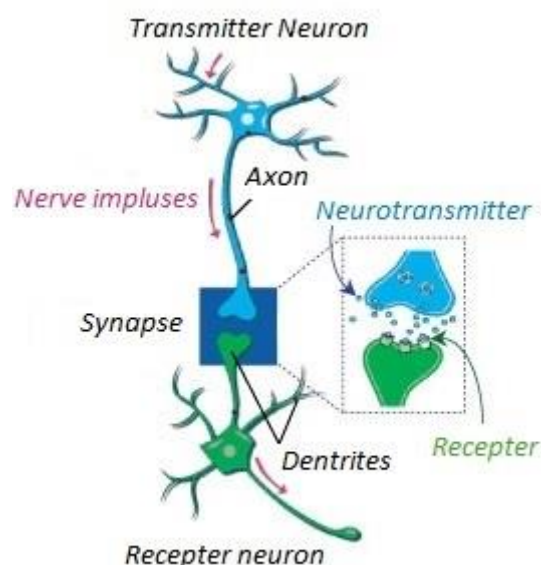


Fig 3: Synapse

## The Mind Map at the Service of Learning

By way of conclusion, the essential role of a neuron is to circulate information: from a transmitting neuron/presynaptic neuron to a receiving cell/post-synaptic neuron via neurotransmitters.

Indeed, the brain, as being a blank page, in front of a set of information will try to format them.

He then looks for a structure that makes sense; he organizes, prioritizes, creates links and tries to fill in the blanks.

### E. The mental map and memorization mechanisms

Memory is the ability to store and access information. How can the establishment of synapses between neurons and the flow of impulses along nerve circuits explain memory activity? In other words, how to do mind mapping or use a map; map promotes memorization?

We can argue that the mental map can be a facilitating tool during memorization. Indeed, it was developed to best imitate the mechanism of the brain: the neural pathway.

It allows a structured approach, promotes repetition and therefore the easy retrieval of information.

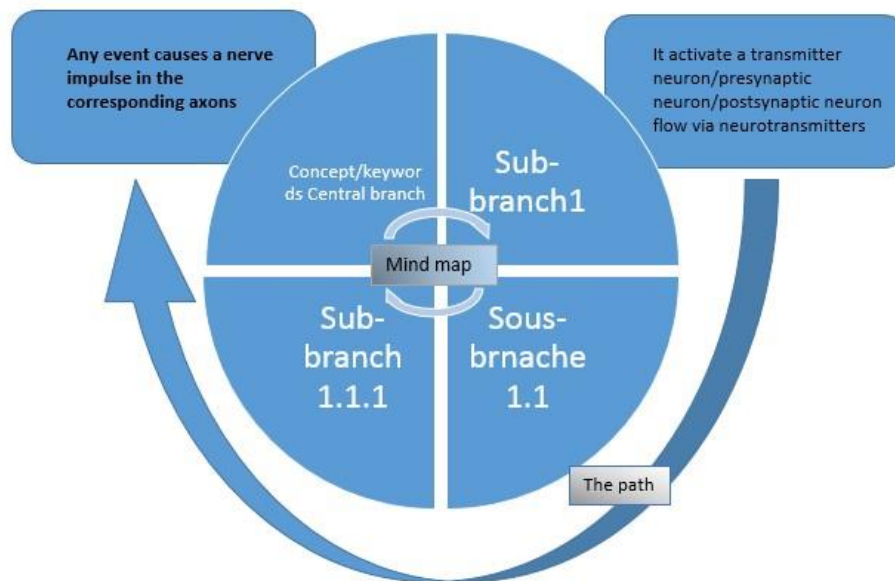


Fig 4. The mental map and memorization mechanisms

Significant solicitation (repetition) is required to begin to build traces of learning. The importance of intense stress favors the repeated propagation of nerve impulses.

The mind map is, by design, a tree structure, a tool that promotes repetition and therefore learning (long-term memory).

Mind mapping itself can initially use short-term memory, but when the student creates branches, looks for links, it causes repetitions and the beginning of learning.

Finally, it should be noted that mind mapping and the mental map, through their methodology and their representation, could contribute to increasing motivation, arousing interest and increasing self-confidence (positive emotion).

This allows the limbic system to pass information to the cortex so that there is learning.

## IV. TABLE CONSTRUIRE UNE CARTE MENTALE

### A. The mental map and memorization mechanisms

#### A.1. The paper medium

If we wish to widen our field of vision, we will choose the panoramic format (known as "Italian" or "landscape") because it is more suited to our anatomy.

In practice:

- We use the sheet of paper in landscape format.
- We use a blank paper of lines and squares so as not to be influenced by a constraining structure.

#### A.2. The Heart of the Map

Our visual system itself, the retina in particular, is based on the principle of central vision, the fovea, and peripheral vision. This system allows us to examine both accurately while observing the surrounding space.

In practice:

## The Mind Map at the Service of Learning

- We put the subject right at the center, which allows us to have a 360° space to spread our ideas or information.
- We use at least three colors and give it a size of around five cm in five cm for A4 format.
- We do not enclose the theme in a square or a rectangle. At most, we prefer a vaporous form like a cloud.

### A.3. Branches

The branches are the expression of a flow, which is expressed by a cascade of ramifications. We are therefore dealing with a structure of fluid and plastic connections. The proximity to the center induces a radiant hierarchy in the service of a more globalizing than sequential approach.

In practice:

- Our branches have an organic aspect, that is to say borrowed from the shapes of nature. They are curved and oblong
- We give them a length identical to that of the word they support, so that when reading, a space does not interfere with the meaning given to their connection.
- We distribute them harmoniously in the space, in order to obtain a clear structure that is pleasant to look at.

### A.4. Keywords

Words are indeed signs, which, like images, carry information.

However, reading words preferentially requires the resources of the left cerebral hemisphere, which is more analytical and precise, attentive to detail and respect for rules.

Words can, however, also be treated as images depending on how they are represented. We use the term "keywords" because they are intended to open to other words or images.

We can consider the keywords used in a map as clues that reveal information, which from an observation, an object, will weave a web made of links leading to a certainty or at least to a likely guess.

In practice:

- We choose keywords for their ability to evoke useful information.
- We write the keywords very legibly on the branches so that they can be understood quickly with a simple glance, because a card is scanned more than it is read.
- We strive to put only one keyword per branch, so as not to lock ourselves into sentences, which are often definitive.
- A keyword may be an expression grouping together several words. The important thing is to only express one idea or concept at a time.

### A.5. Images

"A picture is worth a thousand words". We could also say that a picture can evoke more than a thousand words.

The image emulates the right cerebral hemisphere, which manages emotion, imagination, globality, analogy. It is a medium that quickly brings us to the essentials of what to grasp. Our society makes frequent use of it, especially in the press where the drawing allows us to understand a complex political or economic situation, or at the level of signage to make us understand not to use a mobile phone in certain places, thus tempering the aggressiveness of a prohibition written in full.

In practice:

- We choose simple but evocative images. Regardless of our talent as a designer, the image has no other vocation than to evoke the information to which it must connect us.
- Our images can represent a concept, for example memory or a material thing. The context conditions and reinforces the meaning we want to give it. If we draw an elephant's head, it could represent the concept of memory (from the expression "to have an elephant's memory") or the animal itself.
- To enhance the impact of our images, we use color and shadow and relief effects.

Colors

The colors are able to make a part of the map homogeneous and at the same time to highlight a particular information. Its use can be used to establish a hierarchy and transversal links and its properties promote readability as well as memorization. Color stimulates the senses and contributes to the pleasure of making and using a map.

In practice:

- We preferably reserve a different color for each main branch.
- We use a particular color to highlight a type of information, for example red for encrypted information or emergencies.
- We can give a meaning to each of the colors used, which may be different depending on the cards.



## The Mind Map at the Service of Learning

### A.6. The style

If each of us has a writing style, this is even more true for mind maps, given the multiplicity of materials used. The letters, the designs, the shape of the branches, the color preferences, the material used, all of this contributes to the expression of our personal style. The efficiency of a mind map also depends on the pleasure we have in looking at it.

In practice:

- We use emotion (humor, exaggeration, astonishment, etc.) and movement through lines that evoke it, so that the information contained is apprehended by as many senses as possible.
- We cultivate our style by building a library of personal images, easy to reproduce
- We are inspired by mind maps produced by other practitioners.
- We observe nature (trees, flowers, crystals, rivers) but also human constructions. Our whole environment can be a source of inspiration.

Equipment

If a simple pencil and a sheet of paper are enough to make a mental map, the users of this tool are often concerned about their equipment, a bit like craftsmen for their tools. The choice of material contributes to the pleasure we have in making cards. Everyone will have their preference for such paper, such pencil, such pen, such brand of marker...

In practice:

- We test and try, papers, pencils, pens in order to choose those with which we are most comfortable.
- We choose equipment that is compatible with our environment. Unpacking in a board of directors his case of colored pencils can reserve us some surprises. We will prefer our fountain pen; we can color our map later. It will be a great opportunity to make it our own again.

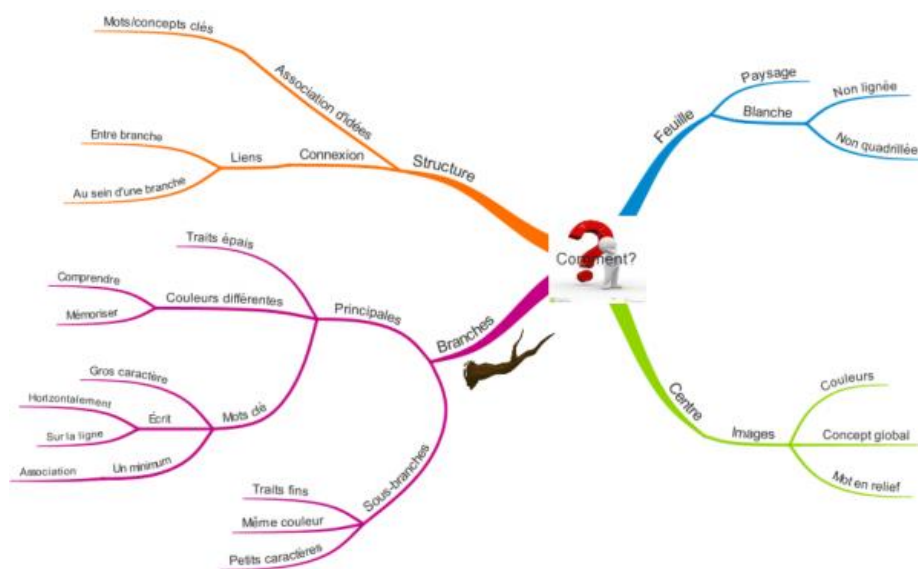


Fig 1. How to Create a Mind Map

### B. Mind-map applications

The mental map does not only have a purely pedagogical vocation. It can be used in everyday life when developing projects, to set goals to achieve, to solve problems. This approach also makes it possible to organize self-assessments and self-regulations. Mind mapping also allows taking notes, organizing information according to the logic of each individual. The latter elaborates it by analyzing the data, by creating a hierarchy between them. Taking notes under this graphic representation makes it possible to propose a tool that diverges from the linear predominance.

- Highlighting concepts, keywords: they are not lost in a flood of words.

Thanks to its polychrome appearance, monotony due to chromatic uniformity and lack of relief is avoided. On the other hand, attention is solicited and interest is amplified.

Saves time: researching keywords avoids dwelling too much on the details.

Stimulation of the brain: it tries to make connections, to create meaning... it is constantly looking to fill in the "blanks", and create new possibilities.



## The Mind Map at the Service of Learning

The mind-map can also be used for



Fig 5. Other applications

### C. Build a mind map with software

#### C.1. Advantages of computer-made maps

Advantages of computer-made maps with dedicated mind mapping software:

- Rapid learning of the software with keyboard shortcuts (when you know a software, you intuit the others).
- Rapid modification of the structure: we change the side branches, we add / delete some.
- Instant change of keywords.
- Library of symbols and codes to catch the eye. Links to information located in different places: documents on my computer, web pages. Deployment/folding of branches and sub-branches, for example according to the needs of a presentation.
- Map that can span one or more other interconnected maps.
- Computer-made maps often "cleaner" than hand-drawn ones, therefore easier for others to understand.
- Teamwork on the same card, on remote computers.

#### C.2. Mind map software

All these dedicated software allow:

- FLEXIBILITY - to add, delete, move ideas.
- COLORS - to use colors to isolate branches from each other, to emphasize an idea, to identify relationships between ideas, to brighten up the map.
- ILLUSTRATIONS - to insert images of the software or those gleaned from the Web to capture attention and facilitate memorization, sometimes without having to read the idea. The symbols and codes of the software, or those that I invent, remind me that I must seek an answer, perform an action, communicate with a comrade, etc. It is not necessary to insert an image for each idea.
- LINKS - to link ideas to:
  - One of my files (opens associated program).
  - A web page (opens a browser);
  - Another one of my mind maps.
- CLOUD - to put a main idea and its sub-ideas in a cloud to make it stand out, or to put all the main ideas in a cloud in order to isolate them from each other (not very aesthetic in my opinion).
- ANNOTATIONS - to enter annotations about certain elements of the map for which I must deepen my research, consult a person, etc.
- EXPORT - to export my maps:
  - In PDF format;
  - As a png, jpeg, svg image...
  - In one of the Microsoft software: Word, PowerPoint...;
  - On my website (fixed or interactive maps).

## The Mind Map at the Service of Learning

I limit the size of my map; the branches must not exceed four levels. If the map becomes too crowded, I narrow my topic or produce another map (linking it to my first map).

### C.3. Software selection criteria

- Here are the criteria for choosing the software we offer:
- Their free in whole or part of the solution
- Simple and intuitive use.
- The possibility for most of them to integrate media, photos, videos...

### C.4. List of software selected according to these criteria

- Free mind: the free software reference is very easy to use.
- Lucid chart: The solution for creating mind maps and other diagrams (flowcharts, flowcharts, decision tree, etc...). It has many features including the ability to import previous creations from Word, PowerPoint and others. A free and unlimited version is available for teachers and students.
- Free plane: created from the source code of free mind, it offers a more playful graphics and is part of free software.
  - Xmind: not free but with a free solution: more up-to-date graphics with very practical themes and templates for formatting. Good general ergonomics.
  - Edraw: many formatting possibilities and creation of mental maps but rather intended for people who master Excel.
  - Framindmap: here it is not a software but a completely free online service for creating a mind map. A clean design, no media to integrate but great ease of use. Ideal for making a mindmap with children.
  - Thinkmapping: after an online registration, this site offers you a multitude of blank mind maps.
  - Coggle: its particularity is the possibility of creating mindmaps in collaborative mode. Once your card has been created, all you have to do is share your notes and cards with whoever you want by sending them an invitation directly from the application. Your contacts will even be able to modify them.

If the creation of mental maps by your child himself is still too complex, first offer him turnkey maps that will familiarize him with this tool. When he is more comfortable with mind, he can then start making them himself.

### C.5. Mind Map in Physics

A mind map is a way of organizing ideas that allows you to structure knowledge, implement an approach, approach a new concept and facilitate note taking.

In order to better understand the educational advantages of mind maps in the physical and chemical sciences, several examples of maps organized according to their contribution are offered.

#### ✓ The advantages and disadvantages of the teaching method by having used it in physics lessons:

Using the mind map the student:

- Has a permanent vision of the central theme
- Sees ideas build around this theme (which is not possible with oral brainstorming)
- Can come back to a previous idea to complete or question it
- Understands the association of ideas according to the group
- Participate in the construction of the course
- Associates the image with its representations and key words, which will increase its memorization skills by using the right brain.
- Has a global vision of the elements of the course
- The time required to write the course in class is shorter

The students copy the mind map made on the board

- The more they are used to the technique in class, the more they copy it simultaneously (24/26 students do it after 3 months) and spontaneously
- Otherwise, they are offered a time to copy it into their notebook
- Students appreciate the colorization of their lessons. They personalize their course, which will facilitate memorization

#### ✓ The reaction of parents

Some parents of students wanted to meet me to talk to me about the teaching method I use, the feedback from their child is very positive:

- Better memorization of lessons

## The Mind Map at the Service of Learning

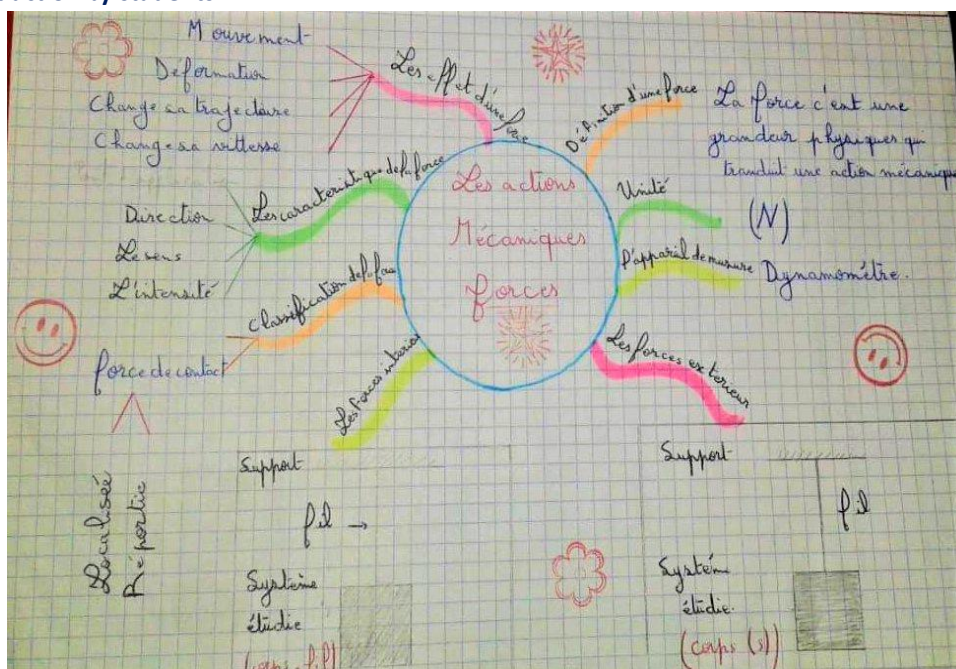
- Improved academic results
- Pleasure of their child during lessons
- Increased motivation

### ✓ Disadvantages

Not all mind map features are used:

- The mind map is copied by the students in landscape format, but in a notebook in portrait format
- The pupils do not use a white sheet without a line or else it is a question of changing habits...
- The use of keywords is only possible when the student has acquired solid writing skills.
- The oral questioning of several students seems necessary and useful to me after the presentation, to check that they are able to replace the key words in elaborate and complete sentences, which they really like!
- My experience shows that students know how to reconstruct a complete and personal sentence during homework.

### ✓ Examples: production by students



## D. APPLICATION

### D.1. Mathematical

#### ❖ Part 1. stated

The context in which the educational system is set up is in the first year of the Scientific Baccalaureate.

Having different classes in different high schools in Casablanca during our internship, we choose to set up an educational device based on the use of heuristic diagrams in one of them.

This allows us to analyze the benefits, advantages and obstacles of our device and to what extent students will enjoy using it.

This choice of class will arise at the high school Chawki, provincial direction Casa-Anfa in Morocco for a month. We teach, function study, for five hours a week for 2 weeks.

During the exercise sessions, and in the presence of our internship supervisor, we introduced the notion of mind mapping to the students.

#### **The objectives set for our mathematics course:**

- Students are used to studying their notions of theory in a textbook as well as their class notebooks. They discover, thanks to heuristic diagrams, a new way of synthesizing concepts not in a linear way but in a tree-like way.
- When creating their diagrams, the student prioritizes the themes into sub-themes according to the meaning, according to the processing of information, elements...
- This phase allows the student to raise the key words, to understand them and to integrate them into a tree representation.
- Mind mapping invites the student to look deep into his knowledge and his already-there (previous patterns) for information, it also encourages him to make associations (create meaning) in order to enrich each theme or sub-theme with the aim of not leaving any "blanks".

## The Mind Map at the Service of Learning

- The student, during mind mapping, starts from a main concept and processes it, analyzes it in order to create links, meaning between each branch. The student may also discover, as he creates his mind map, that certain elements he needs to enrich a sub-theme may belong to another sub-theme. This allows him to discover similarities, differences, he thus deepens his knowledge.
- The individual creation of his own mind-map allows the student to more easily appropriate the concepts as well as the links uniting them. Indeed, the mind map forces the student to focus on the meaning because without it, it is impossible for him to develop this diagram. This approach asks the student to question himself, to revisit his own knowledge and to challenge the teacher so as not to leave any term understood. Meaning is therefore the common thread.
- In addition to links, meaning, motivation and understanding of concepts, if we propose to develop these mind maps, the student is in a process requiring the repetition of keywords, links, meaning, etc... The repetition provokes the beginning of the memorization, which it deepens during the study of the mind map. It is easier for a student to remember what he has built himself.

Finally, the approach to mathematics in a new form and the development of a new tool for memorizing arouses in the student and interest in “doing math differently...” Once interest has been aroused, the student dares to try it out.

### The session of Thursday, December 6, 2018 2:30 p.m. to 4:30 p.m.

First we started with a theoretical session about mental maps lasting an hour, then we moved on to another practical session, taking the course on functions as well as the Barycentre as a support for develop a map that summarizes these courses. These maps were collected for the study on compliance with the criteria.

In order also to allow students to appropriate mind mapping, we suggest that they create at home a heuristic diagram of their life, who are they? The only constraint imposed is to respect the rules of mind mapping and the development of at least five main branches. The concepts found on the main branches are therefore not imposed. Each student is free to approach the concepts that are important to him.

### ❖ Part 2: Study of mental maps produced in class according to the criteria.

#### Sample

We have a sample of 38 students in the first year of the Scientific Bacallaureate, with 25 girls and 13 boys.

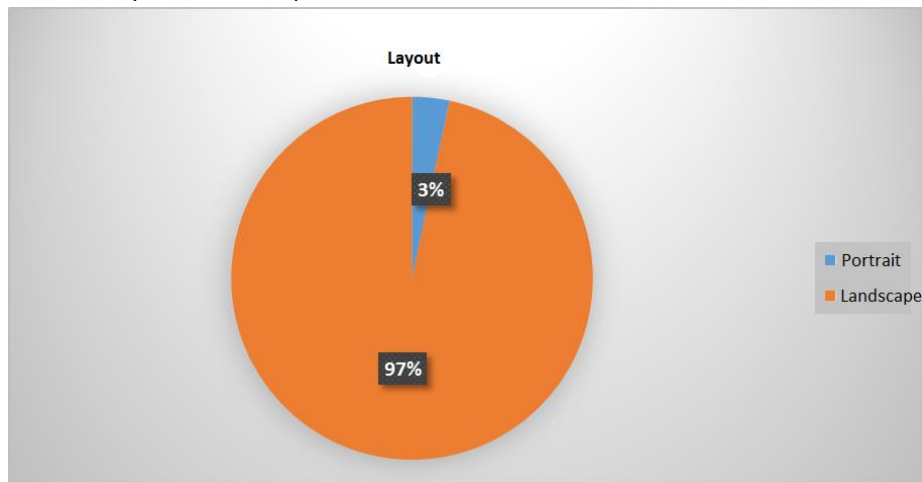
The whole class having taken the same course on functions with the same teacher.

After collecting the 38 mind maps, a study is conducted according to the rate of compliance with the criteria presented below:

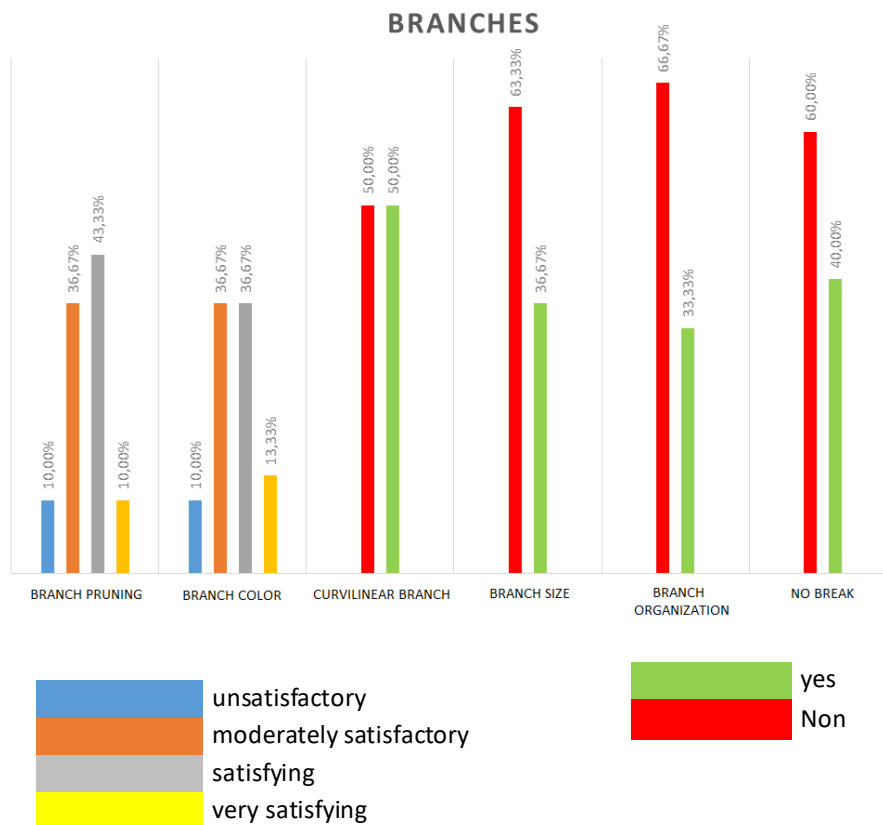
Criterion Mind map paper out	indicators
digital Layout	Landscape, Portrait
Central theme/concept	Position the heart of the card Well- proportioned size (ex. 5cm square for an A4 sheet) text or picture, the font used or chosen picture...
Branches	Branch size, color, font and picture chosen, spacing between branches, curvilinear branches, branch size equals word size, clockwise branch arrangement, no break between the branches....
Key words	Choice, uppercase font, one word/branch, horizontal writing, location on branch, phrases, branch size equals word size
Colors	Harmony, maximum of 5 to 6 colors/card, the color of the ramifications is identical to the mother branch....
Pictures, icons, symbols	Integration, Adequacy, definition, size, clarity, source, location.
Weaving links between the branches	Integration
Visualization	Arrangement, spacing between branches, general aesthetic
Hypertext links for digital map	Integration, functional, good Adequacy
originality	Creativity

## The Mind Map at the Service of Learning

We present, in statistics, the study of mental maps in 30:

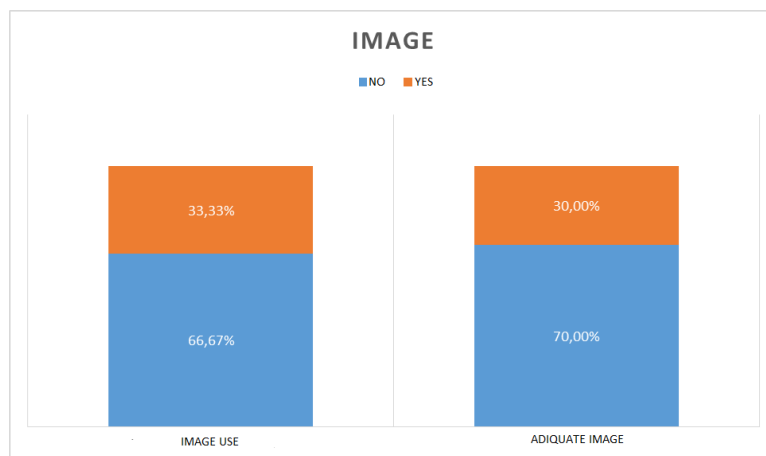
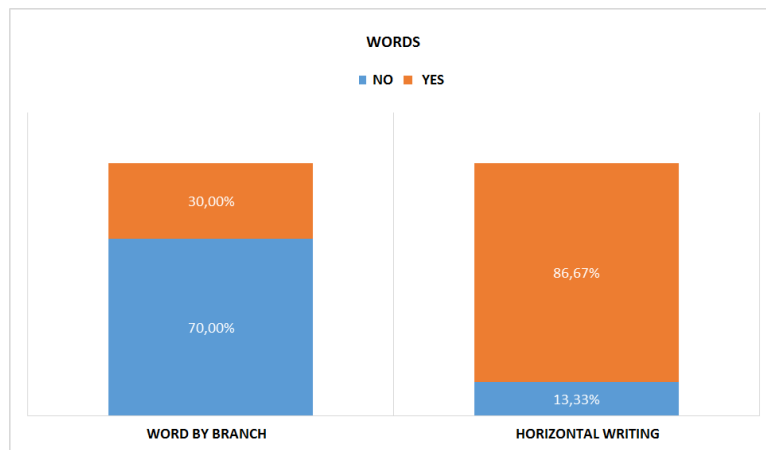


- Only one person used the sheet in portrait format.

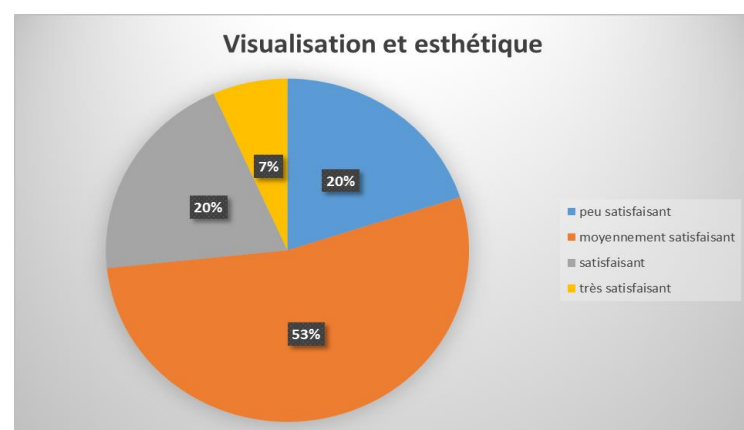
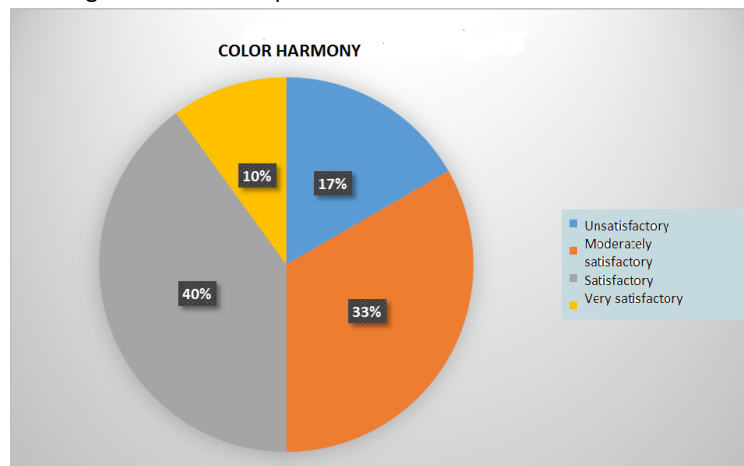


The different criteria on the branches were evaluated, including the size of the branches, their shapes, the breaks as well as the choice of color. It can be seen that almost the same percentages that pass one index of the criterion pass the others. Hence the correlation between the different elements of the criteria on the branches.

## The Mind Map at the Service of Learning

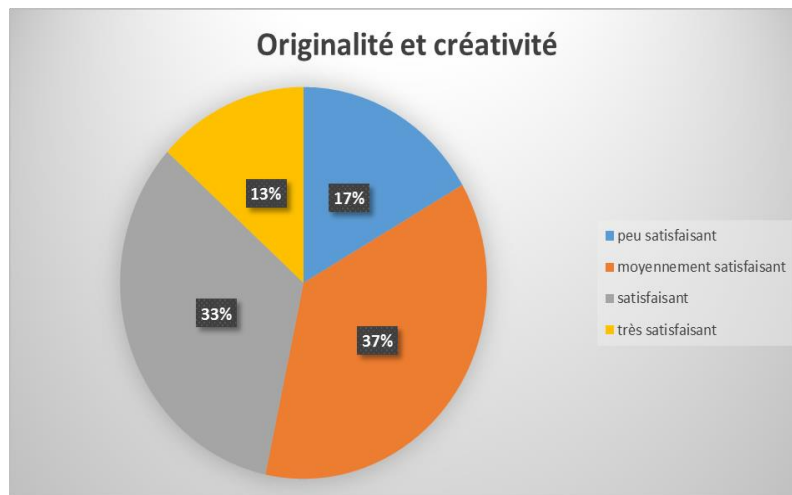


It can be seen that almost all the images used are adequate with a deviation of 3%





## The Mind Map at the Service of Learning



Finally exposing us statistics on the color harmony rate; visualization and aesthetics to close the evaluation on originality and creativity, which is thus one of the objectives of this educational tool.

### ❖ Part 3: Student feedback via the “feedback” questionnaire

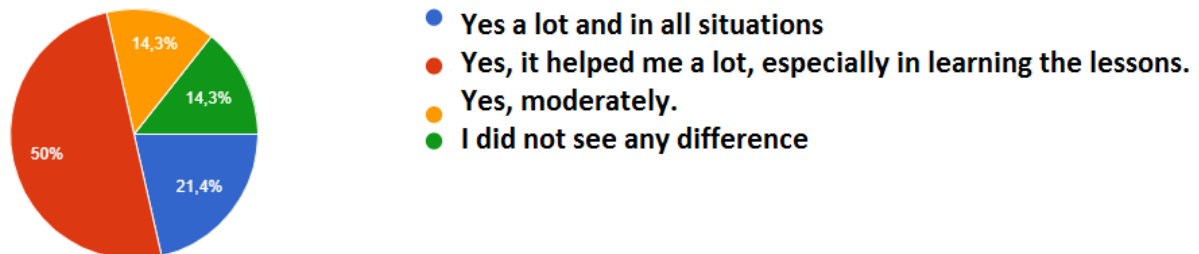
We wanted to discover the impact that the use of mind maps could have on students during the development of lessons, the effects of its use during memorization as well as note taking.

For this, we wanted to observe how the students used the mind-map and determine the interest and pleasure they found in this technique.

After a week on the introduction of mind-map, we quote their answers on a questionnaire dedicated to study the impact of the maps on their motivation:

**In general, do you think that working with mind maps has been useful for you?**

14 answers



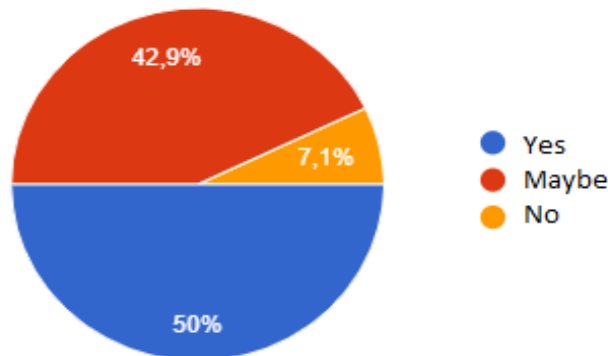
**In your opinion, have these cards brought you any help and if so which one?**

11 answers

Yes they help us learn the lessons and spoke easily  
 To learn my lessons  
 Facilitates data storage  
 They will help to develop our ideas  
 Learn lessons faster  
 She helps me fix the information after I learn it  
 For summary or revised  
 Yes it helped me to be sure of my revision  
 During the class

### Do you plan to continue using mind maps :

14 answers



### If so, in what specific cases?

10 answers

Review
To make summaries of my lessons
Learn my lessons
Lesson summary
To learn history and geography easily
Planning
Especially in communication
Review
To make summaries of my lessons

### Sentez-vous un plaisir de travailler avec la carte mentale vos cours ?

13 answers

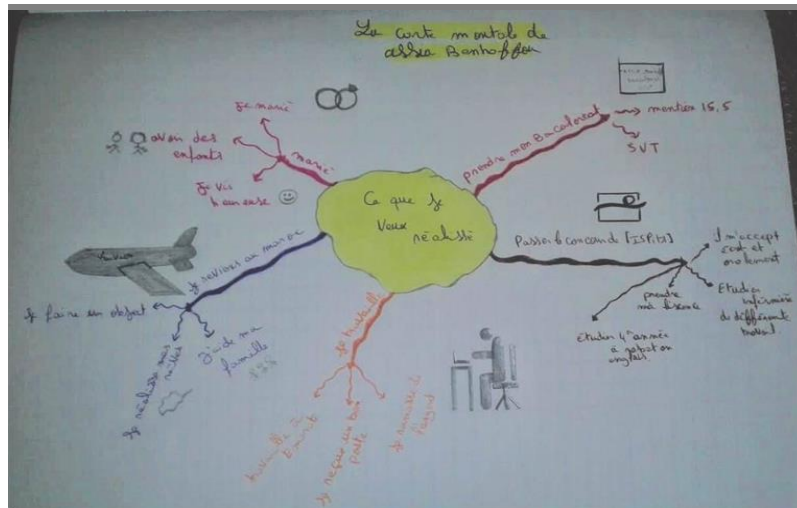


After a global reading of the questionnaire, we present, in a few words, the answers of the pupils.

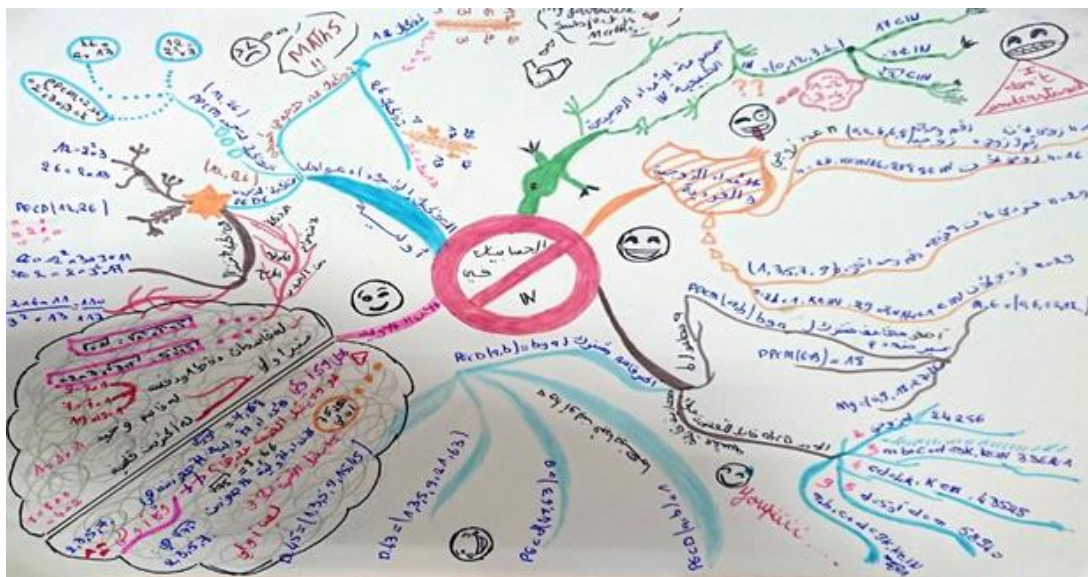
Examples of student mind maps (Common core science / 1st scientific baccalaureate):

Personal heuristic diagram

## The Mind Map at the Service of Learning



Heuristic scheme in mathematics



## V. CONCLUSION

The visual, user-friendly, structuring aspects of mind maps help struggling students who have difficulty concentrating in class and understanding information presented in large blocks of text. But, in general, the mind map is a relevant tool for all students, since it allows them to very easily create review sheets.

However, the map cannot be reduced to this exclusivity because it also functions with language, order, rationality, logic... So many functionalities supposed to be managed by the "left" hemisphere. The map is one of the few tools that combine the simultaneous use of our two hemispheres in perfect synergy.

It allows, therefore, a harmonious rebalancing in the use of our two hemispheres, which condition our vision of the world.

In addition, those who practice the map, reconnect with the pleasure of discovery in everyday life.

Our end-of-training work, "The mental map at the service of learning in the Moroccan system", aimed to show a "photograph" of what mind mapping, the mind map could bring to the learning of mathematics. .

The work is to be considered as a draft answer. The results and the tools that emerge do not claim to be generalizable, to be set in stone. It is a reality resulting from a set of subjects, at a given moment, through their experience, their History.

This reality has allowed us to read, to translate the impact of mind mapping, of the mind map in a mathematics-learning device both from the analysis of the criteria respected. The treatment of the material quickly showed us the relevance of the choice of our theme. We quickly discovered a correlation between the use of the mind map, mind mapping and the increase in the rate of success and concentration.

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## Development of an Android Application-Based Marketing Management Information System for FIK UNY Tennis Courts to Increase the Promotion



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**ABSTRACT:** This research is development research with the 4 D approach model, namely: define, design, develop, and disseminate. Data collection techniques were obtained from observation, interviews, and questionnaires. The subjects of this study were users of FIK UNY tennis courts which included permanent users, Selabora coaches, Selabora students, parents of Selabora students, UNY Tennis UKM, incidental users, and tennis court management admins of FIK UNY. Research data analysis techniques were obtained from questionnaires that had been filled in by media experts, material experts, and tennis court users at FIK UNY.

The results of this study are an android-based FIK UNY tennis court marketing management application product. The feasibility level of this product is known through the material expert validation assessment with the Very Eligible category, while the results of the media expert validation assessment with the Eligible category. This product also went through a small-scale test, and a large-scale test, with the results of the two-scale tests in the Very Eligible category. The results of the validity test with a value of 0.875 and the reliability test were obtained with a Cronbach's Alpha value of 0.618, so it can be concluded that the instruments that have been compiled are declared valid and reliable. Based on the results of the effectiveness test, shows that the calculated g value is 0.5072,

**KEYWORDS:** development, information systems, marketing management

### INTRODUCTION

In today's digital era, the use of technology or information systems is needed by companies, organizations, agencies, offices, and even Small and Medium Enterprises (SMEs) that find it easy to run the administration, including administration, service, marketing, and promotion. Incorporating marketing on social media as part of an overall business strategy can have great benefits for organizations (Dwivedi, Kapoor & Chen, 2015). The best strategy for business people is internet marketing because it is more profitable and effective in the new normal era, whether utilizing social media, applications, or websites by utilizing smartphone technology.

Many companies use technology to plan and implement business via smartphones (internet) which can make it easier for consumers to buy and sell products or services in all places (Tannady et. al, 2018). Consumers can get what they want without going to the nearest store and can find what they want without difficulty through internet services (applications or websites) via smartphones and get offers easily (Sharma and Bahl, 2019). Smartphones have become part of people's lives, making it easier, more efficient, and effective if marketing or promotional strategies are carried out digitally through applications or websites because people rely heavily on smartphones for their daily business activities.

Advances in information technology not only help people's lives get better every day but also support the global business. The use of information technology through information systems will not only improve the quality and timeliness of information produced by management, but with the right information technology, it can create information technology as one of the relevant factors helping businesses penetrate new markets to be innovative and produce new products and services. which helps the growth of businesses and companies. Management information systems are one of the most important achievements in the field of administrative work, which aims to provide reliable, accurate, relevant, and complete information to managers to improve organizational performance (Yaser et. al, 2014).



# Development of an Android Application-Based Marketing Management Information System for FIK UNY Tennis Courts to Increase the Promotion

The use of technology or information systems by the marketing department of a company is very much needed after the Covid 19 pandemic in recent years. Today, sport is not just a game or a hobby, it is also an industry that has created many businesses in combination with other fields such as medical engineering, psychology, nutrition, information technology, tourism, marketing, etc. (Rahimi & Alidoust, 2019).

Today, sport is not just a game or a hobby, it is also an industry that has created many businesses in combination with other fields such as medical engineering, psychology, nutrition, information technology, tourism, marketing, and others. Sports marketing activities consist of people, activities, businesses, and organizations producing, facilitating, promoting, or organizing any product for the request of supporters. , to facilitate student activities and public interest in sports, UNY has one of the sports facilities to be proud of, namely the UNY FIK Tennis Court. Supported by the existence of complete and adequate facilities such as a prayer room or place of worship, toilets, changing rooms, canteen, integrated parking lot, as well as a large tribune on the outdoor court, and judging from the location of the FIK UNY tennis court which is very strategic because it is in the city center and located in campuses, schools, institutions and companies, there is a lot of potentials that can be improved in the management of tennis courts at FIK UNY to increase income generating. Service quality and customer satisfaction are very important concepts that must be understood if you are to remain competitive and thrive, in today's competitive environment providing high-quality services is the key to sustainable competitive advantage. FIK UNY tennis court management also provides several affordable rental packages for institutions, students, workers, or the general public by obtaining complete facilities and national standard courts. Even though the FIK UNY Tennis Court has national standard facilities, the management of member data and financial accounting still uses conventional methods, for example, the member database is still stored in Ms. Excel.

## METHODS

This research uses the type of Research and Development (R&D) with the development of the 4 D Model (Define, Design, Develop, and Disseminate). The products developed are then tested for feasibility with validity and product trials to find out how far the promotion has increased after using marketing media/applications.

Product trials were carried out in 2 stages, namely small-scale trials and large-scale trials. Small-scale trials can be conducted on 4 or 5 respondents from outside the population. Furthermore, large-scale trials can be carried out on 15 to 50 respondents from the community/members/prospective users of FIK UNY's tennis court facilities. Data collection uses several methods, namely: (1) Observation, (2) Interview, (3) Questionnaire. The instrument used to collect data in testing the development of this product is to use a non-test instrument. Analysis was carried out by calculating the percentage of eligibility.

## DISCUSSION

### Results

#### 1. Initial Product Development

##### a. Defining (Define)

In the initial product development, the defining stage is carried out to determine and define the needs in the media design process as well as gather various information related to the product to be developed. This stage is divided into several steps, namely the initial analysis stage. At this stage, the results of observations and analysis that have been carried out, the management of the FIK UNY tennis court has not maximized the internet/online network to promote facilities and services on the FIK UNY tennis court. In the concept analysis stage identification, detailing, and drafting of concepts are carried out to complement the parts of the media to be developed, then the concepts are arranged systematically and linked to other relevant concepts. At the analysis stage of marketing media objectives,

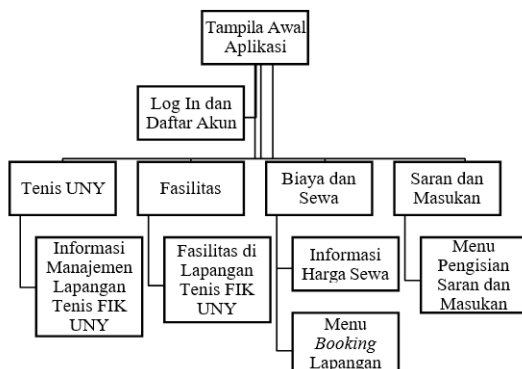


Figure 1. Marketing Media Concept for FIK UNY Tennis Court



# Development of an Android Application-Based Marketing Management Information System for FIK UNY Tennis Courts to Increase the Promotion

## b. Design (Design)

This design stage aims to design a marketing medium that can be used by the characteristics of users on the UNY FIK tennis court. The preparation of the test is carried out based on the analysis of the concept and the elaboration of the objectives of the application development. The development of the media in this study is the marketing media for FIK UNY tennis court management. The choice of format is expected to help users make it easier in the court rental process, make it easier for the general public to know the training programs and facilities offered, and as an effort to increase the promotion of FIK UNY tennis courts on social media/online. The initial design of the application that will be developed to help improve the promotion of the FIK UNY tennis court is the initial appearance design, facilities, rental rates, and contacts.

## 2. Product Trial Results

Expert Validation The material for this research is Dr. Ahmad Nasrulloh, M.Or., and Dr. Abdul Alim, M.Or. with the following validation results:

**Table 1. Material Expert Validation Test Results**

Validators	Aspect	value that Obtained	Score Maximum	Percentage
Material Expert 1	Android application	48	50	96 %
Material Expert 2	Android application	47	50	94 %
Average				95 %

Judging from the overall results of the average expert validation assessment of the material, it can be concluded that the application development in this study obtained an assessment of 95% in the Very Eligible category. Media expert validation for this research is Dr. Sulistiyono, M.Pd., and Martono, M.Or. with the following validation results:

**Table 2. Media Expert Validation Test Results**

Validators	Aspect	value that Obtained	Score Maximum	Percentage
Media Expert 1	Android application	44	50	88 %
Media Expert 2	Android application	40	50	80 %
Average				84 %

Media expert 1 validation results on the aspect of the android application obtained 88% results in the Very Eligible category, then the material expert 2 validation results obtained 80% results in the Eligible category. Judging from the overall results of the average media expert validation assessment, it can be concluded that the application development in this study obtained an assessment of 84% in the Very Eligible category

A small-scale trial was conducted on 10 respondents, and the results of the overall average rating resulted in an assessment of 91.2% in the Very Eligible category for the development of this FIK UNY tennis court marketing application for media to support management promotion. The results of the overall average assessment of the 5 aspects in the FIK UNY tennis court marketing application obtained pre-test results of 83.44% in the Very Eligible category and post-test results obtained 91.84% in the Very Eligible category.

**Table 3. Pre-test and post-test large-scale test results**

No	Aspect	Pre Test Score	Percentage Pre Test (%)	Post Test Score	Percentage Posttest (%)
1	Application Features	615	19.65	681	19.77
2	Place	626	20.01	686	19,92
3	Price	415	13,26	462	13,41
4	Product	635	20,29	688	19.98
5	Promotion	838	26,78	927	26,92
Total Rating Score		3129	100	3444	100
Score Maximum	3750		83,44		91.84

# Development of an Android Application-Based Marketing Management Information System for FIK UNY Tennis Courts to Increase the Promotion

## 3. Product Revision

After validating the android application by material experts and media experts as well as testing it on users (respondents), there are several suggestions and input obtained to improve the android application. Based on the results of the assessment of the android application by material experts 2, suggestions were given for better, more precise, and attractive attachments to make them look clearer and tidier. Based on the results of the evaluation of the android application by media experts 1, suggestions were given for adjusting the color and layout of the menu icon to be more consistent. Based on the results of the evaluation of the android application by media experts 2, suggestions were given for naming the application, adding a schedule for field users, displaying hourly rental prices and photos used for the application are the most recent photos,

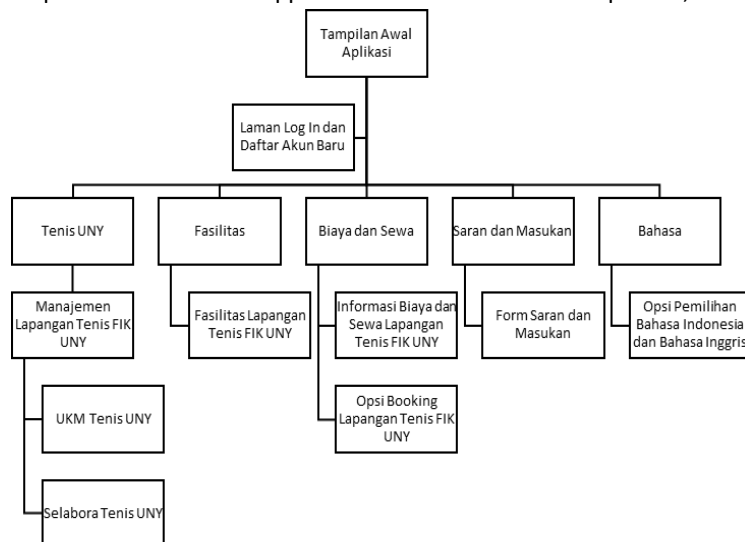


Figure 2. The Final Product Concept of UNY FIK Tennis Court Marketing Application

## 4. Assessment Instrument Reliability Validation Test

According to Arikunto (2010), a validity test is carried out to find out whether the measuring instrument has accuracy in making measurements, or in other words whether the measuring instrument can measure what is to be measured. This validity as stated by Lawshe with CVR and Aiken becomes Aiken's V Index, these two indices are based on the results of the expert validator's assessment of n on an item regarding the extent to which the item represents the construct using a formula to calculate Aiken's validity coefficient with the following formula:  $V = \sum S/[n(c-1)]$  To assess the validity of the test items assessed, the results of the V count should be compared with the value of the V table at the 5% level of significance scale. The reliability test that has been carried out shows the results of the Cronbach's Alpha value of 0.618,

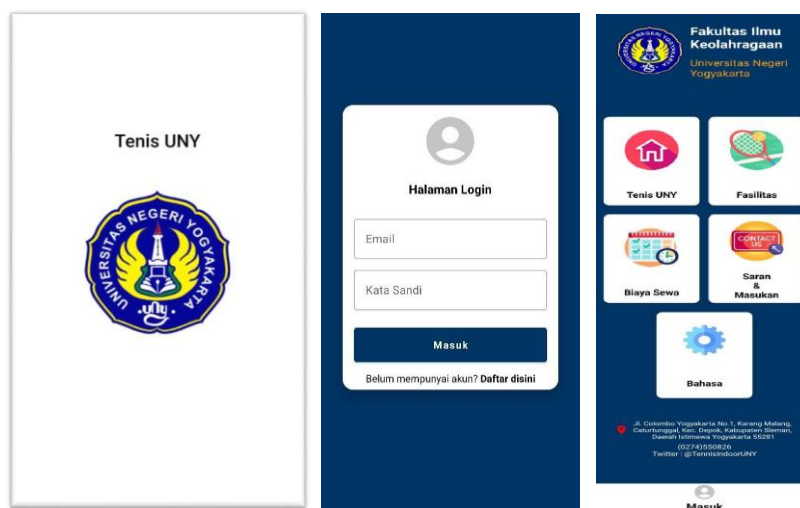
## 5. Product Effectiveness Test Results

An increase in the value given by respondents indicates that the application used as a media to support the promotion of the FIK UNY tennis field is effective for use with a pre-test rating of 83.44% in the Very Eligible category and the post-test with an assessment of 91.84% in the Very Eligible category. It can be concluded that the development of this application is very feasible to be developed for use by the community.

## 6. Final Product Review

The final product in this study is an android-based application that aims to increase the promotion of tennis courts at FIK UNY. This application will make it easier for people to rent tennis courts.

# Development of an Android Application-Based Marketing Management Information System for FIK UNY Tennis Courts to Increase the Promotion



**Figure 2. The appearance of the Final Product of the UNY FIK Tennis Court Marketing Application**  
Remarks: 1) Initial Page Display; 2) View of the login Page; 3) App Home Page Display.

## DISCUSSION

This research was conducted to develop an android-based FIK UNY tennis court marketing management application as an information system marketing tennis court services. A marketing information system is a computerized system designed to provide an organized flow of information to enable and support an organization's marketing activities (Ghafoor, 2006). The strategic function of marketing is being emphasized more because Internet-based technologies have enabled a radically new approach to selling in which information technology for the first time touches customers and provides new ways to gather marketing information. In a knowledge-intensive economy, the ability to collect, analyze, and act on marketing information faster than the competition is a core competency from which competitive advantage flows. Marketing information systems provide the information technology backbone for the strategic operations of marketing organizations (Schmidt, 2017).

Marketing information systems serve collaborative, analytical, and operational needs. In a collaborative mode, marketing information systems allow managers to share information and work together virtually (Nurgraha, 2017). The application was developed based on collaborative needs in the form of information on training programs at FIK UNY tennis courts, facilities obtained by users, information on rental prices, and facilities for ordering courts through the application.

In developing a comprehensive framework for a marketing information system, other areas must be considered. These sections are database, customer, marketing research activity, market segmentation, and marketing dashboard (Kingdom et al., 2018). Based on the development of the framework, the validation is from material experts and media experts.

At the validation stage by material experts, an average percentage of 95% was obtained in the Very Eligible category, while the media expert test results obtained an average percentage of 84% in the Very Eligible category. The results of the material and media expert tests that have been carried out show that the Android-based FIK UNY tennis court marketing management application developed is stated to be Very Feasible to be developed and used as a support for FIK UNY tennis court promotion media so that it can attract consumers and potential customers quickly (Park et al., 2018; Ritz et al., 2019).

There are suggestions and inputs during the validation stage of material experts and media experts, for example selecting more updated facility attachments, information on rental prices for hourly field usage, naming applications, setting attachments to be consistent between landscape and portrait on the facilities menu, color adjustments and the layout of the menu icon is also more consistent, the selection of attachments and fonts is adjusted to the layout of the application and with the latest attachments according to the conditions of the tennis court. After revising the results of the validation of material experts and media experts, trials were then carried out on a small and large scale.

In small-scale and large-scale trials, respondents assessed 5 aspects of the application regarding the usefulness of the application in promoting the UNY FIK tennis court. The five aspects are Application Features, Place, Price, Product, and Promotion. A small-scale trial was conducted on 10 respondents, and the results of the overall average rating resulted in an assessment of 91.2% in the Very Eligible category for the development of this FIK UNY tennis court marketing application for media to support management promotion.

The results of the trials that were carried out on 50 respondents obtained different results during the pre-test and post-test, namely that there was an increase in the number of values given by the respondents. An increase in the value given by respondents

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indicates that the application used as a media to support the promotion of the FIK UNY tennis field is effective for use with a pre-test rating of 83.44% in the Very Eligible category and the post-test with an assessment of 91.84% in the Very Eligible category. It can be concluded that the development of this application is very feasible to be developed and used by the community. The participation of users in application development is the basis for this pre-test and post-test. This is following other studies, (Ratnasingam et al., 2021).

Research conducted by Machado et al. (2020) showed a positive relationship between product presentation including the marketing mix and promotion on application use, as well as a positive influence between product presentation, promotion, and use of applications on customer purchase intentions. In line with the research above, this study obtained the percentage of eligibility for media promotion from 83.44% to 91.84%.

When testing the validity, the V score was obtained with the lowest value range of 0.875 and the highest was 1 greater than the V table score using 4 expert judgments with 5 alternative scales at a significance level of 5% of 0.80. The calculated V value is 0.875 to  $1 \geq$  the V table value is 0.80 and it can be stated that the research instrument compiled is valid.

Cronbach's Alpha Reliability Test with SPSS on the assessment of 10 assessors of the instrument developed showed a Cronbach's Alpha value of 0.618, so it can be concluded that the questionnaire that has been compiled is declared reliable or consistent with the results of Cronbach's Alpha  $0.618 \geq 0.60$ . Furthermore, based on the results of the effectiveness test, showed that the calculated g value obtained a result of 0.5072, compared to the g table value, indicating that the level of effectiveness of using the FIK UNY tennis court marketing application to increase promotion obtained results in the Medium category with indicators  $0.7 > 0.5072 > 0.3$ .

### CONCLUSIONS

Media development in this study resulted in a product in the form of a Marketing Management application for FIK UNY tennis courts which aims to increase the promotion of FIK UNY tennis courts. Based on the results of the effectiveness test, showed that the calculated g value obtained a result of 0.5072, compared to the g table value, indicating that the level of effectiveness of using the UNY FIK tennis court marketing application to increase promotion obtained results in the Medium category with indicators  $0.7 > 0.5072 > 0.3$ . FIK UNY tennis court management can apply it in a sustainable manner and with improvements to the UNY Tennis Marketing Management application to be used as an operational means of leasing and promotion.

### RECOMMENDATIONS

The results of this study can provide several suggestions for FIK UNY tennis court management, including the following:

1. FIK UNY tennis court management can apply it sustainably and with improvements to the UNY Tennis Marketing Management application to be used as an operational means of leasing and promotion.
2. Users can make it easier to choose a court rental through the application and can get the latest information about the FIK UNY tennis court.
3. Researchers can always update existing features and adapt them to developments in tennis court management at FIK UNY.
4. For further researchers, this research can be used as a reference or literature review.

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## Anticholesterol Bioactive Peptides from Bromelain Hydrolysates of Mangrove *Sonneratia alba* Protein



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**ABSTRACT:** Cholesterol with high levels in blood vessels can cause atherosclerosis, stroke, and sudden heart attack. Isolates soy protein have bioactive peptides that have the potential as anticholesterol. This research aims to determine the optimum conditions of hydrolysis and characterize bioactive peptides from soy protein isolate hydrolysates by the bromelain enzyme. Hydrolysis optimization conducted using the enzyme bromelain with levels of 0,2%; and 0,5% (w/v) and variation in incubation time 0, 1, 2, 3, 4, 5 to 6 hours at 45, 50 and 55°C. Protein hydrolysates analyzed the degree of hydrolysis (% DH) and tested anticholesterol activity test through HMG-CoA reductase inhibition test with pravastatin as a positive control. The results showed the optimum conditions hydrolysis of isolate soy protein were obtained at 2 hours, temperature 45 °C with enzyme concentration 0,5% that is by DH value of 40,22%. The highest anticholesterol activity was obtained from the hydrolysate with percent inhibition value of 82,80% (7.371 ppm). SDS-PAGE analysis results show the appearance of bands under 10 KDa and the results of fractionation of bioactive peptide fragments has a molecular weight of 2779 and 2609 Da.

**KEYWORDS:** Anticholesterol, bromelain, bioactive peptides, isolate soy protein

### 1. INTRODUCTION

Cholesterol resembles a complex fat compound that has a function to make adrenal cortex hormones, sex hormones, vitamin D, and bile salts that help absorb fat in the intestines. If the total cholesterol level in the blood exceeds normal limits, or high blood cholesterol levels, it will cause various causes such as heart disease, stroke, diabetes mellitus and atherosclerosis. Normal cholesterol levels range from 160-200 mg/dL.

Drugs that are often used to lower cholesterol levels are synthetic drugs, one of which is atorvastatin. Atorvastatin is a statin drug with a long half-life that can induce bile acids, the synthetic enzyme cholesterol-7 alpha-hydroxylase (CYP7A1) by suppressing farnesoid X receptor (FXR) signaling in the liver and intestines[1]. Continually taking statin drugs can result in several side effects such as moderate/severe liverdysfunction, cataracts, moderate/severe myopathy, and kidney failure [2]. In a recent study, consumption of statins under certain conditions and in excessive doses will lead to an increased risk of developing type 1 diabetes [3].

The existence of side effects of using synthetic drugs, it is necessary to conduct research through the search for food plants or herbal plants that have properties that can lower cholesterol levels and have no side effects. One of the food crops which has the potential to be developed as a source of anticholesterol is soybeans. Soybeans are seeds that can be used for health because they contain high levels of dietary fiber, vitamins, minerals, and protein, and are known as a source of protein. The protein content of soybeans is very high when compared to other nuts, soybean protein reaches 35% based on dry weight, even soybeans with superior varieties have protein levels of 40-43%.

Several studies have shown soy protein has been shown to reduce the risk of heart disease by lowering blood cholesterol (LDL) levels [4]. Pak. et al. [5], reported that the hydrolysis of pepsin enzymes in soybeans obtained the Ile-Ala-Val-Pro-Gli-Glu-Val-Ala peptide which can inhibit the HMGCoA reductase enzyme with an inhibition value of 45%. The results of Lammi et al[6] showed that the peptides Tyr-Val-Val-Asn-Pro-Asp-Asn-Asp-Glu-Asn and Tyr Val-Val-Asn-Pro-Asp-Asn-Asn-Glu-Asn derived from the protein - Conglycinin can act as a competitive inhibitor of the HMG-CoA reductase enzyme with IC50 of 150 and 200 µM.

Lin et al[7], reported several peptides that have potential as hypocholesterolemic agents having peptide molecular weights of 1384, 1583 and 1586 Dalton, respectively. According to Meinlschmidt et al[8] hydrolysis of soybean protein using papain enzyme at a temperature of 80°C, pH 7, enzyme:substrate concentration of 0.2%, and time variations of 0, 10, 30, 60, and



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120 minutes obtained the results of degrees The highest hydrolysis time was  $4.9 \pm 0.0\%$  at 10 minutes and the soy protein profile decreased from 75 kDa to 25 kDa to  $< 10$  kDa. In his research Zeng et al [9], has carried out hydrolysis of soybean protein using papain enzyme (EC 3.4.22.2, Sigma 80 units/mg) with concentrations of 0.5, 1 and 2% at  $37^\circ\text{C}$  and time variations of 5, 15, and 30 minutes obtained the results degrees of hydrolysis was at a concentration of 2% for 30 minutes, which was 4.29%. According to Chang [10] enzymatic hydrolysis of vegetable proteins is safer, and provides a more uniform product through more specific reactions. The papain enzyme can hydrolyze the amide group on the amino acid residues of phenyl alanine, leucine, valine, and tyrosine.

Kim [11] stated that enzymatic protein hydrolysis was carried out to obtain bioactive peptides that were safe for food. According to Whitaker [12] bromelain is an enzyme that has a wide cutting specificity for amino acid residues that make up its substrate which includes lysine, arginine, phenylalanine and tyrosine so that it can produce a high degree of hydrolysis. The bromelain enzyme has properties similar to other proteolytic enzymes such as papain, fisin, and rennin enzymes, which have the ability to hydrolyze other proteins [13]. Walker [14] states that the specific activity of the bromelain enzyme is optimum at a temperature of  $50^\circ\text{C}$  and at pH 6.5-7 using 1M phosphate buffer pH 6.5, when the temperature is above  $50^\circ\text{C}$  and the pH is more than 7, the activity is not within the optimum limit. the bromelain enzyme will decrease. According to Poh and Majid [15], bromelain enzyme has an optimum temperature of  $35\text{-}45^\circ\text{C}$ . Another study conducted by Indumathy et al [16] regarding the extraction, partial purification and characterization of the bromelain enzyme from pineapple with variations in the buffer solution used, pH and temperature, the optimum conditions for the bromelain enzyme were at  $20^\circ\text{C}$ , pH 4.2 and the buffer used is 0.1M sodium acetate buffer.

In this study, 0.1 M phosphate buffer pH 6.5 and incubation times of 0, 1, 2, 3, 4, 5, and 6 hours at  $45^\circ\text{C}$ ,  $50^\circ\text{C}$ , and  $55^\circ\text{C}$  were used. The sample used was smangrove protein isolate that had been dehydrated which was hydrolyzed using the enzyme bromelain with a variation of the enzyme concentration 0.2% and 0.5%. (b/v). The optimum conditions for protein hydrolysis were determined based on the dissolved protein content, the degree of hydrolysis and its anticholesterol activity. Anticholesterol activity testing was carried out using the HMG-CoA reductase enzyme inhibition method [17]. In this study, an anticholesterol bioactive peptide was isolated from yellow soybean protein hydrolyzate by hydrolysis with the bromelain enzyme under different conditions, resulting in a high degree of hydrolysis.

## 2. METHOD AND EXPERIMENTDENGAN

### 2.1 Material and Apparatus

Material: *S. alba* mangrove fruit was obtained from Blitar, East Java, Indonesia. *S. alba* mangrove fruit has its petals removed, washed under running water, sliced thinly and then dried for 2–3 weeks until it can be broken, were ground and sieved through a 60 mesh sieve

Bromelain enzyme in the form of dry powder extracted from pineapple with specific activity 0.14 Chemicals used with Pro Analysis specifications from Merck (Germany).

The equipment used includes: blender (stainless steel), centrifuge (Yenaco model YC-1180), spectrophotometer (Shimadzu 1600 A), pH meter (Jen Way type 3320, Germany), magnetic stirrer (Stuart Scientific), vortex (Thermolyne type 16700), refrigerator, water bath (GFL 1083), analytical balance (Ohaus), electric heater (Gerhardt), spatula, vacuum oven, vortex (Maxi Max Type 16700), 80 mesh sieve and glassware.

### 2.2 Soybean Protein Isolation

Powder *S. alba* mangrove fruit soaked in technical hexane, at a ratio of 1:5 w/v for 1 hour at room temperature, then centrifuged at 7500 rpm for 15 minutes at  $4^\circ\text{C}$ . The supernatant obtained was discarded, the precipitate was re-extracted twice to remove the remaining fat content. The fat-free sample was mixed with distilled water at a ratio of 1:10 w/v, added 2 M NaOH dropwise to pH 8, stirred for 90 minutes at room temperature and centrifuged at 9000 rpm for 30 minutes at  $4^\circ\text{C}$ . Take the supernatant and add 2 M HCL drop by drop to pH 4.5 and then centrifuged for 20 minutes. The supernatant obtained was discarded, while the protein precipitate was taken and dried in a freeze dryer. The yield of the protein isolation process from *S. alba* mangrove fruit was calculated using the equation

Weight isolate *protein* (g)

Rendemen Isolat Protein B (%) : ----- x 100 %-

Weight *S. alba* mangrove fruit (g)

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### 2.3 Hydrolysis of Protein Isolate

The protein isolate sample was hydrolyzed using the bromelain enzyme at a certain time, bromelain concentration and temperature. Then the solution was heated at 80°C for 10 minutes with the aim of inactivating the enzyme, then Tris-HCL buffer pH 9. A total of 20 mL was added. The protein content of the isolate was added. The degree of hydrolysis of protein was measured by the Hoyle and Merrit method.

### 2.4. Determination of Protein Levels in Protein Isolates

A total of 5 ml of protein isolate was added to 5 ml of Biuret reagent. The mixture was homogenized and incubated for 20 minutes at room temperature. Then measure the absorbance with a spectrophotometer at a wavelength of 540 nm. The concentration of protein in the protein isolate was calculated using a standard curve with the equation  $y = bx + a$ .

### 2.5 Determination of the Degree of Hydrolysis of Isolate Protein

Soy protein isolate hydrolyzate was taken as much as 10 mL and added with 10 mL of 10% (w/v) TCA solution. Next, the mixture was allowed to stand for 30 minutes, then centrifuged for 15 minutes at a speed of 12000 rpm. The supernatant was tested for protein content based on the method of Bradford (1976). The degree of hydrolysis is calculated using the equation:

$$\text{Degree of hydrolysis} = \frac{\text{Protein on the hydrolysis of protein isolate}}{\text{Protein on protein isolate}} \times 100\%$$

### 2.6 Anticholesterol Hydrolyzate Isolate Protein Test

Testing of anticholesterol activity was carried out according to the work steps made by Sigma-aldrich. The reagents used were buffer, pravastatin, NADPH, HMG-CoA, HMG-CoA reductase (HMGR) enzyme, and hydrolysate. Before starting the test, the Elisa reader was set the wavelength to 340 nm. The reagents were added according to the procedure listed in Table 1.

**Table 1. Sample formulation for HMGR . activity inhibition test**

Sampel	Buffer (μL)	Pravastin (μL)	NaDPH	HMG-CoA	HMGR	Hidrolisat
Blank	184	-	4	12	-	-
Control negative	182	-	4	12	2	-
Control positive	181	1	4	12	2	-
Isolat 45	172	-	4	12	2	10
Isolat 50	172	-	4	12	2	10
Isolat 55	172	-	4	12	2	10

Every minute for 10 minutes, 200 μL of sample was measured for absorbance with an elisa reader (340 nm). The amount of enzyme activity is determined by the equation:

$$\text{Enzyme activity Unit/mgP} = \frac{(\Delta A_{\text{sample}}) - (\Delta A_{\text{blank}}) \times TV}{12.44 \times V \times 0.6 \times LP}$$

Information:

12.44 = 2 NADPH requirements during the reaction. (the coefficient for NADPH at 340 nm is 6.22/mM.cm)

TV = Total volume (mL)

V = Volume of enzyme used

0.6 = Enzyme concentration in mg-protein (mgP)/mL

LP = Light path (cuvet)

$A_{\text{sample}}$  = Absorbance sample at time  $t_n$  - Absorbance sample at time  $t_{n+1}$

$A_{\text{blank}}$  = Absorbance blank at time  $t_n$  - Absorbance blank at time  $t_{n+1}$

The percentage of inhibition is calculated by the equation:

$$\text{\% inhibition} = \frac{(\text{Negative control enzyme activity}) - (\text{sample enzyme activity})}{(\text{Negative control enzyme activity})} \times 100\%$$

$$\text{\% inhibition} = \frac{(\text{Negative control enzyme activity}) - (\text{sample enzyme activity})}{(\text{Negative control enzyme activity})} \times 100\%$$

3. RESULT AND DISCUSSION

3.1 *S. Alba* Mangrove Fruit Protein Isolate

*S. alba* mangrove fruit protein was isolated by precipitation method using NaOH and HCl solution. The test results showed that the protein content in *S. alba* mangrove fruit was quite high, namely 47.28%. The total protein content of *S. alba* mangrove fruit isolate used in this study did not meet Codex Standard 175-1989 which stated that the minimum protein content of soy protein isolate was 90%≤. The low protein isolate content was possible because during the isolation process a lot of protein was wasted or dissolved in water during the washing and purification process of the protein.

3.2 Hidrolisis Isolate Protein

3.2.1 Effect of Time on Degree of Hydrolysis

The hydrolysis of *S. alba* mangrove fruit protein isolate was carried out with various variations of temperature, time and bromelain enzyme concentration. The time variations used in this hydrolysis step were 1, 2, 3, 4, 5, and 6 hours, and the concentrations of the bromelain enzyme used were 0.2% and 0.5%. with temperatures of 45°C, 50°C and 55°C. The results of measuring the degree of hydrolysis of the hydrolyzate of *S. alba* mangrove fruit protein isolate at a temperature of 45°C with different hydrolysis times and enzyme concentrations can be seen in Figure 1

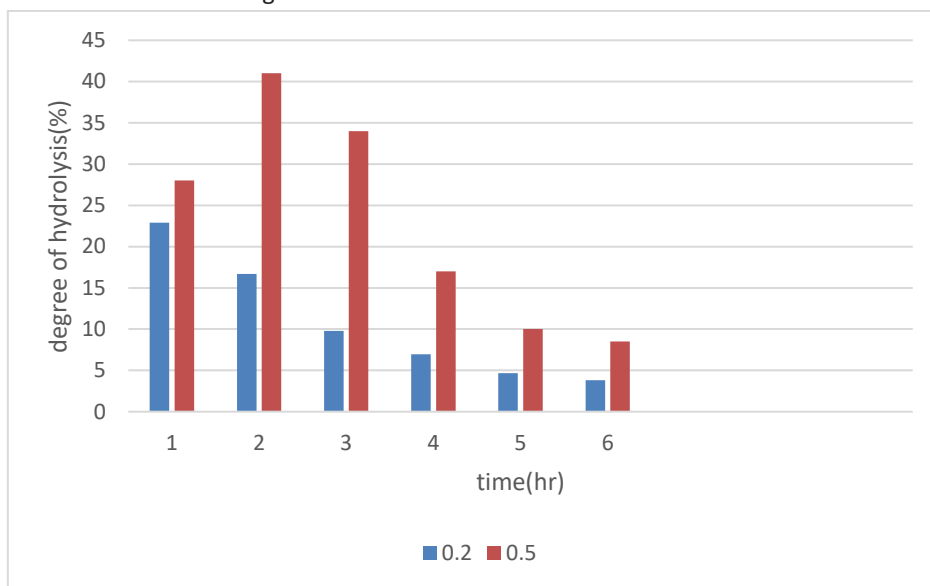


Fig 1. Effect time hydrolysis on degree of hydrolysis at temperature 45°C

The value of the degree of hydrolysis at 45°C and the enzyme concentration of 0.5% in Figure 1 shows an increase in the value of the degree of hydrolysis at 1 to 2 hours and decreases at 3 to 6 hours. At 0.2% enzyme concentration showed a decrease in the value of the degree of hydrolysis with increasing hydrolysis time. The value of the most optimum degree of hydrolysis at 45°C was obtained in 2 hours with an enzyme concentration of 0.5% where the value of % degree of hydrolysis obtained was 40.22%. According to Murray et al [18] enzyme concentration affects the rate of reaction between the substrate and the enzyme so that it will affect the resulting product. However, if the concentration of the enzyme used is too high or excessive, it can also cause the enzyme not to work optimally because of the presence of free enzymes that cannot bind to the substrate, so that the hydrolysis process becomes inefficient[19]. If the temperature is increased to 50°C, the value of the degree of hydrolysis at a temperature of 50 °C and the enzyme concentration of 0.2% in Figure 2 shows an increase in the value of the degree of hydrolysis of the enzyme 0.2% in Figure 2 shows an increase in the value of the degree of hydrolysis at time 1 to 6 hours, while the 0.5% enzyme concentration showed an increase in the time interval between 1 to 5 hours and decreased at 6 hours. The value of the largest degree of hydrolysis was obtained at the time of hydrolysis of 5 hours and the enzyme concentration was 0.5% with a value of % degree of hydrolysis of 25.09%. 2.1% as shown in Figure 2

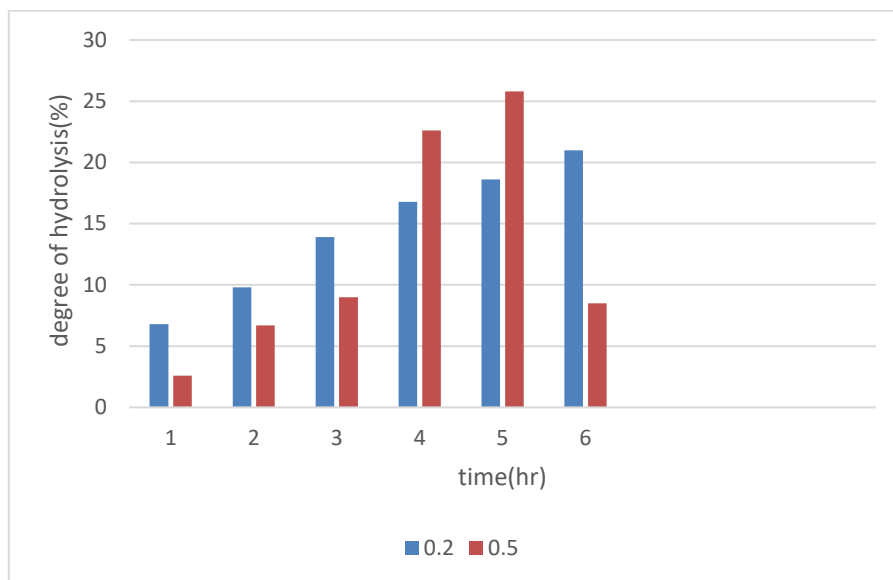


Fig 2. Effect time hydrolysis on degree of hydrolysis at temperature 50°C

By increasing the hydrolysis temperature to 55°C, with an enzyme concentration of 0.2%, it showed an increase in the value of the degree of hydrolysis at 1 to 2 hours and decreased again at 3 to 6 hours. On the other hand, the 0.5% enzyme concentration showed a decrease in the value of the degree of hydrolysis at a time interval of 1 to 6 hours. The value of the largest degree of hydrolysis was obtained at the time of hydrolysis of 2 hours and the enzyme concentration was 0.2% with a value of % degree of hydrolysis of 29.63%, while the smallest value of the degree of hydrolysis was found at the time of hydrolysis for 6 hours and the enzyme concentration was 0.5% with the value of % degree of hydrolysis. by 0.78% as shown in Figure 3.

In addition to the enzyme concentration, the optimum temperature of the enzyme and the time of hydrolysis are also influential factors in the hydrolysis process [20]. According to Poh and Majid[21] at a temperature of 35-45°C, the bromelain enzyme will work fully by releasing maximum kinetic energy which causes the collision between enzyme molecules and the substrate to accelerate, resulting in a sufficiently large amount of dissolved protein and is characterized by the percentage degree of hydrolysis is quite large as well. According to Zarei et al[22] when hydrolysis reaches optimum conditions, there will be a decrease in dissolved protein levels, because enzymes have a certain time or optimum time to work to hydrolyze substrates so that there can be an imbalance between enzymes and substrates and causes the hydrolysis process to fail. optimum again.

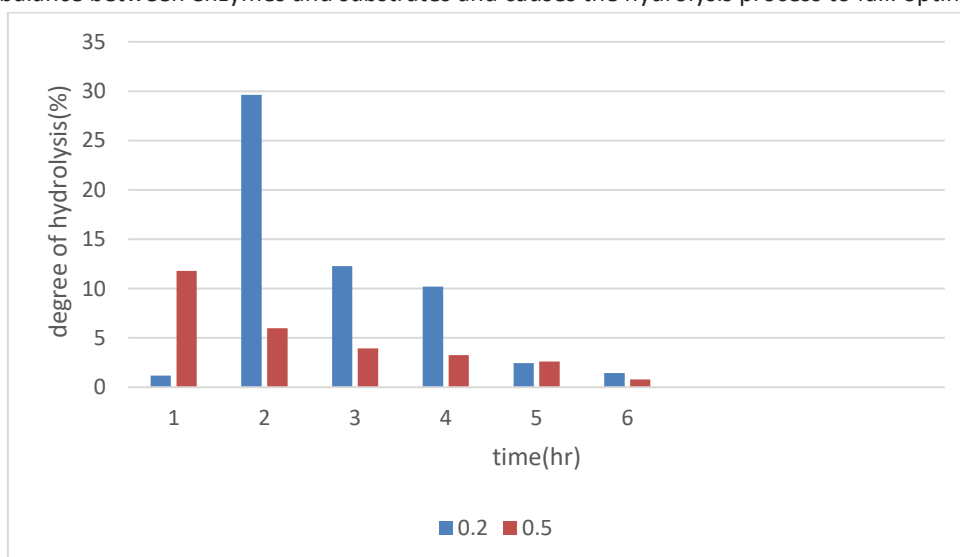


Fig 3. Effect time hydrolysis on degree of hydrolysis at temperature 55°C

Whitaker [23] , stated that a high degree of hydrolysis can be produced because the bromelain enzyme has a wide cutting specificity for amino acid residues that make up its substrate which includes lysine, arginine, phenylalanine and tyrosine. Meanwhile, a lower degree of hydrolysis resulted in a hydrolyzate with a higher molecular weight fraction, which showed better emulsification and aeration properties but showed greater hydrophobicity [24].

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According to Kamau and Lu[25], if the amount of enzyme concentration used to hydrolyze protein is increased, the value of % degree of hydrolysis will also increase. This happens because with the increasing amount of enzyme concentration, the speed of hydrolysis also increases. The greater the concentration of the enzyme used, the more peptide bonds that can be hydrolyzed quickly resulting in a high degree of hydrolysis, but on the other hand, if the concentration of the enzyme used is low, the value of the degree of hydrolysis produced also tends to be low because the amount of substrate availability is greater than the amount of enzyme. used, causing the peptide bond cutting speed to be slower .According to Himonides et al. [24] the degree of hydrolysis is defined as the percentage of the number of broken peptide bonds in the protein hydrolyzate and can determine the nature of the protein hydrolyzate. Factors that affect the degree of protein hydrolysis are enzyme concentration, type of enzyme used, temperature, pH and hydrolysis time [20].The enzymatic hydrolysis method was chosen because it can produce peptide products with specific amino acid composition and sequence according to the type of protease used. Enzymatic hydrolysis also works at neutral pH so it does not damage the amino acids produced . Enzymatic hydrolysis is important to pay attention to the physico-chemical conditions of the substrate before hydrolysis is carried out, where the temperature and pH of the solution must be in accordance with optimal conditions for enzyme work [26].

Based on the results of the three hydrolysis degree measurements above, the highest % hydrolysis degree value was taken, namely at a temperature of 45 °C with a hydrolysis time of 2 hours and an enzyme concentration of 0.5%, which was 40.22%. The results of the hydrolysis at the optimum conditions were then tested for anticholesterol properties. The samples used were hydrolyzate at 45 °C with an enzyme concentration of 0.5%; the hydrolyzate temperature was 50 °C, the enzyme concentration was 0.5% and the hydrolyzate temperature was 55°C the enzyme concentration was 0.2%.

### 3.3 Anticholesterol Activity of *S. alba* Mangrove Fruit Hydrolyzate

Anticholesterol activity was tested on three hydrolysates which had the highest degree of hydrolysis through an in vitro test using the 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA reductase) enzyme inhibition method. The basic principle of this anticholesterol activity test is the ability to inhibit the HMG-CoA reductase enzyme by peptide substrates and compared to the positive control (pravastatin), the higher the inhibitory ability of the enzyme, the greater the anticholesterol activity. The mechanism of pravastatin works as an anticholesterol by competitively inhibiting the HMG-CoA reductase enzyme, because it has a structure similar to HMG-CoA. The HMG-CoA reductase enzyme works as a catalyst for HMGCoA compounds into mevalonic acid with the help of NADPH. If there is an inhibitor, the amount of remaining NADPH will be more than NADP+. The control has more NADP+ than NADPH. The results of the percentage inhibition (anti-cholesterol) test are shown in Table 2, Table 3 and Figure 4

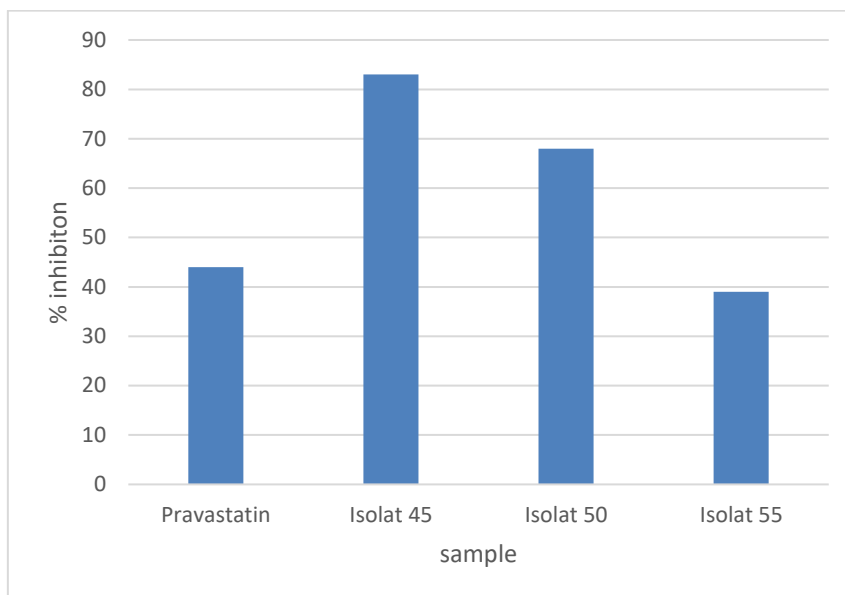
**Table 2. Data for enzyme activity**

No	sample	$\Delta A_{sample}$ (n=10)	$\Delta A_{blanko}$	TV	V	LP	Enzyme activity unit/mgP
1	Control negative	0.02925	0.00465	0.2	0.002	0.55	0.599
2	Pravastin	0.01855	0.00465	0.2	0.002	0.55	0.338
3	Isolat 45	0.0089	0.00465	0.2	0.002	0.55	0.103
4	Isolat 50	0.0125	0.00465	0.2	0.002	0.55	0.191
5	Isolat 55	0.0191	0.00465	0.2	0.002	0.55	0.364

**Table 3. Data for % inhibition**

No	sample	Enzyme activity unit/mgP)	% inhibiton
1	Control negative	0.599	-
2	Pravastin	0.338	43.57
3	Isolat 45	0.103	82.80
4	Isolat 50	0.191	68.11
5	Isolat 55	0.364	39.23

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**Fig 4. % inhibition from hidrosilat isolate protein soy bean**

The results of the anticholesterol activity test based on Figure 4 show that for the standard pravastatin with a concentration of 0.02125 g/mL, the percentage inhibition of HMG-CoA was 43.57% while the percentage inhibition of 82.8% was obtained from the hydrolyzate at 45°C, the concentration 0.5% enzyme, and the concentration of hydrolyzate was 7.371 g/mL. While the hydrolyzate sample with a temperature of 50 °C, 0.5% enzyme concentration and 4.598 g/mL hydrolyzate concentration obtained a percentage of inhibition of 68.11%, and the hydrolyzate with a temperature of 55 °C, 0.2% enzyme concentration and hydrolyzate concentration 5.4315 g/mL, the percentage inhibition was 39.23%. However, the percentage of inhibition of the samples obtained in this study is still relatively better when compared to the research of Pak et al., [5] where the anticholesterol activity with % inhibition values of 31, 43, 45 and 50% was obtained from soybean hydrolyzate with a concentration of 1 g/mL which was hydrolyzed using pepsin enzyme at a concentration of 0.4%. The enzyme activity in the control was greater than the enzyme activity in the sample, the lower the enzyme activity value, the higher the inhibitory power [27].

Research conducted by Lin et al [7] showed that in silico peptide synthesis has anticholesterol activity by inhibiting the HMGCoA reductase enzyme. The peptide has the sequences Thr-Pro-Met-Ala-Ser-Asp (Hexapeptide), His-Phe-Lys-Trp (Tetrapeptide) and Pro-Met-Ala-Ser (Tetrapeptide). Each of the three peptides had IC50 values of 80 M, 80 M and 68 M with a peptide concentration of 100 M. Another study conducted by Wenny et al. [27] peptides derived from cowpea and modified with the Gln-Asp-Phe sequence (tripeptide) have anticholesterol activity. The peptide had an IC50 value of 12.8 M and a %inhibition value of 85.8% with a peptide concentration of 250 M. If seen from previous studies that peptides with amino acid residues 3 to 6 have anticholesterol activity. Peptide has a function as a bioactive component as an anticholesterol by inhibiting the HMG-CoA reductase enzyme which has a structure similar to the structure of HMG-CoA (3-Hydroxy-3-methyl-glutaryl-coenzyme A) or pravastatin. The characteristics of a peptide that is anticholesterol when viewed from its reactive group has a hydroxyl and carboxyl/carbonyl group as well as the groups in pravastatin and HMG-CoA [28].

Research by Lammi et al. [6] reported that 2 peptides from soybean -conglycinin namely YVNPNDNEN and YVNPNDNEN can induce hypocholesterolemia in HepG2 cells. The two peptides have molecular weights of 1178,158 Daltons and 1177.174 Daltons. Other research conducted by Lin et al [7], reported several peptides that have potential as hypocholesterolemic agents have amino acid sequences DHIHWITPSHPG, DHYSYTWFSWPT and QLEWSYWPQLSR with peptide molecular weights of 1384, 1583 and 1586 Dalton, respectively.

Soybean protein hydrolyzed using protease enzymes from *Bacillus amyloliquefaciens* bacteria can induce hypocholesterolemia using cultured cells in vitro [29]. The results of the analysis showed that hydrolysis of yellow soybeans using papain enzymes at 37 and 50°C had anticholesterol activity with inhibition of 78.29 and 95.65%, respectively. The inhibition value can be classified as very strong and the peptide content contained in the hydrolyzate can inhibit the enzyme HMG-CoA reductase, because according to Rinto et al., [29] the inhibition value can be classified as strong if it has a value greater than 50%, while the inhibition value is medium if it has a value greater than 25%. In this study, pravastatin was used as the standard, because pravastatin has anticholesterol activity and has a molecular structure similar to the HMG-CoA molecule (substrate).



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### 4. CONCLUSION

Based on the results of the research conducted, the optimum conditions for hydrolysis of soybean protein isolate with bromelain enzyme which produced the best anticholesterol activity were obtained at 2 hours and a temperature of 45°C at a sample concentration of 7.371 ppm with a percent inhibition value of 82.80%. While the standard pravastatin has a lower percentage of inhibition (43.57%) at a concentration of 0.02125 ppm. In the study, soy protein isolate hydrolyzed using bromelain enzyme had good anticholesterol activity compared to that which was not hydrolyzed. Soy protein isolate which is hydrolyzed will produce specific peptides such as peptides that have a cyclic structure. Peptides that have a cyclic structure will be resistant to proteolytic enzymes in the body and also have a faster absorption orally.

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# Modelling Accessibility to Primary Healthcare Facilities in Argungu LGA: Using Multiscale Geographically Weighted Regression (MSGWR) Approach



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**ABSTRACT:** This study uses socioeconomic and demographic data to demonstrate the value of a novel multidimensional approach to healthcare accessibility. The optimum location for healthcare facilities in relation to demand areas was determined using location-allocation models and local multiscale geographically weighted regression (MGWR) to explore spatially non-stationary relationships. The result shows that the potential accessibility of a community to primary healthcare depends on the geographic and socioeconomic characteristics of various places. The results of this study may be used to inform policy planning and decision-making for increasing accessibility to healthcare services, particularly in rural areas for achieving the Sustainable Development Goals (SDGs).

**KEYWORDS:** Healthcare, accessibility, location-allocation, demand, GWR

## 1. INTRODUCTION

Access to health facilities is a vital aspect of providing adequate health care to individuals especially in rural areas of developing countries (Murawski & Church, 2009). Planning and allocating health resources must be done using an accurate assessment of current healthcare accessibility (Ma, Luo, Wan, Hu, & Peng, 2018). Accessibility to healthcare services refers to how easily medical care may be obtained from a specific location (Polo, Acosta, Ferreira, & Dias, 2015). Due to limited resources and increasing demand, there will always be an imbalance between the supply and demand for healthcare resources. As a result, spatial distributions of healthcare resources need to be carefully assessed and continually improved for the sake of social equality (Gong et al., 2021). Certainly, the cost of obtaining health care is determined by a variety of factors, including the distance traveled to obtain healthcare services (Kizito & William, 2020). However, prior research have not concentrated on aspects of accessibility such age group, educational level, religious conviction, gender preference, cost of travel, cost of services, and availability of staff (Fu, Liu, & Fang, 2021). Travel impedance (travel time, distance, and cost) has been amply established by academics to be one of the most significant variables affecting people's physical access to service facilities (Zhou, Yu, Yuan, Wang, & Wu, 2020). To avoid healthcare inequities, it is advised by international standards that healthcare facilities be situated 5 kilometers or less from the place of demand. As stated in the Sustainable Development Goals (SDGs), the World Health Organization (WHO) states that the goal of creating health standards is to serve as a tool in the administration of health services and to strive for the highest quality of care feasible within the resources available. One of the 17 provisions of SDGs is the provision of adequate healthcare and population wellbeing. According to the World Health Organization, primary health care (PHC) is "basic healthcare that is universally accessible to individuals and families in the community at an affordable cost, based on practical, scientifically sound and socially acceptable methods and technology". PHC is the cornerstone of Nigerian health policy and most Nigerians' first point of contact with the healthcare system (NPHCDA, 2015). The Ward Minimum Health Care Package (WMHCP) was created to address this current strategy for delivering PHC services, and it consists of a set of health interventions and services that address health and health-related problems, resulting in significant health gains at low cost to the government and its partners. Among the primary support areas are child survival, maternal and newborn care, nutrition, non-communicable disease prevention, and health education and community mobilisation (NPHCDA, 2015). PHCs have recently been included in the fight against the Covid-19 pandemic.

According to estimates, around 54% of Nigeria's population has access to modern healthcare. Because of a lack of personnel and infrastructure, rural communities and the urban poor are underserved (PRIMASYS, 2017). Kebbi states has some of Nigeria's worst

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public healthcare services, according to previous surveys (Omoleke, Usman, Kanmodi, & Ashiru, 2021; Oyekale, 2017). Yauri, Dankani, and Wali (2018) attempted to explain geospatial access to healthcare facilities in Birnin Kebbi albeit using spatial pattern mapping. However, the major limitation of these studies is that they did not fully assess the relationship between healthcare accessibility (facility) and population (demand) in order to arrive at their conclusions. In order to gain a better understanding of Kebbi State's healthcare system, it is necessary to investigate this relationship.

Despite government policy mandating the establishment of at least one PHC in each ward several areas remain unserved since some healthcare facilities are located far from the people in need. Again, it is necessary to assess the geographic accessibility of healthcare facilities and make recommendations for methods to improve geographic accessibility in accordance with global best practices (Kizito & William, 2020). PHC facilities are still insufficient to fulfill the demands of an ever-increasing population in the study area. The few facilities that are available are not uniformly located and are not often within a reasonable distance of most settlements. A lack of equal healthcare facility distribution would have a significant impact on the healthcare delivery system especially, the sustainable development goal (SDG) (Lawal & Anyiam, 2019). As a result of these trends, new measures to reduce disparities in access to PHC facilities in the state and meet SDG's by 2030 are needed. This study, which is the first of its kind in the study area to our knowledge, combines location allocation and assesses the variations in the health service facilities then examines the variables that affect these variations. A location-allocation model is a method for finding optimal sites for facility locations. The method involves simultaneously selecting a set of locations for facilities and assigning spatially distributed sets of demands to these facilities to optimize some specified measurable criterion (Rahman & Smith, 2000). The rest of the paper is structured as follows: Section 2 reviews the related literature, while Section 3 discussed the main data source and methods of analyses. In Section 4, the results of the analyses are presented and models are discussed in Section 5. Finally, in Section 6 the main findings are summarized, and future research is prospected.

## **2. LITERATURE REVIEW**

### **2.1 Location-Allocation Model in Public Healthcare Delivery**

The World Health Organization (WHO) recognizes the value of incorporating GIS in public health activities, especially, in modelling geographic heterogeneity in health behavior and outcome (Shaltynov, Rocha, Jamedinova, & Myssayev, 2022; Wang, 2020). In order to achieve the SDGs, geospatial data and methodology can be utilised to track progress and provide a solid framework for policymaking in health-related activities (WHO, 2018). The relationships between health, place and space including analyses of geographical patterns of healthcare access, monitoring, and intervention planning is well understood (Foley, Charlton, & Fotheringham, 2009; Shen & Tao, 2022). A framework for examining the use of health services and producing alternatives, either to suggest an efficient service or to improve health services, is provided by the integration of location-allocation and accessibility models (Abdelkarim, 2019). The goal of facility location decisions, also known as location-allocation problems, was to optimize the location of facilities to reduce cost and distance from demand and supply regions (Cooper, 1963). These choices are crucial in the long-term design of health-care programs (Zhang, Cao, Liu, & Huang, 2016). To achieve this, it is necessary to ensure that healthcare centers and other important health facilities are evenly spread and well-located so that people can easily access them. Previous studies have demonstrated that disparity exist among different socioeconomic and demographic settings in society (Fitzpatrick, Powe, Cooper, Ives, & Robbins, 2004; Kohlenberger, Buber-Ennsner, Rengs, Leitner, & Landesmann, 2019; McMaughan, Oloruntoba, & Smith, 2020). This study aim to combined geospatial models and related socioeconomic and demographic attributes to explore their influence on access to healthcare facilities in Argungu LGA.

## **3. DATA AND METHODS**

### **3.1 Study Area**

Argungu Local Government Area (LGA) of Kebbi state was created in 1976 with headquarters at Argungu comprising 11 Wards. Argungu is also the headquarters of Argungu Emirate council which existed since the year 1515 founded by Muhammadu Kanta. It is the oldest emirate in the state and also home of the famous and widely attended Argungu international fishing and cultural festival which is the oldest known festival of its kind in Nigeria. According to 2019 population estimates, Argungu LGA has a population of 199,889 (NPC, 2019). Argungu LGA has total land area of 428 Km<sup>2</sup> about 9.6 percent of the total landmass of Kebbi state. Most of the inhabitants of the area lives along the marshy Fadama land and are mostly farmers, fisher men and hunters. Major crops produce in area include rice, vegetables and fruits in the fadama area while sorghum, millet, beans are the upland or rain-fed crops. Argungu LGA is located between latitude 12°30'0"N to 12°50'0"N and longitude 4°10'0"E to 4°50'0"E covering an area of 491.128 Km<sup>2</sup> and elevation of 241 meters above sea level.

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The study area enjoys tropical continental type of climate, which is largely controlled by two air masses namely; tropical maritime and tropical continental blowing from Atlantic and Sahara desert respectively. The air masses determined the two dominant seasons, wet and dry. Humidity is 27% while wind blow at 15Km/h in ESE direction. Argungu receive a mean annual rainfall of 800mm between May to September with a peak period in August, the remaining period of the year is dry. The average temperature is 26°C and can rise up to 40°C in the peak of hot season (March-July). However, during harmattan, (December – February) temperature falls to 21°C. Figure 1 shows the location map PHC in Argungu LGA ward boundaries.

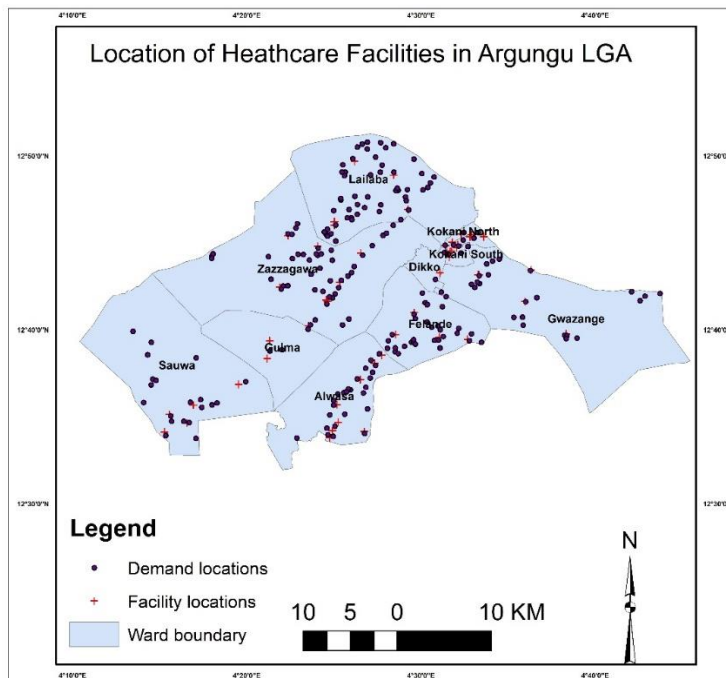


Figure 1 Location map of PHC in Argungu LGA ward boundaries

### 3.2 Data

In this study, data from both primary and secondary sources (Table 1) were used to complete the research successfully. The primary data, which include socioeconomic and demographic survey was designed and collected using the Open Data Kit (ODK) application tool during a field exercise. ODK is a free open source data gathering application that works with Android mobile devices and makes data available instantly via an online server. The Open Data Kit (ODK) is a commonly used data collection tool for research (Loola Bokonda, Ouazzani-Touhami, & Souissi, 2019). Based on the sample size determined in each ward, the questionnaire was then administered to households in all 11 wards of Argungu local government. The data collected are broadly grouped into 5 dimensions of access to healthcare: accessibility, availability, affordability, acceptability and adequacy based on literature (Levesque, Harris, & Russell, 2013). Recent literature have demonstrated the impact of contextual socioeconomic and demographic characteristics (e.g. age, gender and home ownership) on the community access to healthcare facilities (de Carvalho Dutra et al., 2021; Dotse-Gborgbortsi et al., 2022; Mansour, Al Kindi, Al-Said, Al-Said, & Atkinson, 2021).

Table 1. Secondary data sources

	Name	Description	Source
1	eHealth Africa data portal. Ward shapefiles, population estimates and healthcare facilities.	eHealth Africa has a wide variety of free geospatial datasets for research	<a href="https://hfr.health.gov.ng/facilities">https://hfr.health.gov.ng/facilities</a>
2	OpenStreetMap (OSM). Road network datasets	OSM is a free open license collaborative geospatial database of the world	<a href="https://www.openstreetmap.org/exp ort">https://www.openstreetmap.org/exp ort</a>
3	Nigeria Health Facility Registry (HFR). Health facility locations and	HFR is a national database for all health facilities in Nigeria maintained by the Federal Ministry of Health.	<a href="https://hfr.health.gov.ng/facilities">https://hfr.health.gov.ng/facilities</a>

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## 3.3 Method of Data Analysis

In this study, the OSM data was first converted to network datasets in ArcGIS Pro software. These data were then clipped to the study area, and the Nigerian Health Facility Registry (HFR) website was used to verify the geolocation of the facilities acquired from eHealth Africa (see Table 1).

### Accessibility Models

To measure spatial accessibility, the geometry centre (centroid) of each demand location is used to measure the travel distance between facility and demand areas (Polo et al., 2015). The location allocation tool is then used to choose the optimum candidate facility to serve a demand population according to specified parameters (e.g. between 1000 metres and 5000 metres). One of the most popular models for public facility location problems is the p-median problem (Basti & Sevkli, 2015; Gwalani, Tiwari, & Mikler, 2021; Mladenović, Brimberg, Hansen, & Moreno-Pérez, 2007; Shaltynov et al., 2022). In this model, the number of p facilities is determined for a given demand in order to minimize the overall weighted travel distance or time between facilities and demand centers Polo et al. (2015). This model assumes that the demand population users use the nearest facility. However, Jia et al. (2014) However, Jia et al. (2014) claim that one significant drawback of the traditional p-median model is that facilities might not always be assigned to demand locations. The p-median model can be formulated based on ReVelle and Swain (1970) Equation 1-5.

$$\min \sum_i^n \sum_j^n \alpha_i d_{ij} x_{ij}$$

(1)  
Subject to

$$\sum_j x_{ij} = 1 \forall i$$

(2)  
 $x_{ij} \leq y_j, \forall i, j,$

(3)

$$\sum_j y_j = p$$

(4)  
 $x_{ij} \leq y_j \in \{1,0\}$

(5)  
where  $x_{ij} = 1$  if demand  $i$  is assigned to facility  $j$  and  $x_{ij} = 0$  otherwise,  $n$  is the number of demand sites,  $\alpha_i$  is the population of demand  $i$ ,  $d_{ij}$  is the shortest distance between  $i$  and  $j$  and  $p$  is the number of facilities to be located.

In this analysis there were 212 demand communities competing for only 50 healthcare facilities in the study area. Figure 2 shows some of the selected locations in the location-allocation model.

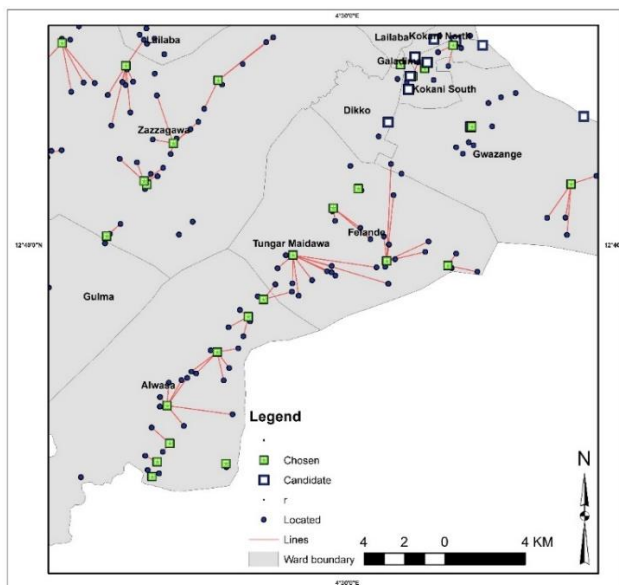


Figure 2. Some selected locations in the location-allocation models



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## Regression Models

In the second stage of the analysis, different regression analyses (global and local) were performed to explore the relationship between physical accessibility to healthcare and socioeconomic factors affecting it. To begin with, correlation analysis was conducted to assess the relationship between the variables (Figure 3).

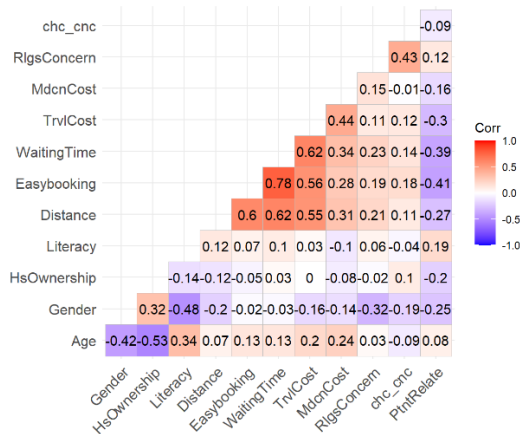


Figure 3. Correlation analysis between the variables

## Ordinary Least Square OLS

Initially, the ordinary least square (OLS) otherwise known as global regression (stepwise) was performed to reduce collinearity between the variables (Equation 6). However, the global model parameters derived from the OLS assumed that variables are constant over space (Charlton, Fotheringham, & Brunsdon, 2009) this assumption does not always hold as spatial variations in relationships is not stationary (Erdogan, Yalçin, & Dereli, 2013). The general specification of a multiple regression model takes the form of Equation 6:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_n X_n + \epsilon \tag{6}$$

where Y is the value of the dependent variable,  $\beta_0$  is the constant intercept,  $\beta_1, \beta_2, \beta_3, \beta_n$  are the slope coefficients of the independent variables  $X_1, X_2, X_3, X_n$ , while  $\epsilon$  is a standard error of component.

If  $X_1$  is significant it is retained, otherwise dropped

$$Y = \beta_0 + \epsilon \tag{7}$$

In the next iteration variables with a higher correlation with Y are added

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon \tag{8}$$

## Geographically Weighted Regression (GWR)

Spatial heterogeneity exist across space, hence the need for a localised model such as Geographically Weighted Regression (GWR) (Charlton et al., 2009). GWR is a (local) modelling technique to estimate regression models with spatially varying relationships (Fotheringham, Brunsdon, & Charlton, 2003). For model calibration in GWR, the choice of bandwidth is an important step (Equation 7). A bandwidth is a distance search window over which a localised model is controlled (Lu, Harris, Charlton, & Brunsdon, 2014). Bandwidths are locally chosen by a data-driven method based on minimization of a local cross-validation (CV) criterion (Arlot & Celisse, 2010; Vieu, 1991). A CV score is essentially the estimated squared production errors (Fotheringham, Charlton, & Brunsdon, 1998). However, different service facilities may have different characteristics resulting in spatial homogeneity heterogeneity to coexist (Liu et al., 2022). A typical GWR model is given in equation 9:

$$y_i(u) = \beta_{0i}(u) + \beta_{1i}(u) X_{1i} + \beta_{2i}(u) X_{2i} + \beta_{3i}(u) X_{3i} + \dots + \beta_{ni}(u) X_{ni} + \epsilon \tag{9}$$

$y_i(u)$  is independent variable at location  $i$ ,  $(u)$  is a vector of two dimensional coordinates describing location  $i$ ,  $\beta_{0i}(u)$  is the intercept parameter at location  $i$  specific to that location,  $\beta_{ni}(u) X_{ni}$  is the local regression coefficient for  $n$ th explanatory variable at location  $i$ .

## Multiscale Geographically Weighted Regression (MSGWR)

In the standard form, a single bandwidth is used to calibrate GWR. This may be unrealistic because it implicitly assumes that each response-to-predictor relationship operates at the same spatial scale. Some relationships may operate at larger scales and others at smaller scales (Comber et al., 2022). GWR using single bandwidth is not capable to express such features, while MSGWR could alleviate such problems by assigning specific bandwidths for each variable based on iteration. MSGWR allows the relationship

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between the response variable and explanatory variables to vary spatially and at different scales (Fotheringham, Yang, & Kang, 2017; Mansour et al., 2021). GWR and its recently improved version-MSGWR have been widely used in the modelling of health-related issues to explore spatial variations in the parameter estimates in the study area (Foley et al., 2009; Fu, Liu, & Fang, 2021; Gao, Guhl, Boukebous, & Deguen, 2021; Liu et al., 2022). In this study, R statistical software and specifically, the GWmodel library was used for the calibration of the multiscale geographically weighted regression (MSGWR) using socioeconomic data obtained from the field survey. The optimum bandwidth for each independent variable was chosen using the AIC. The fact that AICc indicates model parsimony adjusted for small degrees of freedom and that its use helps to prevent over-fitting GWR models make its bandwidths more preferable to those discovered by CV and uncorrected AIC (AICc bandwidths tend to be larger than bandwidths found using CV and AIC) (Comber et al., 2022). In this study the AICc was used based literature.

### RESULTS

In this study, the results of the location-allocation set at 5,000 metres (5KM) impedance cutoff, only 37 (about 74%) out of 50 facilities were allocated. Within this cutoff, 137 (about 65%) out of 212 demand communities were allocated to different healthcare facilities. The remaining 75 (about 35%) demand communities lies further away from the global benchmark based on Euclidean distance decay. The results indicate that 10 out of the 37 chosen facilities were allocated 1 demand community each. Tungar Maidawa facility in Felande ward has the highest allocation of 11 demand communities and population weight of 17,395. On the other hand, Ummara facility having 7 demand community allocation has the largest population weight of 18,285. Additionally, Gijiya facility has a population weight of 17,851 from 4 demand communities. The result also show that Ela Tungar Zazzagawa facility in Zazzagawa ward and Gwabare facility in Alwasa ward have the lowest population weight of 27 and 20 demand population respectively.

The results of the OLS model shows that only 5 statistically significant variables (age, gender, house ownership, travel cost and ease of booking) were retained. (Table 2).

**Table 2. Stepwise OLS regression results**

Variables	Estimate	Std. Error	t-value	p-value	VIF
(Intercept)	3.3739	0.4181	8.070	0.0000***	
Age	0.0185	0.0057	-3.219	0.0015**	1.605
Gender	0.3480	0.1089	-3.193	0.0016**	1.269
HsOwnership	0.1740	0.0682	-2.551	0.0110*	1.450
TrvlCost	0.4737	0.0922	5.135	0.0000***	1.659
Easybooking	0.8706	0.1198	7.262	0.0000***	1.469
Adjusted R <sup>2</sup>	0.46				

Significant codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

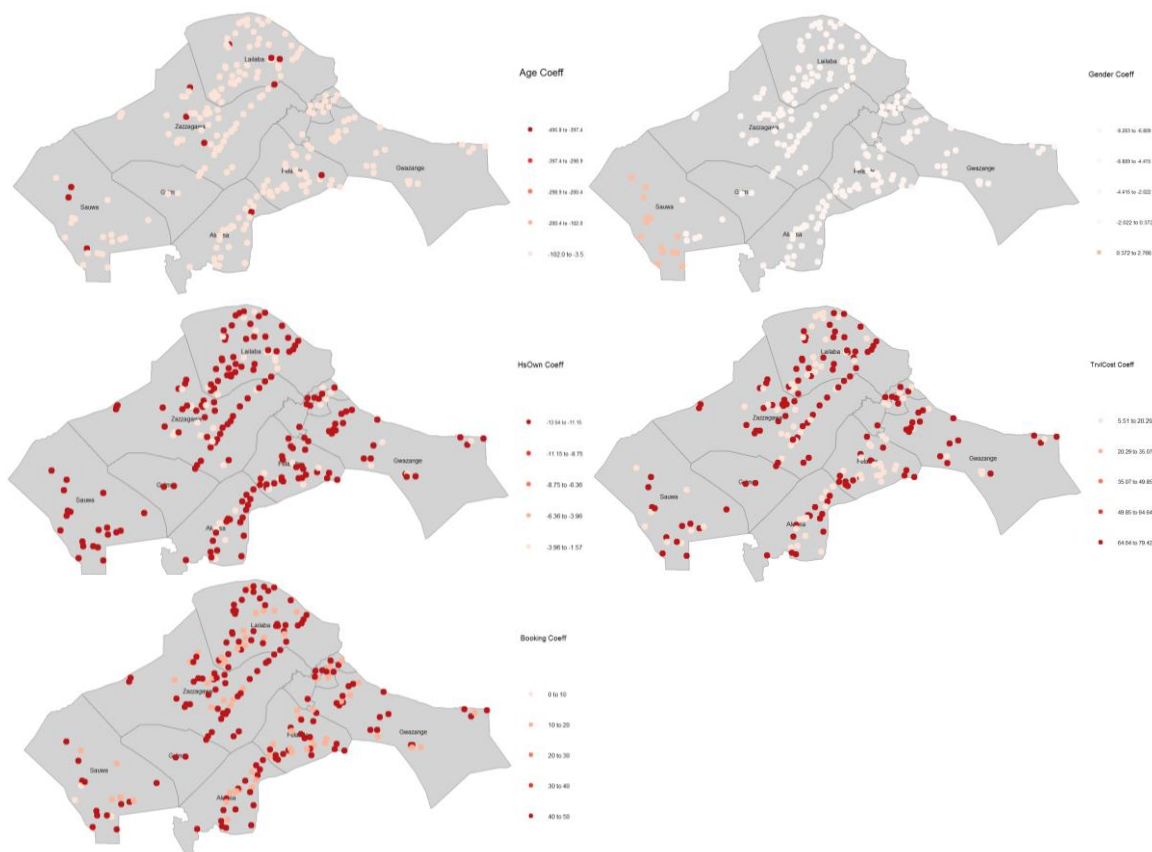
To explore the spatial variation in the relationships with accessibility to healthcare facilities, GWR and MSGWR were applied to the same set of significant variables used in the global OLS models. Table 3 shows the comparison of the global and local models. The performance of the global OLS model was improved by the local models. MSGWR produced the largest adjusted R-squared (0.53) and lowest AICc (438.5963). In this analysis, the local models fit reduces the AIC by more than 3 units reflecting a more robust model of parsimony (Comber et al., 2020)

**Table 3. Model comparison between OLS, GWR and MSGWR**

Model	R <sup>2</sup>	Adjusted R <sup>2</sup>	AIC	AICc
OLS	0.47	0.46	439.2491	440.8252
GWR	0.49	0.47	431.2486	439.7979
MSGWR	0.53	0.49	419.0811	438.5963

The coefficients of the variable estimates of MSGWR model were also mapped to explore the spatial variation in the study area (Figure 4).

## Modelling Accessibility to Primary Healthcare Facilities in Argungu LGA: Using Multiscale Geographically Weighted Regression (MSGWR) Approach



**Figure 4. MSGWR coefficients of the estimates in the variation of accessibility to healthcare facilities.**

The spatial distribution of the coefficient of age is negative across the study area. A possible reason for this relationship might be because the relatively older adults are more likely to access healthcare services than younger age group. Older adults might have different medical condition that requires them to seek for healthcare services.

The local spatial variation of the gender coefficient is negative in most of the communities except in communities in southern Alwasa ward where the coefficient is positive. This shows that women are most likely to seek for healthcare services than their male counterparts, however, the case is different in the communities in Alwasa ward. A possible explanation to this occurrence could be religious concern, though this has not been established in this study.

The negative coefficient of the home ownership used here as a proxy for socioeconomic status, revealed that access to healthcare services decreases with decrease in the socioeconomic status of individuals across the study area. Those who are economically more affluent are more likely to access healthcare services, considering that fact that healthcare delivery is dependent to some extent on affordability.

In terms of the distribution of coefficient of transportation cost, it can be seen that it has positive correlation with accessibility to healthcare services. This relationship indicate that as accessibility to healthcare services increases so also affordability of transportation cost increases. People who can afford transport fare are potentially more likely to access healthcare services.

The coefficient estimates of ease of booking for healthcare services is also positively correlated with accessibility across the study area. The relative ease with which individuals can book appointment for healthcare services is a factor of availability, which in turn affects their willingness to access healthcare services.

### DISCUSSIONS

This study explored the multiscale impact of socioeconomic and demographic factors such as age, gender, home ownership on accessibility to healthcare facilities. The key findings from this research were that a set of sociodemographic variables were found to impact on accessibility to healthcare service and that these factors vary geographically, a factor also found in (Mansour et al., 2021). The study also found that socioeconomic and demographic characteristics of different areas, can complement location-allocation models for better understanding of accessibility to healthcare facilities (Heise et al., 2019; McMaughan et al., 2020). Surprisingly, healthcare facilities in Gulma, Dikko and Kokani wards were not allocated. Possible explanation for Dikko and Kokani

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wards might be because of their proximity to the general hospital in Argungu. Further research is needed investigate this occurrence.

### CONCLUSION

This study explore the multiscale effect of socioeconomic and demographic factors on accessibility to healthcare facilities in Argungu LGA. The findings of this study might benefit policy planning for decision making for improving accessibility to healthcare facilities especially in the rural areas as stated in the Sustainable Development Goals (SDGs). This study used the threshold of 5KM to allocate demand communities to available facilities, therefore further analysis is needed to investigate how facilities can be relocated to increase accessibility.

### FUNDING

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## Measuring Company Value with Intervening Profitability Variables in Companies Listed on the Indonesia Stock Exchange's LQ-45 Index for the 2018–2021 Period



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**ABSTRACT:** This study aims to analyze the effect of company size, capital structure and dividend policy on company value with profitability as an intervening variable in LQ-45 Companies Listed on the Indonesia Stock Exchange for the 2018-2021 Period. All companies listed on the Indonesia Stock Exchange's LQ-45 index from 2018 to 2021 comprise the study's population, namely there are 63 companies. Purposive sampling is used in the sampling process. using criteria-based sampling, from a total population of 63 companies only 28 companies meet the criteria and are used as research samples. Data analysis utilizing analysis path and multivariate linear regression. The findings indicated that a company's size had an impact on company's value, While the dividend policy does not impact the value of the company's value, the capital structure does. profitability mediates the effect of company size on company value, profitability does not mediate the effect of capital structure on company value and profitability mediates the effect of dividend policy on company value.

**KEYWORDS:** Company Size, Capital Structure, Dividend Policy, Profitability, Company Value.

### I. INTRODUCTION

One of the key considerations for investors when evaluating a firm as a whole is its company value, which reflects the company's future possibilities. Maximizing company value can be done in various ways, namely by carrying out existing operations within the company more effectively and efficiently. Performance within the company focuses on the final results of operational activities within the company during a certain period, Performance measures are used to assess how well a firm is doing at maximizing shareholder value. The bargaining power of the shares reflects the worth of the firm; if the company is seen to be one with promising future prospects, the value of the shares rises. On the other hand, the stock price will be low if the firm is thought to have poorer prospects. (Abidin et al., 2014).

The company's size is significant, which suggests that it is growing and developing, which will attract investors and raise the company's worth. Positive investor reaction will result in an increase in the company's worth. Due to their higher ability to influence market dynamics and their ability to deal with economic rivalry, large corporations are less susceptible to changes in the economy. Because they have better access to outside sources of information than small organizations have, large corporations have more resources to raise the value of the company.

Companies can increase their worth by having a reliable source of funding or capital structure.. Sources of funding for a company can come from within or outside. The source of funding from within the company can be in the form of additional equity through the issuance of new shares or the use of retained earnings that are reinvested in the company, while sources of funding from outside the company can be in the form of debt. In capital structure theory, According to the trade-off theory, the proportion of the ideal capital structure ratio can be found by balancing the profits of using debt with the bankruptcy costs of the company's debt.

To determine the company's future prospects or its current worth and the returns that investors will get, investors need to assess the decisions of a company, the financial decisions in question are dividend policies. This decision aims to maximize the company's value. The dividend policy of a corporation refers to its decision about the distribution of profits or the retention of profits as kept earnings for the purpose of funding future investment. Companies with high dividends are a good signal for investors, According to the Bird in the Hand hypothesis, high dividends have an impact on share demand and stock prices. If a

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company's stock price increases, it suggests that it is performing well and has the potential to generate additional profits, which will increase the company's worth.

The value of the company will increase over time if it becomes more profitable. The level of profitability is used as a reference for capital owners in determining the choice of whether to invest in the company or not. Companies that can increase their profits stably, The company is seen to be performing well, thus this will raise the worth of the business. (Aulia et al., 2016).

Measurement of company value has undergone many developments, from conventional to more modern, and is more capable of determining the value of a company. Tobin's Q is a ratio used to assess a firm's worth based on the possible movement of stock prices, the potential of managers to effectively manage corporate resources, and the possibility for investment growth. (Sudiyatno, 2010). The following is a table of the average ratio of LQ45 companies for the period 2018 to 2021:

**Table 1. Average Company Ratio LQ-45 for the Period 2018-2021**

No	Information	2018	2019	2020	2021
1	Natural Logarithm of Total Assets	31,05	31,14	31,12	31,28
2	Debt to Asset Ratio (DAR)	50,99	52,68	51,93	52,80
3	Dividend Payout Ratio (DPR)	38,66	35,45	30,99	28,73
4	Return On Assets (ROA)	7,95	7,35	5,42	6,62
5	Tobins Q	3,29	1,84	1,37	1,27

Based on Table 1 above, it can be concluded that the average ratio in LQ45 companies for the period 2018 to 2021 fluctuates and indicates that the company's management is not optimal.

### II. REVIEW OF LITERATURE

The goal of the trade-off theory in capital structure is to weigh the advantages and costs associated with using debt. Additional debt is still permitted if the advantages outweigh the disadvantages. Additional debt is no longer permitted if the cost of using debt is greater (Modigliani & Miller, 1963).

Bird In The Hand Theory explains that the expected probability of capital gains is greater than the fixed dividend yield, As a result, investors will demand a larger rate of profit for each jobless dividend yield (John Lintner, 1956).

The Company's Value of a corporation is what it has managed to collect as proof of public trust through a protracted process, namely since the company was founded until now (Denziana & Monica, 2016). Tobin's Q Ratio was used in this study to calculate the company's worth.

A company's size scope is measured by its company size, which might depend on a variety of criteria, such as the amount of revenue, total assets, and total equity (Brigham & Houston, 2010). This study calculated total assets using the natural logarithm to determine the size of the firm (Juliani & Tanwijaya, 2022). The overall assets owned increase in proportion to the company's size, making resources abundant. The quantity of resources available is optimally used for investment operations, increasing the company's profitability. investors will be drawn to huge corporations because of the potential for significant returns from the profits the company makes, which will raise the stock price of the company. The worth of the company will rise as a result of the rise in stock price.

The capital structure outlines the connection between funding-source own capital and capital derived through long-term debt (long-term liabilities). The Debt to Asset Ratio (DAR) is the metric that this study uses to assess the capital structure.

A company's choice on how much of its net profit will be dispersed as dividends or retained earnings is known as its dividend policy (Deitiana, 2011). The Dividend Payout Ratio (DPR) is the formula employed in this study to assess dividend policy (Gumanti, 2013).

The capacity of a business to turn a profit with the money it has is known as profitability (Permata, 2014). Return On Asset (ROA) is the profitability metric employed in this study.

### III. OBJECTIVES OF THE STUDY

The purpose of this study is to test the level of Effect of Company Size, Capital Structure and Dividend Policy on Company Value with Profitability as an Intervening Variable in LQ-45 Companies Listed on the Indonesia Stock Exchange for the 2018-2021 Period.

# Measuring Company Value with Intervening Profitability Variables in Companies Listed on the Indonesia Stock Exchange's LQ-45 Index for the 2018–2021 Period

## IV. HYPOTHESES

The total assets possessed by the firm are reflected in the size of the business; the larger the business, the more assets owned by the business, and the more money the business will require to continue its operational operations. The management's judgment about the firm's usage of funds will be influenced by its bigger size in order to maximize the worth of the company (Khoiriyah, 2017). From this explanation, it is hypothesized that H1, namely the Size of the Company has a positive effect on the value of the company.

According to the trade-off theory, businesses that use debt to a certain extent are valued more highly than those that do not, but companies that continuously increase debt indefinitely will increase the company's risk, a higher level of debt will, therefore, boost the company's worth to some extent. From this explanation, it is hypothesized that H2, namely The value of the company is positively impacted by the Capital Structure.

According to the Bird in the Hand Theory, investors favor dividends over capital gains because dividend yields are viewed as being more reliable and secure, besides that high dividends will influence investors' decision to make investments in the business in order to raise its value. The dividend policy that the firm management decides must be more carefully considered because it will impact the company's future value (Yuniningsih et al., 2019). From this explanation, it is hypothesized that H3, namely Firm value is positively influenced by dividend policy.

The size of the company contributes to the value of the company from its profitability. Large companies in general can expand the market and have a greater opportunity to make a profit and show success in developing their business so that the company has investors who are interested in investing. Because the business prospects are so promising and the company's stock price is increasing, the growth in company profits also increases the company's value (Octaviany et al., 2020). From this explanation, it is hypothesized that H4 is that Profitability mediates the influence of Company Size on company value.

In other words, cost savings and tax deductions outweigh the interest costs generated by the loans. Benefits coming from the existence of debts surpass the sacrifices made by the firm from the debts issued. The company's profitability will rise as a result of the increased debt since it will result in more net income. The company's strong profitability will serve as a favorable indicator for potential investors and shareholders, increasing their interest and the demand for the company's shares. A rise in share demand will drive up stock prices and boost the company's value (Dinata & Krisnando, 2020). From this explanation, it is hypothesized that H5, namely The impact of the capital structure on the company's value is moderated by profitability.

The Bird in the Hand Theory states that the prediction of future profit growth is influenced by the size of the dividend payout ratio. Investors will be drawn to investing in companies with high dividend rates and will maximize the performance of companies that have the potential to generate more profits. High profits also signal that a company's prospects are favorable, which can prompt investors to increase stock demand. The value of the firm rises as a result of the increasing demand for stocks. From this explanation, it is hypothesized that H6, namely Profitability, mediates the effect of the Dividend Policy on company value.

## V. RESEARCH METHODOLOGY

Quantitative research techniques were used in this study. The research site is the Indonesia Stock Exchange (IDX), which may be accessed at [www.idx.co.id](http://www.idx.co.id), the Indonesia stock exchange's official website, to obtain information on the financial statements of the firm. Companies that are part of the LQ-45 index and are listed on the Indonesian stock exchange comprise the population considered in this study (IDX), namely there are 63 companies for the period 2018 to 2021. Sampling using purposive sampling technique sampling method based on criteria, from a total population of 63 companies only 28 companies employed as study samples since they satisfied the criteria. Data type is quantitative data. This study's data came from a secondary data source. Data collected from an existing source that is considered a secondary data source, already collected, and processed form by another party.

A non-participant observational approach, which involves observing while acting only as an independent observer, was used to obtain data for this study. Furthermore, Library Research (Literature Study) is by studying theories, concepts from various literature and research pertaining to the issue being studied. The data analysis techniques used are descriptive statistics, classical assumption tests (normality test, multicollinearity test, autocorrelation test, and heteroskedasticity test), multiple linear regression analysis (t-test), and path analysis with the IBM SPSS Statistics program with 2 equations as follows:

$$\text{Equation 1 : } Z = P_{Z.X_1} X_1 + P_{Z.X_2} X_2 + P_{Z.X_3} X_3 + P_Z \epsilon$$

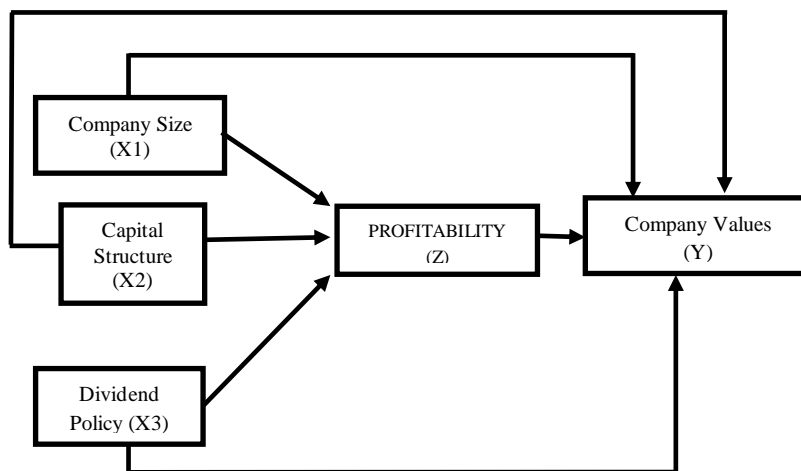
$$\text{Equation 2 : } Y = P_{Y.X_1} X_1 + P_{Y.X_2} X_2 + P_{Y.X_3} X_3 + P_{YZ} Z + P_Y \epsilon$$

# Measuring Company Value with Intervening Profitability Variables in Companies Listed on the Indonesia Stock Exchange's LQ-45 Index for the 2018–2021 Period

## Description

- Y : Company Values
- $P_{YX_1}$  : Variable path coefficient  $X_1$  to Y
- $X_1$  : Company Size
- $P_{YX_2}$  : Variable path coefficient  $X_2$  to Y
- $X_2$  : Capital Structure
- $P_{YX_3}$  : Variable path coefficient  $X_3$  to Y
- $X_3$  : Dividend Policy
- $P_{YZ}$  : Variable path coefficient Z to Y
- $P_{Y\epsilon}$  : Error Standard path coefficient Y
- Z : Profitability
- $P_{ZX_1}$  : Variable path coefficient  $X_1$  to Z
- $P_{ZX_2}$  : Variable path coefficient  $X_2$  to Z
- $P_{ZX_3}$  : Variable path coefficient  $X_3$  to Z
- $P_{Z\epsilon}$  : Error Standard path coefficient Z

## VI. CONCEPTUAL MODEL



## VII. DATA ANALYSIS RESULTS AND DISCUSSION

Normality test results using the Kolmogorov-Smirnov test obtained the results of the analysis that the value of Asymp. Sig (2-tailed) i.e. 0.69 greater than  $\alpha = 0.05$  (5%) meaning Non-Significant. Thus the research variables have a normal distribution, so it can be concluded that all these data meet the assumption of normal distribution.

**Table 2. Test the Classical Assumptions of Equation 1**

Variable	Collinearity Statistics		Unstandardized Residual (Sig. 2-tailed)	Durbin-Watson
	Tolerance	VIF		
LnTA	0,981	1,019	0,088	1,732
DAR	0,985	1,015	0,462	
DPR	0,989	1,011	0,789	

**Predictors:** (Constant), DPR, DAR, LnTA

Dependent Variable : ROA

The results of the analysis stated that this study showed in equation 1 the absence of symptoms of multicollinearity in all free variables where the VIF value on all variables is smaller than 10 and the Tolerance value is greater than 0.01. And the results of the analysis show that the correlation value between the free variable in equation 1 and the residual, namely in the variables Company Size, Capital Structure and Dividend Policy does not have a significant correlation with the residual because the sig

## Measuring Company Value with Intervening Profitability Variables in Companies Listed on the Indonesia Stock Exchange's LQ-45 Index for the 2018–2021 Period

value (2-tailed) is greater than 0.05, so the results of this analysis can be concluded that the regression model in equation 1 does not occur Heteroskedasticity. Furthermore, the results of the analysis showed the result that Durbin Watson's value was 1.732. Durbin Watson Table values with data count  $N = 87$  and Number of Independent Variables ( $K$ ) = 3 and  $\alpha = 0.05$  are  $dL = 1.5808$  and  $dU = 1.7232$  and value  $4 - dU = 4 - 1.7232 = 2.2768$  Because the value of  $dw = 1.732 > dU = 1.7232$  and  $dw = 1.732 < 4 - dU = 2.2768$ . Thus no autocorrelation occurs.

**Table 3. Test of Classical Assumptions of Equation 2**

Variable	Collinearity Statistics		Unstandardized Residual (Sig. 2-tailed)	Durbin-Watson
	Tolerance	VIF		
LnTA	0,913	1,095	0,937	2,224
DAR	0,964	1,038	0,266	
DPR	0,934	1,071	0,908	
ROA	0,869	1,151	0,888	

Predictors: (Constant), ROA, DPR, DAR, LnTA

Dependent Variable : TOBINS'Q

The results of the analysis stated that this study showed in equation 2 the absence of symptoms of multicollinearity in all free variables where the VIF value on all variables is smaller than 10 and the Tolerance value is greater than 0.01. And The analysis's findings indicate that the correlation value between the free variable in equation 2 and the residual, namely in the variables Company Size, Capital Structure, Dividend Policy and Profitability does not have a significant correlation with the residual because the Sig value (2-tailed) is greater than 0.05, so the results of this analysis It be deduced that equation 2's regression model does not occur Heteroskedasticity. Furthermore, the results of the analysis showed the result that Durbin Watson's value was 2.224. The value of Durbin Watson Table with the sum of data  $N = 87$  and Number of Independent Variables ( $K$ ) = 4 and  $\alpha = 0.05$  is  $dL = 1.5567$  and  $dU = 1.7485$  and the value of  $4 - dU = 4 - 1.7485 = 2.2515$  Because the value of  $dw = 2.224 > dU = 1.7485$  and  $dw = 2.224 < 4 - dU = 2.2515$ , thus no autocorrelation occurs.

**Table 4. T Test Results Equation 1**

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	19.320	5.667		3.409	.001		
	LnTA	-.441	.177	-.257	-2.487	.015	.981	1.019
	DAR	-.048	.036	-.141	-1.365	.176	.985	1.015
	DPR	.058	.026	.228	2.220	.029	.989	1.011

a. Dependent Variable: ROA

Based on table 4 shows that the size of the company negatively affects profitability, sig. 0.015 is less than the value of 0.05 (5%) and the path coefficient is -0.257 while Profitability is not significantly impacted by the capital structure, with sig. 0.176 is greater than the value of 0.05 (5%) and the path coefficient of -0.141 furthermore Profitability is significantly affected by the dividend strategy, with sig. 0.029 is less than the value of 0.05 (5%) and the path coefficient is 0.228.

**Table 5. T Test Results Equation 2**

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-.216	.719		-.301	.764		
	LnTA	.050	.022	.198	2.272	.026	.913	1.095
	DAR	-.011	.004	-.218	-2.563	.012	.964	1.038
	DPR	-.001	.003	-.027	-.316	.753	.934	1.071
	ROA	.089	.013	.614	6.860	.000	.869	1.151

a. Dependent Variable: TOBIN'S Q

## Measuring Company Value with Intervening Profitability Variables in Companies Listed on the Indonesia Stock Exchange's LQ-45 Index for the 2018–2021 Period

Based on table 5 shows that The worth of the company is significantly influenced favorably by the size of the business, with sig. 0.026 is less than the value of 0.05 (5%) and the path coefficient is 0.198 while The company's worth is significantly impacted negatively by the capital structure, with sig. 0.012 is less than the value of 0.05 (5%) and the path coefficient is -0.218, furthermore, the dividend policy has a non-significant effect on the value of the company, with sig. 0.753 is greater than the value of 0.05 (5%) and the path coefficient of -0.027 and A company's value is significantly increased by profitability, with a sig. 0.000 is less than the value of 0.05 (5%) and the path coefficient is 0.614.

**Table 6. Direct and Indirect Influences**

	Coefficient	Sig.	Result
<b>Direct Influence:</b>			
Company Size → Company Values	0,198	0,026	H <sub>0</sub> Accepted
Capital Structure → Company Values	-0,218	0,012	H <sub>0</sub> Accepted
Dividend Policy → Company Values	-0,027	0,753	H <sub>0</sub> Rejected
Profitability → Company Values	0,614	0,000	
Company Size → Profitability	-0,257	0,015	
Capital Structure → Profitability	-0,141	0,176	
Dividend Policy → Profitability	0,228	0,029	
<b>Indirect Influences:</b>			
Company Size → Profitability → Company Values	$(-0,257) \times (0,614) = -0,158$	0,019	H <sub>0</sub> Accepted
Capital Structure → Profitability → Company Values	$(-0,141) \times (0,614) = -0,086$	0,190	H <sub>0</sub> Rejected
Dividend Policy → Profitability → Company Values	$(0,228) \times (0,614) = 0,139$	0,033	H <sub>0</sub> Accepted

Based on table 5 demonstrates that the impact of firm size on company value is mediated by profitability, by obtaining significant value data of 0.019 smaller than 0.05 (5%) and an indirect influence coefficient of -0.158 subsequently profitability does not affect how The company's value is impacted by the capital structure, by obtaining significant value data of 0.190 greater than 0.05 (5%) and indirect influence coefficient of -0.086 and Profitability mediates the impact of the dividend policy on the company's value, by obtaining significant value data of 0.033 smaller than 0.05 (5%) and an indirect influence coefficient of 0.139.

### The Effect of Company Size on Company Value

The results showed that the size of the company had a significant positive effect on the Company's Value by obtaining data on the value of the direct influence coefficient of 0.198. On significance, the value obtained a result of 0.026. The results of this study can be interpreted as a positive number contained in the t-count which indicates that the bigger a company, The worth of the company will increase, and vice versa.

A large firm will imply that it has stronger control over market circumstances, and in this research, the size of the company is determined by the natural logarithm of total assets. Boosting total assets every year is the company's step in increasing company value, so that the company can face economic competition which makes the company less vulnerable to economic fluctuations.

### The Effect of Capital Structure on Company Value

The data on a direct effect coefficient value of -0.218 on a significance value of 0.012 revealed that the Company's Capital Structure had a substantial negative impact on Firm Value. The results of this study can be interpreted as a negative number contained in the t-count which indicates that the greater the debt of a company, the smaller the company's value and vice versa.

The comparison of debt to total assets is used in this study to determine the capital structure. The higher the value of the comparison of debt to total assets, the higher the risk borne by the company, as assets are one of the indicators that investors use to determine whether the company can pay its debts or not. The likelihood that the firm will be able to repay its debts with its total assets is decreasing as the DAR ratio rises, which would discourage investors from investing and lower the company's value.

### The Effect of Dividend Policy on Company Value

The findings revealed that the dividend policy of the company had no discernible impact on firm value by obtaining a coefficient value of -0.027 at a significance value of 0.753. According to the study's findings, a company's dividend payout will not have an impact on its market value.



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Because dividend yields are viewed by investors as more certain and secure than capital gains, they prefer to invest in companies that pay high dividends. However, paying high dividends will also lower the company's operating costs, which will limit its ability to perform optimally and cause its value to fall. Because of this, the dividend policy has no impact on the company's worth.

### The Effect of Company Size on Company Value Through Profitability

The findings demonstrated that profitability moderate the connection between firm value and company size by obtaining a significance value of 0.019 less than 0.05 (5%) and an indirect effect coefficient of -0.158. Large companies have larger resources than small companies, these resources can maximize company operations so that It will impact the company's profitability and expansion. Increased profitability is one of the factors that investors look for when deciding whether to invest in a company, and indirectly, via profitability, the size of the firm will raise its worth.

### The Effect of Capital Structure on Company Value Through Profitability

The findings demonstrated that, using the data at hand, profitability was unable to mediate the link between capital structure factors and company value with a significance value of 0.190 greater than 0.05 (5%) and an indirect effect coefficient of -0.086. Debt to a certain extent will generate profits because with this debt the company has more sources of funding for its operations so that it will increase profitability and is viewed favorably by investors, but with the continued increase in debt so that interest is greater than profit will actually reduce profitability and will be viewed badly by investors resulting in the value of the company. The uncertainty indicates that profitability cannot mediate the relationship between capital structure and firm value.

### The Effect of Dividend Policy on Company Value Through Profitability

The results showed that profitability was able to mediate the relationship between dividend policy variables and firm value by obtaining a significance value of 0.033 less than 0.05 (5%) and an indirect effect coefficient of 0.139. A high dividend policy will be viewed as good performance by investors and potential investors because it can provide welfare for shareholders so that investors want to invest in the company. The capital that a company gets from the sale of its shares can maximize its performance and get greater profits than before, increasing profits in a company will increase its value of the company.

## VIII. CONCLUSIONS

The worth of the Company is influenced by its size. This identifies that the larger a company is, it is seen as good by investors so the value of the company will be high. The value of the corporation is influenced by the capital structure. This shows that investors view high corporate debt as dangerous, which will cause them not to be interested in investing in it and cause the company's value to fall. The dividend policy does not raise the company's worth. This shows that the amount of the dividend paid by the corporation has no bearing on the rise and fall of a stock's value. Company Size through Profitability can contribute to Company Value. Profitability through capital structure does not increase the company's value. Dividend Policy through Profitability contributes to the Company's Value.

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## Digital Transformation in Islamic Banking

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**ABSTRACT:** The purpose of this study is to examine digital transformation in Islamic banks. Data were obtained through a survey questionnaire from three Commercial Sharia Banks in Aceh: BSI, BCA Syariah, and Bank Aceh. A descriptive analysis was carried out to examine. First, the reasons for these Islamic banks using digitization are related to the technology used as well as the status and position in the use of digitization; second, reviewing regulations, challenges, prudential risks, and the stability implications of digitizing Islamic banking. This study found that in most Islamic Banks, in this case, Bank Syariah Indonesia (BSI), BCA Syariah, and Bank Aceh, the digitalization process is still ongoing but has gained greater traction since the COVID-19 pandemic. The main reasons for the main impetus in carrying out digital transformation include strengthening competitiveness, increasing operational efficiency, and increasing customer satisfaction. Technologies adopted include mobile and digital wallets, biometric authentication, and artificial programming interfaces. Nevertheless, the push for digital transformation has been hampered by the limitations of digital infrastructure in Islamic banking's lack of human resources and architecture. This research discovers the benefits and risks of the implications of digitalization for the stability of the Islamic banking industry in Indonesia and provides valuable recommendations for the progress of Islamic banking in particular in Aceh and Indonesia in general.

**KEYWORDS:** Islamic Banking; Stability; Digital Transformation

### A. BACKGROUND

Adopting innovative technologies and business models is a prominent emerging trend that is fast changing the ecosystem of the Islamic Financial Services Industry (IFSI), and Islamic banks (IBs) are not immune to these developments. Before the outbreak of the COVID-19 pandemic, digitalization in the Islamic banking industry had been building momentum and increasingly transforming the financial products and services rendered. As many countries were entering the recovery phase of the first pandemic wave, a second wave was recorded and subsequently compounded by discovering a new and more infectious mutation of the SARS-CoV-2 virus.

The consequential reintroduction of movement restrictions and physical distancing as measures to flatten the curve of the spread of COVID-19 has also added speed to the need for digital transformation in rendering financial services. Digital transformation is crucial to sustaining the growth momentum of the Islamic banking industry (IFSB's Islamic Financial Services Industry (IFSI) Stability Report 2020) by broadening its current outreach, exploring new horizons, identifying untapped potentials, and unlocking opportunities, especially in financially developed markets but with minimal or no presence of Islamic banking. (<https://www.salaamgateway.com>)

A radical departure is required from the traditional sales and product-inclined Islamic banking model to a collaborative or competition-induced innovative model of Islamic banking and financial service delivery. Such a model should align with the high expectations of today's tech-savvy and convenience-driven customers (<https://www.pwc.com/my/en/assets/workshops/2019>), whose digital banking behavior has also been evolving in parallel. Digitalising Islamic banking will bring about a myriad of opportunities for the growth of the industry. For instance, it will help IBs respond to changing customer structure and expectations and to the consequential disintermediation due to competition from new entrant non-bank Islamic financial services providers. Richer insights will be put into business decision-making due to the availability and processing of more granular data about customers' preferences and dispositions.

Digitalising Islamic banking will also enhance access to financing by micro, small and medium enterprises (MSMEs) (<https://www.worldbank.org/en/topic/smefinance>) and support value-based intermediation

(<https://www.bnm.gov.my/index.php?ch=en>) among offering many other benefits. Digitalization will enhance IBs' compliance with regulatory requirements and risk management capabilities. Moreover, supervisory activities and capabilities of the regulatory and supervisory authorities (RSAs) would be enhanced due to the resultant operational efficiency and effectiveness

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brought about by the automation of supervisory processes and improved real-time data capture and use. RSAs have also strengthened their consumer protection role by leveraging technology to augment their consumer complaints management system through, for instance, a chatbot application for complaints handling

(<https://static1.squarespace.com/static/583ddaade4fcb5082fec58f4/t/5c62711941920237ef03d090/1549955392920/R2A+Chatbot+Case+Study.pdf>).

Digitalisation also promotes financial inclusion in line with the agenda of development finance institutions, regulators, standard setters, and other institutional stakeholders in the financial services industry.

(<https://www.youtube.com/watch?v=JTSb61PGrpM&feature=youtu.be>). In this regard, the positive implication of digital Islamic banking for financial inclusion is also noteworthy and in line with the global trend, as highlighted by the IFSB. (<https://www.ifsb.org/download.php?id=5519&lang=English&pg=/published.php>). This is due to the structural composition and dynamics of the traditional and potential customer base of the IBs. The median age of Muslims worldwide is 24 years compared to 32 years globally. Fifteen among the top 59 countries with smartphone penetration are Organisation of Islamic Cooperation (OIC) member countries. Compared to 49% worldwide, 72% of the unbanked population resides in OIC countries. (<https://www.dinarstandard.com/wpcontent/uploads/2018/12/Islamic-Fintech-Report-2018.pdf>).

Notwithstanding its numerous benefits, digitalization may also create exposure to potential risks that have implications for the financial stability and integrity of the Islamic banking industry. (FSP, 2019). Such may derive from how the incumbent IBs respond to the challenges arising from market structure dynamics, risks, and challenges involved in transforming to digital Islamic banking. Digitalization may also expose IBs to cyber-security risks, data quality issues, money laundering and financing terrorism (ML/FT) risks, and cloud concentration risks. Consumers and investors may also be exposed to protection issues. Sharīah non-compliance risks could also result from the special intricacies of the Islamic banking products and processes in the event of non-compliance with the essentials and sequence of automated Sharīah requirements due to programming error or system malfunctioning.

The regulatory implications of digitalization would depend on Banks' response to finding a balance between encouraging technology-based financial innovation while protecting consumers (OECD, 2018), supporting business operations, and promoting financial inclusion. This should be done without infringing on the fundamental premise of Sharīah

(<https://ceif.iba.edu.pk/pdf/IslamicFinTechReport19.pdf>) upon which Islamic banking is built. In this regard, Banks have also been issuing guiding frameworks and regulations, promoting regulatory sandboxes, and establishing digital banking institutions, including Islamic banks.

This paper investigates the digital transformation process in the Islamic banking industry. The scope of the paper covers only the three Commercial Sharia Banks in Aceh: BSI, BCA Syariah, and Bank Aceh. Given the exploratory nature of the research, except to enhance the explanation, no inferences are drawn, and no preferences are indicated for any of the numerous technology-driven financial innovations mentioned in the paper. Rather, a general overview is provided of the situation and the pertinent prudential issues.

## B. CURRENT STATUS OF AND RATIONALE FOR DIGITALIZATION OF ISLAMIC BANKS IN ACEH

### 1. Bank Syariah's Perceptions of Digitalisation

The first survey question asked the respondent IBs about what they perceive digital Islamic banking to be in the context of their operations. The responses provided generally fits into the definition of digital financial services (DFS) provided by the Organisation for Economic Cooperation and Development (OECD, 2018), which states that:

DFS involves financial operations using digital technology, including electronic money, mobile financial services, online financial services, i-teller, and branchless banking, whether through a bank or non-bank institution. DFS encompasses various monetary transactions such as depositing, withdrawing, sending, and receiving money and other financial services, including payment, credit, pensions, and insurance. DFS can also include non-transactional services such as viewing personal financial information through digital devices.

BSI of the respondents views digitalization of their operations from the perspective of what Islamic banking products and services they offer. BCA Syariah extends such views to include the various channels or platforms through which such services are offered to customers. And Bank Aceh Syariah also view the digitalization of its Islamic banking activities as enhancements to their operational efficiency, data security, regulatory compliance, and the customer experience in its entire ramification via technology. A noteworthy response offered by some IBs is that such digital operation is performed based on the permissibility offered by their operating license. As such, a digital Islamic bank is that which the relevant RSA duly licenses to provide all traditional banking and intermediation services while leveraging the latest technological advancements to improve its banking model. This could be either a fully digital retail bank, marketplace bank, or offering Banking-as-a-Service. (Jenik, Flaming, and Salman, 2020).

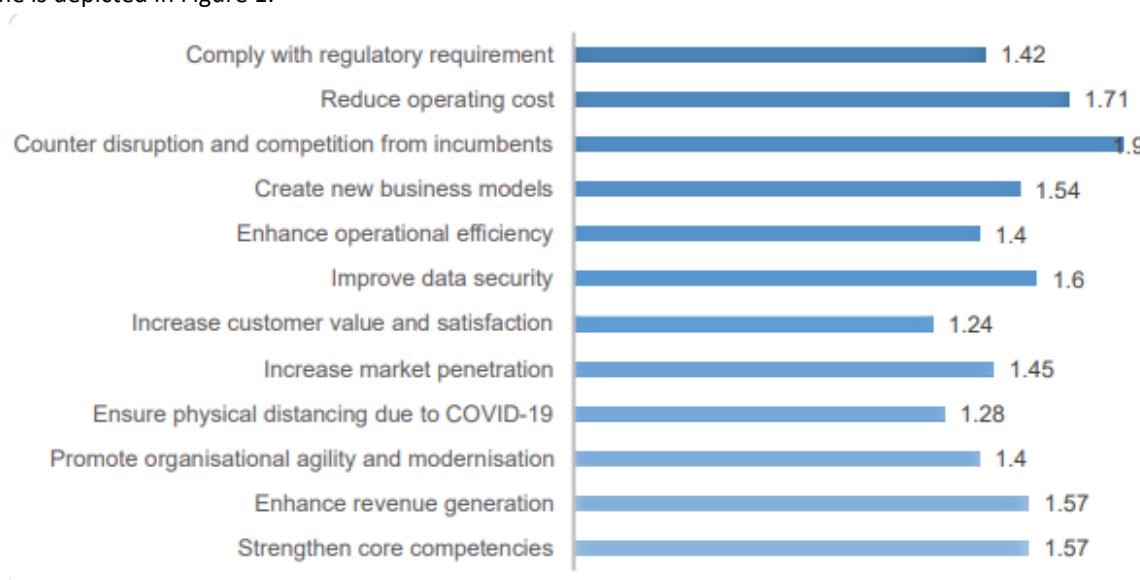
## Digital Transformation in Islamic Banking

Such a digital Islamic bank is, therefore, different from an Islamic neobank which, though it may offer Islamic financial services via technology, is not licensed to perform financial intermediation services. Perhaps, neobanks, in their bid to avoid regulation and compliance costs, would not opt to become licensed digital banks, so they would not be able to venture into activities like accepting deposits.

### 2. Rationales for Islamic Banking Digitalisation

The next question in the survey sought the responding IBs' (BSI, BCA Syariah, and Bank Aceh) rationale for embarking or proposing to embark on digital transformation. Across jurisdictions, customer satisfaction is considered a key rationale for digital transformation in Islamic banking. Specifically, other key rationales are moderated by the systemic significance of the domestic Islamic banking sector and structural and geographical factors. Competition and contestability are considered very pertinent among IBs in jurisdictions that have attained systemic importance.

IBs from some of these jurisdictions consider compliance with regulatory requirements as a key rationale for their digital transformation activities. Whereas, in jurisdictions with a very marginal share of domestic Islamic banking assets and a large population, market penetration and cost reduction are considered the prime rationale for most IBs' digital transformation. The COVID-19 outbreak has also impeded the digitalization process among IBs from these latter jurisdictions. Most IBs from Aceh consider improvement in data security as key. Based on the literature review, 12 possible reasons IBs should engage in digital transformation were listed in the survey questionnaire.<sup>1</sup> Participants' responses indicated that all the reasons stated are considered pertinent. A weighted mean analysis is conducted to determine the relative importance of each of these reasons. And the outcome is depicted in Figure 1.



**Figure 1. Reasons Why BSI, BCA Syariah, and Bank Aceh Engage in Digital Transformation**

Source: Data Survey, 2022

Specifically, with a weighted mean score of 1.9, the IBs generally consider countering disruption by new entrants and competition from another incumbent IBs as the relatively most pertinent justification for embarking on digital transformation. Both competition and competitors are changing, and IBs must respond accordingly. Competitive differentiation and contestability of the IBs will largely depend on to what extent they can digitalize their workplaces. This is crucial to enhance operational efficiency through the optimal combination of both front-office and back-office technology and to attract the right talents with the specific requisite human capital.

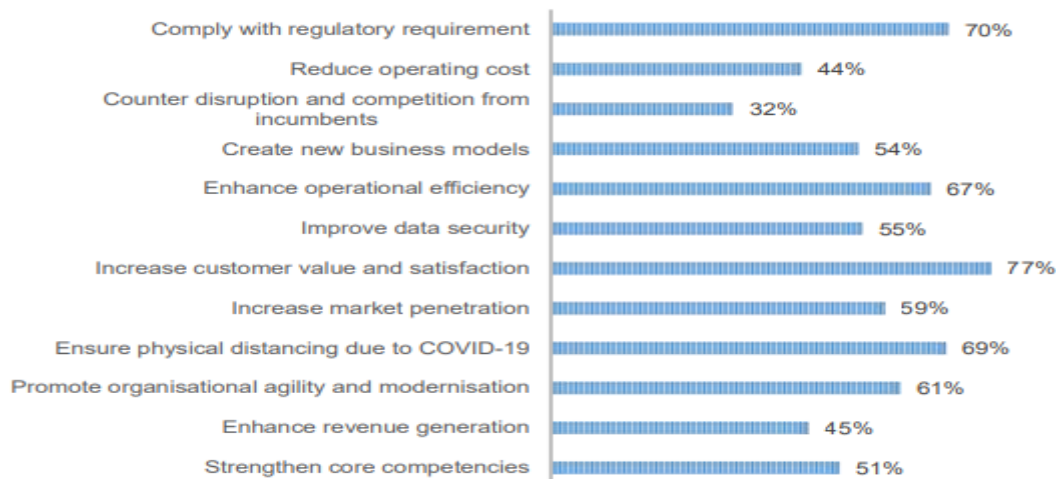
Competition and contestability are envisaged to increase further as new players come on board and regulators respond to finding a balance between encouraging innovation, protecting consumers (See OECD, 2018), and ensuring financial stability (X. Vives,

<sup>1</sup> The data from the questionnaire in relation to this and similar questions were generated on a scale of 1 to 5. In isolation and at varying percentages, responses to all 12 items were indicated as either "Strongly Agree" or "Agree", except in a few instances when the "Neutral" option was indicated. Explaining each item would require many tables to indicate what percentage is "Strongly Agree = 5", "Agree = 4", "Neutral = 3", "Disagree = 2", or "Strongly Agree = 1". However, the interpretation reflected in Figure 2.1 is based on weighted scores. The figures are absolute and are interpreted based on their degree. Each item is given an equal weight of 1, then multiplied by responses obtained from each IB respondent

## Digital Transformation in Islamic Banking

2019). The responses obtained, therefore, seems more of a pre-emptive justification than a contingent reaction to the threat from both FinTechs and BigTechs

(<http://cibafi.urbansoft.co.uk/Files/L1/Content/CI1809-CI1809-GlobalIslamicBankersSurvey2019Report.pdf>). This is because, at the moment, both large and small IBs consider competition from the new entrants' novel and technology-enabled business model as moderate at most. As shown in Figure 2, only 32%27 of the respondent IBs, "strongly agree" that competition from new entrants, when considered in isolation, is a reason for their digitalization process. These IBs are mainly from nine systemically important and one non-systemically important Islamic banking jurisdiction.



**Figure 2. The proportion of IBs that "Strongly Agree." with Reasons for Digitalisation**

**Source:** Data Survei, 2022

Customer satisfaction is a very important rationale for IBs' engagement in digital transformation in today's customer-centric financial market. Customer satisfaction as an important reason for digitalization recorded a weighted mean score of 1.24, as shown in Figure 1, with 77% of the respondent IBs29 also indicating that they "strongly agree" with this view considered in isolation in Figure 2. Customers want improved services at a lower cost and more convenience in their banking experiences. The future outlook of the financial system revolves around the repository and availability of and access to accurate yet comprehensive digitalized data about a customer. Such data are expected to be processed in real time based on algorithms to determine customers' creditworthiness, insurance, or investment preferences.

Simplification of banking processes and added convenience via technology have resulted in customer satisfaction, which has positive implications for banks' economic bottom lines. Changing customer demand, particularly from the increasing number of millennials who have grown up in a digitally connected world and do not have the same loyalty to banks as older generations, is adduced as one of the factors driving the prominence of digitalization. While some consumers, particularly corporates, remain loyal to banks, changing retail consumer expectations pressure banks to adopt various forms of technology to improve their services. This has brought about value, given that customers now have more access to hitherto restricted assets, more control of their choices, and more visibility in product development.

### 3. COVID-19 and digital transformation in BSI, BCA Syariah, Bank Acehs.'

The need to ensure physical distancing due to COVID-19 recorded a weighted-mean score of 1.24, as shown in Figure 1. Arguably, the outbreak of COVID-19 and the consequential need for physical distancing and efficient disbursement of funds to the needy have amplified the indispensability of the digitalization of banking services. Figure 2. indicates that 69% of the respondents at BSI, BCA Syariah, and Bank Aceh in Aceh "strongly agree" that the pandemic is an important reason for their digitalization process. Although cutting across all jurisdictions, most of the responses were from IBs from Aceh.

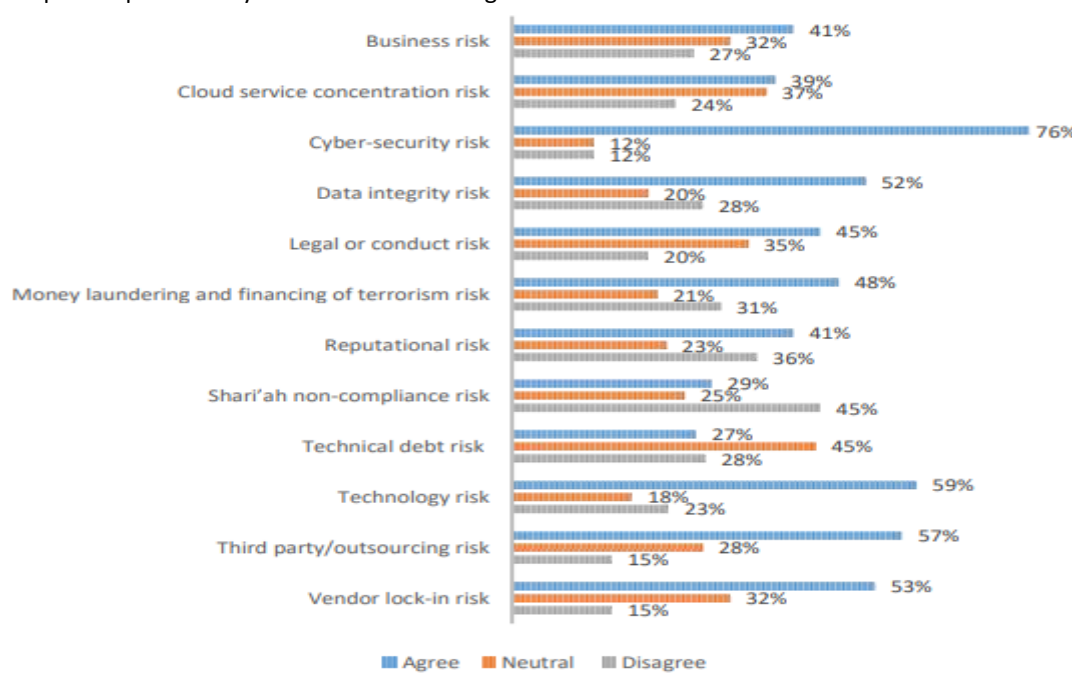
As a strategy to reduce the infection rate, contactless digital payments between persons and purchases in stores have been greatly encouraged since the pandemic outbreak. Incentives to use digital payments have also been provided in some instances, especially in developing countries.<sup>36</sup> The increased experience with online banking due to the restrictions on movement, especially since the first wave of the pandemic, does not favor the physical service delivery that bank branches are meant to provide.



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### C. Technology and Prudential Risks In BSI, BCA Syariah, Bank Aceh's Digitalisation

Technological adoption has not only opened the way to new possibilities and enhanced the operational efficiency of IBs (BSI, BCA Syariah, and Bank Aceh) but has also created potential risks. Responses obtained from the IBs that participated in the survey indicate that risks relating to cyber security, technology, third-party/outsourcing, and data integrity are of concern. The distribution of responses provided by the IBs is shown in Figure 3.



**Figure 3. Digital Transformation Risks Facing BSI, BCA Syariah, Bank Aceh's**

Source: Data Survey, 2022

Cyber-security risk seems to be the main prudential risk facing the IBs in their digital operation, especially those from Bahrain, Brunei, Egypt, Kuwait, Qatar, Saudi Arabia, and UAE. This risk is indicated by 76% of the IBs. The swift changes in technological advancement make the legacy infrastructure of many IBs highly susceptible to cyber risk. The CIBAFI Islamic Global Bankers' Survey in 2019 ranked cyber risk as the number one risk facing IBs.

This may not necessarily be an issue peculiar to IBs, as conventional banks are also faced with the issue of cyber security. As such, the potential for a cyber-attack on any financial institution is more a matter of when than if. It is projected that the cost of global cybercrime will reach USD 6 trillion by 2021. The effects of such attacks on perceptions about data integrity – indicated by 52% of the responding IBs – may also significantly interrupt business operations and have implications for public confidence in the technology.

High susceptibility to cyber-security risk may also create reputational risk for an IB's digital operation, as highlighted by 41% of the respondents. Given the implications of cyber-risk occurrence for financial stability, the focus of IBs should transcend cyber-risk prevention. Such a focus should also cover response, recovery, and adaptation, given that cyber risks are difficult to pre-empt yet evolve and transform swiftly with no trace of perpetrators. The FSB already notes the financial stability implications of such, especially in the event of a cyber-attack or an operational failure of cloud services. In a case where quite a several IBs rely on a few dominant cloud service suppliers, this could pose a systemic risk triggered by "cloud concentration" risk due to the operational centrality of computing services. This risk is also indicated by 39% of the respondent IBs. Such failures' effects on data integrity perceptions could also have implications for public confidence in the technology, thus creating reputational risk.

Other related prudential risks are legal and data security risks, which are indicated by 42% and 50% of the IBs, respectively. The former could arise due to the fragmented payment market, where many innovative products and services make governance, management, and control rather complex. For instance, in biometric authentication technology, a false acceptance or rejection could arise, depending on the unique biometric feature used. This could have implications for users' experience, thus leading to legal or reputational risks for an IB.

Although 59% of the respondent IBs strongly agree that technology risks have prudential implications for the digitalization of their banking operations, only 29% indicate that technical debt is a concern. The former risk occurs when either unsuitable or outdated technology is deployed for the bank's daily operations, such as the reconciliation of books of accounts. The latter occurs where additional avoidable costs would have to be incurred later by adopting and investing in a cheaper technology now as a

## Digital Transformation in Islamic Banking

short-term fix at the expense of a more expensive, efficient, and effective alternative. As indicated in Figure 3.3, almost half (48%) of the respondent IBs indicate they strongly agree that money laundering (ML) and financing terrorism (FT) risks might have prudential implications arising from digitalizing their operations. This concern is not peculiar to IBs, given that the perpetration of such crimes is driven more by opportunity and convenience than by an institution or transaction following Islamic banking.

Nonetheless, the proliferation of innovative financial products and processes due to financial technology should not make IBs more susceptible to ML/FT activities so that money launderers might use the sophisticated methods financial institutions employ to launder illicit funds. From a prudential risk perspective, Shari'ah non-compliance risk could crystallize from using mobile wallets, for instance. This could also potentially impact the risk profile of an IB, as indicated by 29% of the survey respondents. Such a risk could result from concerns that border on the non-specificity of the contracts upon which such mobile wallets are offered and the modus operandi.

Furthermore, the reduced costs and efforts required by customers for shopping around and switching banks due to technology may erode IBs' brand advantage and make customers less sticky. This will also have implications for the stickiness of deposits and investment accounts as cheap and stable sources of funding for IBs. This is because customers can easily and frequently optimize their surplus balances by moving funds from a lowly-remunerated transaction account to a more productive and higher rate of return-paying accounts or investments.

### D. CONCLUSION

The adoption of innovative technologies and business models is a prominent emerging trend that is fast-changing the ecosystem of the IFSI, and Islamic banks are not immune to these developments. Emerging technology is expected to revolutionize the financial sector further and enhance financial inclusion, accessibility, convenience, and efficiency. Both competitors and competition are changing, and the IBs need to respond accordingly through technology. A plethora informs the rationale for IBs' digital transformation drive of reasons mainly to enhance their competitiveness and contestability in the IFSI via operational efficiency and modernization of their business model. This is in response to the disruption of financial services rendered by new entrant Fintech start-ups and competition from incumbent IBs. This would entail that the IBs leverage technology to increase customer value and satisfaction, reduce operational costs, enhance revenue generation, strengthen core competencies, and improve data security, among other considerations. However, this should be done without infringing on the fundamentals of the Shari'ah.

The COVID-19 outbreak and the consequential movement restrictions and physical distancing as measures to flatten the curve of its spread have added to the need for digitalizing financial services, including those offered by the IBs. For instance, most IBs have also adopted the work-from-home policy, which requires remote access and strengthening of the security of their technology network. More than two-thirds of the IBs are at various stages of their digital transformation process. While the specific status of their implementation varies, it is promising to know that they have commenced. However, most of the IBs in this category also expended less than 50% of their most recent budget on IT-related activities. Those few IBs that commenced their digital transformation process before the outbreak of COVID-19 are expected to find it relatively easier than those that would have to react due to the inevitability of such transformation as a crucial post-COVID-19 economic recovery reality.

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## Metaverse: A New Digital Marketing Trend

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**ABSTRACT:** Modern society is seeing a fast uptick in technology adaptation and incorporation. The development of the internet and other modern devices has made it possible for systems to become further adaptable, diverse, and sophisticated, enabling them to handle the bulk of humanity's duties and burdens. The most successful technological advances in internet adaptation are virtual worlds and augmented reality. But the increased search for technical breakthroughs has made room for the most recent virtual world, called Metaverse. Metaverse has created the presence of the digital space and changed it into the actual world so that we are no longer just dependent on the internet via our screens. Utilizing virtual or augmented reality systems, it enables users to actively involve themselves in the virtual space where they may engage and innovate everyday choices in a time-based setting. The Metaverse has improved its accessories throughout the years. In order to provide customers with a holistic and true experience with the item or commodity they desire to purchase, companies and businesses are making use of automation's special and distinguishing features. Due to the rising competitiveness in the marketing industry, the Metaverse has given businesses and traders the opportunity to investigate technology aspects for more creativity. An introduction to the metaverse and its developments is presented in this paper.

**KEYWORDS:** Metaverse, digital marketing, marketing, online marketing, metaverse marketing, metaverse future

### INTRODUCTION

The Metaverse is a technical transition that comprises the creation of an incredible atmosphere for its customers, who often rely on either virtual reality or augmented reality to interact with the surroundings. In contrast to certain additional digital floors, the metaverse is a pervasive technology that possesses the capacity to live in actuality beyond the necessity of being turned "on" or "off" in order to maintain regular working or operating. The line between the actual and digital worlds has become more hazy as a result of the metaverse, which combines the two by fusing together real and digital technologies. The dependence and reliance on the virtual marketplace, which is fuelled by virtual content, nonfungible tokens (NFTs), and bitcoin, is another characteristic element of the metaverse. This paper offers a glimpse into the digitalization process along with various developments that have set the path for shifting consumer preferences. Within the equivalent scope, the paper investigates both the repercussions and the prospects. The marketing opportunities that social networks, browsers, and content merchandising provide are investigated in Metaverse. Individuals have a tremendous opportunity to thrive in their own efficient and internal responsibilities across the efficient use of advanced technologies in the metaverse. This is especially important in light of the fact that recent unforeseen lucrative and universal crises have been accompanied by ideological and ecological interruptions.

### THE DEVELOPMENT OF THE METAVERSE

The concept of the metaverse originally appeared in a 1992 Neil Stevenson book. It referred to a different real-world universe to which you were linked in order to act as a stand-in for yourself in augmented reality. Actual spatiality, absorption, and actual engagement are all made possible by the electronically realised nature of this universe. People in that realm possess new identities and distinct capabilities from those in the actual world. The metaverse as it exists now is still not at the same level as the actual world. The distinction of the metaverse is that it is immediately felt and interacted with when there is creativity that the movie depicts and empathises with. Consequently, it is technologically more challenging to execute and manage like a film, but it's also quickly becoming the latest craze with plenty of promise (Ondrejka, 2004). The Corona epidemic is to blame for the development of the Metaverse. Everything is pointing toward an electronic, quasi-lifestyle as fear of isolation, mobility flexibility, and groupings begin to dwindle. Nevertheless, this was simply a quickening of the tempo, which was so far moving in the right direction. Then why is the metaverse phenomenon happening now? Gilbert, Dionisio, & 2013). First off, over 60% of people on the planet make use of social media, and 92.8 percent of these individuals are constantly logged in using smartphones. A reality associated with

## Metaverse: A New Digital Marketing Trend

the Internet is known as the "metaverse." It can only be used, deployed, and accessed via the Internet. Catastrophic use started to develop in the metaverse, although in addition, 50% of people had constant access to the Internet.

Secondly, information processing must advance quickly. Particularly, the growth of GPUs (graphics processing units) is accelerating rapidly, directly influencing the growth of other innovations. A graphics card with such a massive number of GPUs was used in the extraction and processing, which was crucial to the blockchain network and the cryptocurrency mania that began with Bitcoin. In addition to time, there has been a significant increase in speed. The GPU is also being used to analyse pattern recognition and cognitive computing that were used during the "AlphaGo vs. Lee Sedol" Go match. Consequently, very good efficiency is needed, and GPU efficiency is rapidly improving in tandem with solving optimization problems. The metaverse should be visually simulated since it is a reality that is electronically inhabited. In the conclusion, the clarity and realism of the metaverse are significantly influenced by the GPU card's efficiency. The advancement of GPU, which has been fueled by the advancement of bitcoin and autonomous systems, is unquestionably a critical turning point in the metaverse (Liu et al., 2009).

## LITERATURE REVIEW

### Digital Marketing

Given today's marketing realities, many people predict marketing 4.0 in this historical period. The considerable shift away from commodity marketers toward those who are shoppers and eventually sentient is covered in Marketing 3.0. The future of marketing will be in developing goods, resources, and a workplace environment that uphold and represent the firm's core values. Marketing 3.0 contains a lot of information, particularly on technical development. Innovation is hardly anything new, as we can see and use it now. Technology has been advancing for a while, and its total influence has had a significant effect on advertising strategies across the globe. A new style emerged, primarily using the words "having shared" and "now" economics (Kotler, 2017; Al-Afifi et al., 2015). Virtual and conventional advertising will ultimately combine due to technological advancements. Everybody craves contact in this day of scientific development. Because we are social, we want to benefit from cutting-edge technology supported by large data interpretative, which makes goods less individualised and solutions more so. In the virtual world, it's important to take advantage of this contradiction; hence, a change in marketing strategy is required. Marketing 3.0 led to the development of marketing 4.0. (Kotler, 2017). Because of recent technological advancements, the globe has undergone an irreversible transformation. Improvements mostly pertain to marketing strategies. Marketing 4.0 is attained by the swift and ongoing integration of automated technologies (Vassileva, 2017). In marketing 4.0, marketing must change to reflect how the consumer journey in the digital economy is evolving. The goal of marketing 4.0 is to humanise companies by giving them characteristics similar to those of people. The next step is to investigate additional in-depth promotional material to establish contact with clients. This even illustrates ways advertisers may use promotion in the virtual world to increase sales. It's crucial to note that marketing 4.0 refers to the development and extension of sentient advertising to include all facets (Kotler, 2017).

Marketing is a field that is constantly evolving in accordance with the laws of progress, the requirements and demands of the customers, as well as the dominant commerce paradigm (Saravankumar and Lakshmi, 2012). Our whole personhood experience has altered as a result of this transition. Upright, restricted, and personal powers are defeated by flat, comprehensive, and societal powers. Buyers become more resilient as a result; people perceive themselves as threatened but are no longer intimidated by top brands and corporations. People generally like to relay tales of successful or unsuccessful brands or products. Consumer interactions are far more reliable than current promotional methods (Amri, 2020). The manufacturing procedure, everyday living, and the customer's lifestyle are all significantly impacted by innovations that go beyond what is reasonable. The notion of a marketing mix ultimately evolved since marketing 1.0, 2.0, 3.0, and 4.0 each have unique features (Başyazcolu & Karamustafa, 2018). Socialization has evolved into a powerful factor of influence that can outperform individual prejudices and even effective promotional messaging. While purchasing an item, consumers are more willing to base their decision on the opinions of their peers. Advertisers must welcome the transition to a corporate environment that is more vertical, accessible, and collaborative. Geographical and societal boundaries have no importance now that technology has made it possible for individuals to interact and discuss, and businesses will find it simpler to develop. The customer base would expand horizontally.

Consumers would be even more sceptical of advertising that relies on a wide range of resources, such as colleagues, relatives, admirers, and distant others (Salim, Rosdian, Marta, 2022). Consumers would eventually buy more common benefits than anyone else. Consumers would focus mostly on their networking sites (Kotler, 2017). When clients are pulled into the virtual world to encourage consumer experience with goods, marketability 4.0 may help the advertising strategy stick out now and stay ahead of the industry pandemonium (Dewi, 2020). Marketing is an industry's lifeline in commerce and is the only thing that could make it successful. The business model is crucial to the success of any item or service. Certainly, the effectiveness of our advertising strategies for goods and services may be judged by how satisfied customers are with whatever we provide (Mashuri, 2019). Virtual

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promotion is not intended to take the place of conventional advertising. Furthermore, a battle that goes on among consumers forces conventional and virtual marketing to coexist. Mostly in the initial phases of engagement among businesses and consumers, conventional advertising is crucial for creating curiosity and awareness. Virtual advertising becomes even more important whenever a client interacts and requests to be personally involved with the business. Using the most recent advancements in your activities is the most important function of online business. Online marketing is a little more accountable than traditional advertising, thus the emphasis is on obtaining outcomes instead of starting consumer connections (Kotler, 2017).

### **Digital Marketing Capabilities**

Digital marketing is a kind of advertising that promotes goods and items using social media as well as other internet sites, including personal laptops, cell phones, and smart devices, as well as other streaming media and business applications. Promotional activities have become more widespread as a result of the increased integration of virtual platforms throughout promotional initiatives and the rise in the usage of virtual devices by consumers in place of actual shops. Virtual advertising is a business's ability to use digitization to connect with all relevant parties in real time and maintain a constant connection in order to turn information obtained through advertising efforts into insightful information. Informational advertising, which necessitates good prediction insights, initiatives, and modern marketing capabilities, is an important area of focus for DMCs. It is little doubt that consumers are wasting more hours on online and virtual platforms for a range of purposes, from web browsing to actual item purchases. As a consequence of this tendency, advertisers are allocating a significant percentage of their marketing expenses to internet advertising.

### **Metaverse Marketing**

Since the Metaverse is still in the beginning stages of its development, the marketing-related economic strategies are now going through the trial validation process. The manufacturing, the selling, and the advertising of bundles are the metaverse advertising methods that are most often employed (Seok, 2021). The technology has advanced to the point where live broadcasts of the Metaverse ecosystem are now possible. This pertains to the realm of three-dimensional virtual worlds. The Metaverse systems are put into practise in order to record live shows and then upload these to the many web servers that are accessible inside the social media setting. Facebook, the dominant force in the world of technology, has unveiled a brand-new moniker named Meta, and since it is the originator of this forward-thinking idea, the company has allocated a substantial sum of ten billion United States dollars to be utilised for commercial reasons. The notion of advertising in the metaverse as just an alternative to internet shopping is a novel one for advertisers, so it presents new opportunities for earning income and making money. The idea of doing business on the internet and via electronic promotion was originally well received by customers; however, internet purchases, also known as e-shopping, haven't been able to compete against conventional stores. Brick-and-mortar retail interactions are preferred by customers because they allow for greater customer involvement, greater brand exposure, and much more opportunities for real-time updates. Electronic commerce might be phased out in favour of mobile marketing, which would result in a level of customer satisfaction that is more comprehensive, holistic, and genuine. This potential has been made available by the metaverse. As a result, advertising mostly in the Metaverse has supplanted the conventional 3D electronic commerce encounter through the use of a digitally linked setting, which offers better adaptable and cutting-edge alternatives (Swilley, 2015).

### **Impact of Metaverse on Marketing**

The metaverse seems to have the ability to bring about sweeping changes or alterations in societal attitudes as well as the conventional settings wherein they engage among themselves. The concept of a technologically comprehensive system that enables individuals to connect with one another in imaginary spaces is at the heart of the Metaverse, which has had an effect on interpersonal life. In a similar perspective, Metaverse seems to have a major transformative influence from the perspective of society, which poses issues for both customers and advertisers (Dwivedi et al., 2022). In terms of advertising, the Metaverse provides businesses with a one-of-a-kind and developing system that allows them to expand their own consumer base and relationship with prospective consumers inside the digital environment. Furthermore, going with the virtual world would give you the chance to add branding strategies in a way that is more distinct and varied than you would otherwise be able to do. According to the estimates, the transition of the paradigms of advertising with regard to the virtual world would unquestionably establish the standard for advertising as well as provide a strategic edge for both merchants and consumers. The transition as regards the virtual world, on the other hand, would need considerable adjustments to both the operational processes as well as the network technologies. This is an important point to bring up. The whole transition would necessitate a reorganisation of the organisations' monetary backing, as well as the assumption of extra expenditures associated with the setup and following education, along with other procedures necessary for the efficient operation of virtual worlds.



## **Metaverse: A New Digital Marketing Trend**

### **Metaverse Business Opportunities**

The Metaverse presents a wealth of potential business prospects by enabling the presentation of a diverse range of companies and goods within the context of an augmented world and three-dimensional setting. In contrast to traditional internet purchasing experiences, advertisers can now provide consumers with an interactive environment in which they can feel a genuine emotion associated with the products. Technology firms, sports titans, and corporations are leveraging the virtual world to create products that provide a comprehensive framework. The virtual world is of utmost significance to advertisers because it provides them with the opportunity to interact with consumers in a fresh and original manner by directing the consumers' focus to the things you are selling in an interactive and practical situation. The virtual world presents a unique chance to broaden brand recognition inside conventional product advertising in many different facets.

### **Metaverse's Approach to Marketing Via social media**

The traditional cycle of creation and distribution in the public is being replaced by social networking platforms, which make full use of mobile technology. The most recent advancements in social networks include the digitalization of material as well as the capabilities to design and distribute programmes that engage the online public. The advertisers are capable of expanding its international presence and raising consumers' knowledge of the business via the internet's dissemination of virtual material. Customers of internet platforms are given the ability to develop and advertise their own information through social networking platforms, which is an additional important aspect of the usage of social networking for commercial reasons. Due to the fact that social networking has increased the skills of internet consumers, these people now have the ability to strive to generate a competent pattern that is in accordance with the most emerging advancements as well as the needs of advertising (Gadalla et al., 2013).

### **Metaverse Search Engine Optimization**

In the same way that traditional virtual technology is at the leading edge of supplying people with facts and encounters across a variety of platforms, browsers would hold that position mostly in the virtual world. As a consequence, Search Engine Optimization (SEO) would become of the utmost importance for collecting and sorting virtual information in order to present consumers with outcomes that are correct and pertinent. In the same manner that digital retailers seek out new methods to improve their material in order to maintain a high ranking in Google outcomes, the people who generate material for the internet would be required to find methods for improving their own information so that it appears in the virtual world. Including the terms "virtual world," "virtual reality," or "augmented reality" in the title of your offering or service is going to be among the most suitable techniques to be discovered in the virtual world. In addition, it won't be sufficient to only depend on inserting the brand, so those responsible for the creation of the material would need to develop ideas and inventions in the hope of increasing the percentage of visitors who convert via SEO. As a result, advertisers are required to be prepared to devise a plan for search engine optimization (SEO) that is compatible with the needs of buyer contributions and its finding via gateway networks.

### **Risk Factors and Challenges for Marketers**

Because the idea is still in its infancy and hasn't yet been fully established, advertisers would be required to build advertising activities that would enable them to communicate with the greatest number of potential virtual world customers. The proponents of the digital world see it not only as a 3-dimensional or digital world, but instead as a whole naive civilization in its own right. If indeed the virtual world is to be considered a new kind of tradition in society, then its established norms of behaviour as well as its original ideas will need to be revised. However, throughout the implementation phase of the virtual world, there will be a need for a fresh perspective on ideals, social rules, psychological principles, or cultural practises. There is too much at stake to conduct an investigation into the practicability of determining the extent to which modern civilization is competent to accept the virtual world in respect of the redefinition of its principles. Concerning the issue of longevity, it is necessary to conduct research on the justice, equality, and confidentiality of people while they interact in the virtual world. In contrast to it, though, the application in the sphere of medicine, activities associated with wellness programmes, and practical advertising would be influenced by the broad adaptation of this. In addition, the presence of an addictive component in virtual world games as well as the use of non-fungible tokens and cryptocurrencies would have an impact on the social and moral heritage as well as the connections between individuals (Di Pietro & Cresci, 2021).

### **Future of Marketing**

Consumers are increasingly choosing approaches that are more sturdy, rapid, and effective in helping to save time. Promotional strategy, which usually requires digital transactions or real money expenses, is becoming less common as individuals look for ways to save time. The development of blockchains, which are an ecosystem designed to support digital activities, will have a major impact on the future of advertising. The traditional method of doing business on the internet, wherein customers make purchases

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and then patiently await their arrival according to established protocol, has been superseded by the virtual world. Customers would be able to make online purchases in an interactive experience to get a true feel for what the objects will do in the coming years when advertising makes use of blockchain-based technology that incorporates NFTs and cryptos. It'll be the future, and this would capitalise on this innovation. Leading automation corporations, including Facebook, Google, and Apple, have indeed made substantial investments in the virtual world and blockchain technology in order to pave the way for payments to take place in an interactive experience without a hitch.

### RESEARCH METHODOLOGY

The whole paper is predicated on secondary data that was gathered from a variety of different sources. The statistics come from the appropriate authorities of the departments as well as published research from a variety of researchers, which may be found on their respective websites or in their publications. In addition to these sources, data was gathered from a variety of books, journals, research papers, and other types of print media.

### CONCLUSION

Consumers will enjoy an interactive environment while purchasing or offering items via the use of a technique known as "virtual world advertising," which is an original and forward-thinking approach to digital advertising. Ever since conception, the Metaverse's gear has indeed been improved, and it is now being integrated into people's everyday lives as well as enterprises and industries in a variety of countries and regions. As a result of its provision of digital identities, the Metaverse realm has given birth to a new civilization in which individuals would engage in a three-dimensional place. In the current climate, companies and businesses all over the globe are investigating various methods in which they can benefit from the virtual world in order to give clients choices that are further cutting edge, adaptable, inventive, and imaginative in terms of how they can get their hands on the items and services they want.

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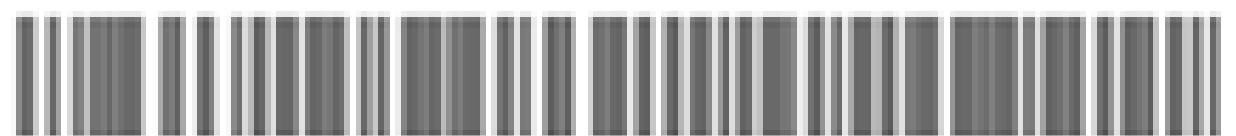
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