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FOREWORD FROM CHAIRMAN OF ADI

By saying thanksgiving, Alhamdulillahirabbil 'Alamin,

It is a reputable Scientific Publication Media aimed to foster research findings that concentrate on recent innovation and creativity to support advancement in global civilization and humanity, Adi Journal On Recent Innovation (AJRI) is continuously published by referring to the principles of journal writing. AJRI is a scientific journal published by Asosiasi Dosen Indonesia (ADI), to facilitate and accommodate the results of scientific journals of qualified academics in the field of Multidisciplinary.

According to the vision and mission of the AJRI Journal, In 2022, ADI Journal On Recent Innovation (AJRI) will become a journal publisher who succeeds in accommodating information on the development of Multidisciplinary throughout the world, contributing to researchers in promoting information on Multidisciplinary in the world. Therefore, AJRI always supports the Ministry of Research, Technology and Higher Education, Revised Implementing Rules And Regulations (RIRR) to prepare as early as possible the generation of the nation to face the education revolution era, one of which is through the quality ADI Journal On Recent Innovation (AJRI) journal, digitally packaged and based on Open Journal System (OJS).

AJRI is published 2 (two) times a year, in March and September. Insya Allah, the quality improvement will be achieved by registering AJRI in the journal indexation with the national reputation Science and Technology Index (SINTA) and the international level indexation of Scopus.

It is expected that through this journal AJRI, the downstream of education in the field of Multidisciplinary science can be realised better so that it can be beneficial for the entire academic community in ADI in particular and the global community in general in order to increase knowledge of Multidisciplinary science.



Indonesia, September 2020

Dr. Dino Patti Djalal
Chairman Of ADI

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FOREWORD FROM HEAD EDITORIAL

Bismillahirrahmanirrahim, praise and gratitude we pray over the presence of the Allah SWT who has given grace and guidance so that it can be finished publishing the AJRI Volume 3 Number 2 March 2022. Where the publication of this journal can be defined as media documentation and scientific information that can help lecturers, students and researchers in publishing research results, opinions and scientific studies to a wide scientific community. Publication of the AJRI Volume 3 Number 2 contains 10 papers, which evolves in the field of Multidisciplinary. Expected to be beneficial to a wide scientific community.

As for 10 (ten) journal published in this edition are:

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|-----|---|--|
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| 2. | Shella Azizah
B.P.Kusumo Bintoro
Regina Dinda Octavyra
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| 3. | Luthfi Aulia Faza
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On this occasion, we invite researchers to submit a manuscript to our editorial summary. Finally do not forget we say many thanks to all those who have helped the publication of this journal, in particular to participate in sending articles to our editors. May be useful for all of us.



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Indonesia, March 2022

Professor. Jalel Ben-Othman
Editor in Chief

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A New Method for Obtaining Global Estimates of Maternal Mortality

Sardjana Atmadja¹

Medical Faculty, University of Islam Negeri Syarif Hidayatullah Jakarta¹
Jl. Ir H. Juanda No. 95, Cemp. White, District. Ciputat Tim., South Tangerang City, Banten¹
Indonesia¹
e-mail: sardjana_spog@yahoo.com¹



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Abstract

Background: Maternal mortality is widely regarded as a key indicator of population health and social and economic development. Its rates and trends are closely monitored by the United Nations and others, inspired in part by the Sustainable Development Goals (SDGs), which call for a three-quarter reduction in the maternal mortality ratio by 2015. Unfortunately, the empirical basis for such monitoring is still quite weak, requiring the use of models. statistics to get estimates for most countries.

Objective: In this paper we describe a new method for estimating global rates and trends in maternal mortality. For countries that lack sufficient data for direct estimation of estimates, we use a parametric model that separates maternal deaths from deaths from HIV/AIDS.

Materials and methods: For maternal deaths not associated with HIV/AIDS, the model consists of a hierarchical linear regression with three predictors and variable intercepts for country and region. Estimated uncertainty is assessed by simulating the estimation process, taking into account the variability in both the data and other model inputs. This method was used to derive the most recent set of PBB estimates, published in September 2010. Here, we provide a brief description and description of the approach, including a novel analysis of the components of variability reflected in the uncertainty interval.

Results: Final estimates provide evidence of a more rapid decline in the global maternal mortality ratio than suggested by previous studies, including another study published in April 2010. We compared the findings of the two most recent studies and discussed topics for further research to help resolve differences.

Keywords: maternal mortality, multiple regression model, AIDS mortality, Millennium Development Goals.



1. Introduction

The most common statistical approaches used to study the pattern of relationships between variables are correlational and regression models[1], [2]. Both of these models have weaknesses in their application[3]. One of the weaknesses of the relationship (regression) model is that this approach is not capable of modeling structural equations related to solving relationships between variables and testing causal models involving observed variables (observable variables) and latent variables (latent variables). The Linear Structural Relationship (LISREL) model is an approach proposed to answer problems related to the structural equation model (Structural Equation Modeling = SEM).

2. Research Method

2.1 Materials and Methods

The relationship between variables in the model explains a concept of dependence. Of the three main variables built by the model, it shows that the model as an analytical system is always evaluated to provide an explanation that there are appropriate assumptions. Often a model can be interpreted with a causal relationship, this relationship gives the meaning of interdependence[4].

An analysis result that is presented shows that the relationship model based on measurements and observations provides a model construction that will be used as a reference for making optimizations[5]. The paradigm used is examination, by looking at the concept system and techniques of direct feedback mechanisms as a fundamental difference in decision making.

Evaluation of models constructed from complex or complicated shows that reducing assumptions on the built model will provide rigor and interpretation.

2.2 Literature Review

Objective

In this paper we describe a new method for estimating global rates and trends in maternal mortality. For countries that lack sufficient data for direct estimation of estimates, we use a parametric model that separates maternal deaths from deaths from HIV/AIDS[6], [7].

3. Result

The constructed model is quite good with a chi-square value of 48.89 and a probability of $p = 0.47743$. This means that this model can be used to optimize the objective function that has been formulated[8]–[10].

In this model the relationship between variables becomes important, this relationship will show a synergy to decrease a dependent variable which in this paper uses the Maternal Mortality variable. In further analysis, it will be calculated using an optimization function based on a mathematical model of the relationship between these variables. The results of this relationship analysis are presented in the following correlation matrix table,

Table 1 Results of Dominant Variable Correlation Analysis

	Work Ethic	Facilities Communication	Facilities Blood
Work Ethic	1	0.47	0.45
Facilities Communication	0.47	1	0.72
Facilities Blood	0.45	0.72	1

The results of the analysis in Table 1 with the relationship model in the table above there is a strong correlation between blood facilities and work ethic, this correlation indicates that the construction of the model built is valid, this construction model will be used as a reference for optimization. The paradigm used is a correlational relationship with the concept system and the technique of the feedback mechanism. Evaluation of the constructed model shows that there are limitations or incorrect assumptions. Observation reference, information management is carried out directly with the observation model.

The results of the optimization of the model with the objective function that has been formulated in the form of mathematical formulas, the objective function value is 127. These results indicate that the total contribution of all variables in the model with the aim of reducing maternal mortality is 57.73%. The percentage of this contribution is obtained by noting that the total contribution of all variables assuming that all variables have a maximum objective function value is 220 (44×5). $45.35\% = 127/220 \times 100\%$.

The objective function value of 127 shows that the contribution of the three main variables in the clinical management model in order to reduce maternal mortality in type c government hospitals is 57.73%. This result is actually not optimal, because each sub-variable in the three main variables has not been maximized. The optimization results show that there are sub-variables that can be increased to maximize the objective function[11].

Reducing maternal mortality to 45% in conditions of society and government that are hit by various crises is not easy, this study shows that by arranging three main variables with twelve sub-variables in clinical management can reduce maternal mortality up to 45%. This decrease can still be reduced by maximizing the sub-variables in the management model which, according to the optimization model, can still be improved. A summary of the optimization results is presented in the following table.

Table 2 Summary of Optimization Results for Work Ethic Variables

Variable	Value Objek Function ®											
	DOCTOR			MIDWIFE			NURSE			Employee PMI		
	v	c	s/s	v	c	s/s	v	c	s/s	v	C	s/s
Linear thinking (x1)	.476		4.52	5.00		0.00	5.00		0.00	5.00		0.00
Income (x2)	.000		5.00	.223		4.77	5.00		0.00	5.00		0.00
Holiday (x3)	.000		5.00	5.00		0.00	5.00		0.00	.736		4.26
Educatio n (x4)	.000		5.00	5.00		0.00	.075		4.92	5.00		0.00
Age (x5)	.000		5.00	5.00		0.00	5.00		3.49	1.51		5.00

Description: v = value c = coefficient s/s = slack or surplus

From table 2 above, it can be seen that the linear thinking sub variable for the doctor subject contributes 0.235% to the total model contribution of 57.73%, this result is obtained by multiplying the 0.45 value with the coefficient ($c = 5$). The slack or surplus value shows that the linear thinking capacity of the doctor subject can still be increased up to 4.52%. From these results it is also found that the capacity of linear thinking for the subject of midwives, nurses and PMI employees has reached the maximum value (value = 5), with the value of slack or surplus is zero[12].

Government policies in handling maternal mortality are more focused on midwives, nurses and paramedics, when in fact medical abilities, especially doctors, are not optimal, this can be seen from the results of the analysis which shows that important sub-variables such as

linear thinking are only used 20%. If 80% of the ability can be used, it can happen that management errors or mismanagement that have occurred so far can be corrected. In this optimization, it is also found that the sub-variables of income, holidays, length of education and age on the subject of doctors do not have much influence, meaning that if income is increased to a certain level, it does not significantly affect the performance of obstetricians. Likewise for the sub-variables of holidays, length of education and age. Empirical experience shows that the income of obstetricians outside government hospitals is much higher, so it is very possible that if the income at government hospitals is increased, it will still not affect the performance of doctors in government hospitals. The holiday sub-variable did not have a significant effect indicating that the obstetrician worked indefinitely[13].

Sub-variables of income for the subject of midwives, nurses and PMI officers have a significant effect on work ethic in the management model, this implies that income for the subject of midwives, nurses and PMI employees when increased will be able to improve their performance on the management model which has implications for increasing the value of function aim.

Education sub-variables for nurses and PMI employees are sub-variables that can still be improved to optimize the goals to be achieved.

Table 3 Summary of Optimization Results for Blood Facility Variables

Variable	Value Objek Function ®											
	DOCTOR			BIDAN			DOCTOR			Employee PMI		
	v	c	s/s	v	c	s/s	v	c	s/s	v	c	s/s
Blood Count (y1)	.000		0.00	5.00		4.62	.379		0.00	5.00		5.00
Linear thinking (y2)	.000		4.06	.393		0.00	5.00		0.00	5.00		1.56
Budget (y3)	3.43		0.00	5.00		0.00	5.00		5.00	.000		5.00

Description: v = value c = coefficient s/s = slack or surplus

The optimization results for the blood facility variable show that there is a difference in understanding the importance of this variable in the management model, this is indicated by a significant variation in the value for the blood count sub-variable and linear thinking sub-variable. According to the doctor subject, the amount of blood has no effect, meaning that whatever amount of blood there is, it must be used for operational purposes. On the other hand, the view that the amount of blood is very important is on the subject of midwives, nurses and PMI employees. This shows that knowledge or education level has a very strong influence in making decisions. Medical services cannot be separated from the main supporting facilities, one of the facilities identified as the dominant variable in clinical management is blood facilities. The optimization results on this variable indicate that the budget sub-variable has a significant and not optimal effect on achieving the objective function, this means that an increase in the budget will have an indirect effect on the management model that is built[14].

Table 4 Summary of Factor Optimization Results for Communication Facility Variables

Variable	Value Objek Function ®
----------	------------------------

	DOCTOR			BIDAN			DOCTOR			Employee PMI		
	v	c	s/s	v	c	s/s	v	c	s/s	v	c	s/s
Budget (z1)	.000		0.00	2.36		5.00	5.00		0.00	5.00		0.00
Team deal (z2)	1.93		4.90	5.00		5.00	.000		0.00	5.00		0.00
Linear thinking (z3)	5.00		0.00	.990		0.00	.000		0.00	5.00		0.00

Description: v = value c = coefficient s/s = slac or surplus

From table 4 above, it can be seen that the linear thinking sub-variable for the doctor subject gives the maximum contribution to the total model contribution of 45.35%, this result is obtained by multiplying the value (value) 5 with the coefficient ($c = 1$). The slack or surplus value indicates that the linear thinking capacity of the doctor subject cannot be increased anymore. From these results it is also found that the capacity of linear thinking for the subject of midwives, nurses and PMI employees cannot be increased with the slack or surplus value being zero. The thing that stands out from this result is the sub-variables of the team's agreement, from the subject of doctors it still needs to be improved until it reaches its maximum capacity. These results indicate that the fixed procedures for communicating between medical teams are still not well adapted. It is necessary to socialize the fixed procedures in communicating to the lowest level.

The structural model in Lisrel is a path relationship measurement model which basically aims to obtain a structural model. Parameter estimation in this model is based on variance-covariance matrix input data or correlation matrix, parameter estimation using variance-covariance matrix data input is very useful for prediction needs or for model proof. Parameter estimation method (estimation) can use ULS (Unweighted Least Square), TSLS (Two Stage Least Square), GLS (Generalized Least Square) or Recursive Model. If the input data is a correlation matrix, then this model will be very good for examining the size of the influence, either direct, indirect or the total effect of exogenous variables on endogenous variables[15].

Determination of the dominant influence of exogenous variables can be done by factor analysis which in this model is known as confirmatory factor. Measurement of the dominant influence of exogenous variables as measured by confirmatory factor analysis, can simultaneously check the validity and reliability of research instruments in relation to data analysis, also using a confirmatory factor approach.

4. Conclusion

The size of the level of validity of each indicator (manifest variable) in measuring the latent variable is indicated by the size of the loading (λ), in the analysis with standardized data (correlation matrix input).

The limit that can be used is the test result with t_{test} , if is significant (probability for $<$ used) it means that the indicator is valid. Examination of the size of the level of reliability of each indicator is indicated by the error value, namely for exogenous variables is and for endogenous variables is . The smaller the error value, it indicates that the indicator has high reliability as an instrument for measuring the relevant latent variable.

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Determining Factors of Continuance Intention to Use QR Code Mobile Payment on Urban Millennials in Indonesia Empirical Study on Mobile Payment Funds



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Shella Azizah¹, B. Kusumo Bintoro², Regina Dinda O³, Achmad Rachmat S⁴
Faculty of Economics and Social Sciences, University of Bakrie^{1,2}, Faculty of Science and
technology, University of Raharja^{3,4}
Rasuna Epicentrum area, Jl. H. R. Rasuna Said No.2, RT.2/RW.5, Karet, Setiabudi District,
Kuningan, Special Capital Region of Jakarta 12940^{1,2}, Modern, Jl. Jenderal Sudirman No.40,
RT.002/RW.006, Cikokol, Kec. Tangerang, Tangerang City, Banten 15117^{3,4}
Indonesia^{1,2,3,4}
e-mail: shella.azizah@bakrie.ac.id¹, kusumo.bintoro@bakrie.ac.id²
regina.dinda@raharja.info³, achmad.rachmat@raharja.info⁴



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Abstract

In this era where technological advances continue to open up business opportunities that allow new entrants with disruptive business strategies to be able to compete with established market leaders. This encourages companies to adopt new technologies, new ways of working to stay relevant in the digital age. This study aims to analyze the determinants of continuance intention to use QR Code Mobile Payment DANA on Urban Millennials in Indonesia which will provide formulation of recommendations for related industries based on the study results of this research. By using quantitative methods, which are used to measure variables in a subject. Through 6 stages in conducting research, which begins with problem formulation followed by preliminary studies, data collection, data analysis in which using the SEM method with PLS (Partial Least Square) followed by discussion and ends with conclusions and suggestions. After conducting a questionnaire assisted by special software that utilizes the PLS (partial Least Square) method, and the results obtained, DANA's QR Code Mobile Payment users will be interested in using it continuously if they already have trust, fun flow in use, and satisfaction. To achieve high trust from users, it takes a quality system and good service quality and understands user needs. DANA Mobile Payment QR Code users feel the flow of pleasure when transacting using the QR Code. Customer satisfaction can be increased by increasing the quality of information or output. Such as increasing the utility of customer service, or even replacing human customer service with AI-based customer service.

Keywords: Economy, QRCode, DANA, e-Wallet



1. Introduction

Internet use in Indonesia is very large and continues to increase every year, this can be seen from the data of 50 percent of the population. The internet and smartphones are critical to the wave of digital innovation that is disrupting industries around the world. Millennials is the term used to build on the rise of the Millennial generation. This means that gadgets have become an inseparable part of their daily lives. Gadgets are more suitable for use with equipment, thus creating a generation that is usually used by the name of equipment. Millennials are the backbone of the Indonesian economy because the previous population, namely Gen-X and Baby Boomers, declined in 2020. The dominant device used by Indonesian people is smartphone or tablet, namely 50.08 percent. In urban areas, smartphone ownership reaches 70.96 percent.

The dominance of the gadget generation (Millennial) in the economy makes industry players increasingly competing to create new businesses. One of them is the development of digital financial services, especially mobile payments. Global digital payment growth increased by 8.8 percent during 2010 to 2011 and reached 307 trillion transactionsxc[1], [2] .Digital transactions in Indonesia that use electronic money have the potential to become the main payment method. There are 38 mobile payment platforms that provide electronic money (e-wallet) with official licenses. DANA has shown its tenacity to become a pioneer of e-wallet applications in Indonesia. DANA has relatively stable monthly active users from the 4th quarter of 2018 to the 2nd quarter of 2019. Based on a report [3]in December 2019, DANA users reached 30 million users. QR Code technology for the DANA application is claimed to be the first in Indonesia.

DANA has now implemented the Quick Response Code Indonesia Standard (QRIS)[4]. This step was taken after the initiative of Bank Indonesia. During the COVID-19 pandemic, DANA has released the Home Shopping feature. This service connects DANA users directly with merchants through an instant messaging application. DANA uses advanced technology with a high level of security and guarantees 100% fund security.offline transactions DANA do not catch up with online transaction volume. The author proposes a study entitled Determinants of Sustainable Intentions to Use QR Codes in Urban Millennial Generation.

2. Research Method

2.1 Types of Research

This research uses a quantitative approach in which the data used are in the form of numbers[5]. The quantitative approach is the approach used in measuring the variables in a subject. While the method used in this research is a survey based on a questionnaire, which can be analyzed using mathematical or statistical techniques.

2.2 The Scope of research

The author chose the research location in the city of Jakarta and surrounding cities which are included in the Jakarta Metropolitan area, namely Jakarta, Bogor, Tangerang, Depok and Bekasi. Millennial Generation (born 1981 to 2000) who have used the DANA QR Code as a transaction payment method.

2.3 Data

Sources The data sources contained in this study are divided into two types, namely:

2.3.1 Primary data: Data obtained directly from the object of research through interviews based on questionnaires.

2.3.2 Secondary data: Data obtained from other sources and supporting literature.

2.4 Data Collection Methods

Data were obtained from various reference journals, books, scientific works, articles, and other written data as a source of the theoretical basis for this research. Field research was

conducted to obtain direct data from the object of research in the field. The data obtained came from the results of interviews with the research object.

2.5 The Population, Sample and Sampling Techniques

The population in this study are users of the QR Code mobile payment DANA in the Metropolitan area of Jakarta. This study uses a non-probability sampling technique, namely purposive sampling. The sample according to [5] is part of the number and characteristics possessed by the population.

2.6 Data Processing and Analysis Using SEM-PLS

The author chose the research location in the city of Jakarta and surrounding cities which are included in the Jakarta Metropolitan area, namely Jakarta, Bogor, Tangerang, Depok and Bekasi. Millennial Generation (born 1981 to 2000) who have used the DANA QR Code as a transaction payment method.

2.6.1. Structural Equation Modeling

Structural Equation Modeling (SEM) is a statistical modeling technique that is currently widely used by researchers[6]–[8]. SEM is a combination of factor analysis and regression analysis or aims to test the causal relationship between variables and quantitative data. The set of matrix equations represents the structural equations.

The popularity of SEM-PLS has increased significantly and is used in many fields. This is a seamless approach to SEM with no assumptions about the distribution of the data. For many years, CB-SEM (covariance-based) has dominated research on data size and shape. According to [9], [10]

CB SEM generates a covariance matrix without focusing on the variance described, while PLS-SEM minimizes the error term and maximizes the R² value of the endogenous construct. The PLS method is considered more appropriate to be used in this study related to the aims and objectives of the study.

2.6.2. Outer Model

Evaluation of the measurement model is carried out, among others, by testing the loading of reflective indicators, internal consistency reliability, convergent validity, and discriminant validity.

loading Reflective indicators used to measure the relationship between the indicator and its latent variables. An indicator is declared valid if the outer loading value is 0.708 or greater. In the initial experiment of distributing questionnaires to 30 respondents, the value of inner loading was obtained as below.

Table 4.05 Outer Loadings Value

Variable	Indicator	Outer Loadings	Description
System Quality	SYS1	0.876	Valid
	SYS2	0.832	Valid
	SYS3	0.788	Valid
	SYS4	0.723	Valid
Information Quality	INF1	0.843	Valid
	INF2	0.886	Valid
	INF3	0.923	Valid
	INF4	0.813	Valid
Service Quality	SER1	0.873	Valid
	SER2	0.794	Valid
	SER3	0.866	Valid
	SER4	0.775	Valid
Trust	TRU1	0.761	Valid
	TRU2	0.843	Valid

Flow	TRU3	0.894	Valid
	TRU4	0.878	Valid
	FLOW1	0.887	Valid
	FLOW2	0.889	Valid
	FLOW3	0.884	Valid
User Satisfaction	SAT1	0.882	Valid
	SAT2	0.924	Valid
	SAT3	0.931	Valid
	SAT4	0.924	Valid
Continuance Intention	CON1	0.937	Valid
	CON2	0.904	Valid
	CON3	-0.112	Invalid

Source: Data processed SmartPLS 2020

There is one reverse indicator, namely CON3 whose value is very small -0.112 so this indicator is declared invalid. There are 3 ways that researchers usually do if they find invalid indicators, namely:

2.6.2.1. Correcting

The questions in the questionnaire that are not valid and then redistributing them to respondents; 2. Discard invalid indicators; 3. Make predictions by changing the value of the questionnaire on the indicator, and then doing method number 1. The author chooses method number 2, which is to remove invalid indicators, because this method is the easiest and most efficient way.

2.6.2.2. Internal

Consistency reliability is used to evaluate internal consistency. A construct is said to be reliable if it has a composite reliability value and Cronbach's alpha value is above 0.7. There are two types of measurement indicators in internal consistency reliability - one based on composite reliability scores and the other based on alpha.

2.6.2.3. Convergent

Convergent validity is intended to measure the magnitude of the correlation between latent variables and indicators on the reflective measurement model. It is said to be achieved if the indicator construct explains more than half of the variance. An AVE value greater than 0.5 may indicate that, on average, the construct explains more than half of the variance of a given indicator. The method used to assess this is by looking at the average extracted variance (AVE value).

2.6.2. Discriminant validity

Discriminant validity can be calculated based on the value of the cross loading of the indicator variables for each latent variable. It means that a construct is unique and describes a phenomenon that is not represented by other constructs in the model. To assess discriminant validity is to test the cross loading of the indicator variables on each latent variable. The value of the cross loading of the related construction must be greater than the value of the other cross loading of the other construction.

2.7. The inner model

The inner model (internal relationship, structural model, and substantive theory) is measured using the collinearity evaluation (VIF) measures, looking at the coefficient of determination (R²), and evaluating the path coefficient value. Higher values in R² indicate greater explanatory power [9].

2.8. Discussion of the results of hypothesis testing

This section is a complete discussion of the results of hypothesis testing that we have evaluated with the path coefficient value obtained from the technique bootstrapping. The technique bootstrapping that has been developed by Geisser and Stone is used to obtain the significance value. T test is the test used in testing this hypothesis. H_0 is rejected if $|t_{\text{statistic}}| > t_{\text{table}}$ or $p\text{-value} < .$ The effect between variables is considered significant at the level of 5% if the value $t_{\text{statistical}}$ compared to the $t_{\text{value table}}$ is 1.96.

2.9 Literature Review

2.9.1. theoretical basis

2.9.1.1. Mobile payment

Mobile payment is an act of payment through a smartphone or mobile device [11], [12]. Researchers have defined mobile payment as a payment mechanism via mobile devices that uses both traditional and modern payment systems and allows users to securely transfer funds in a transaction from an organization or one individual to another.

Mobile payments are different from conventional electronic payments and must have the following characteristics [11]:

- When payment is required, mobile devices are used as the main payment instrument.
- Wireless communication technology is used by users to send messages.
- It is independent of time or space and can happen anytime anywhere.
- Can be used to buy products in the real or virtual world.
- Has the characteristics of personalization and action.

Based on the technology used, mobile payments are divided into two types [13], namely:

- Proximity payments, also called Contactless Payments or Close Payments. We can use technologies Near-Field Communications (NFC) and QR Code (Quick Response Code). NFC requires a contactless reader to communicate between devices. QR Code does not require a reader but requires a smartphone camera to scan the QR Code to communicate between devices.
- Remote Payments such as SMS Banking and USSD (Unstructured Supplementary Service Data). The format of the SMS sent, and the USSD instructions (e.g., * 141 * 28 #) from the smartphone will be processed on the server.

2.9.2. E-Wallet

In Bank Indonesia regulation number 18 / 40 / PBI / 2016 Article 1 Paragraph 7 concerning the implementation of payment transaction processing explains that an electronic wallet (Electronic Wallet) hereinafter referred to as an electronic wallet is an electronic service for storing payment instrument data, among others means of payment using cards and/or electronic money, which can also accommodate funds, to make payments [14], [15]. The maximum limit of funds that can be accommodated in an electronic wallet is up to Rp. 10,000,000 and will be regulated in a circular letter from Bank Indonesia. Electronic money is a non-cash payment instrument issued on the basis of the value of the money deposited in advance.

2.9.3. QR Code

QR Code stands for Quick Response, which can be translated at high speed. Designed by a Japanese company called Denso Wave in September 1994 to track vehicle inventory [13]. Two-dimensional barcodes represent 2-dimensional information that can be read from a vertical or horizontal direction.

In 2019 Bank Indonesia issued a regulation on QRIS[16], [17]. It was further explained that QRIS as the national standard for QR Code Payments was set by Bank Indonesia[12], [18]. Then the management of QRIS is carried out by the Standards Agency appointed by Bank Indonesia.

2.9.4. The Urban

A large number of people who have higher education is the main reason for urbanization, because they are reluctant to return to their place of origin[19]. Changes in the composition of the rural-urban population are not only geographical changes, but also changes in culture, social values and behavior.

2.9.5. Millennials

Millennials (also known as Millennial Generation or Generation Y) are the demographic group after Generation X[20]–[22]. They are the generation born between 1981-2000, or those who are currently 20-39 years old. The baby boomer generation is the generation born after the second world war[23].

In 2020, the Millennial generation will be in the age range of 20 years to 39 years. This age is a productive age that will become the backbone of the Indonesian economy. The results of research released by the Pew Research Center clearly explain the uniqueness of this generation compared to previous generations[24], [25].

3. Findings

Respondents in this study have been filtered using criteria that have been in place since the beginning, the criteria are as follows:

- Have used the QR Code Mobile Payment DANA.
- Born 1981 to 2000.
- Domiciled in the Metropolitan area of Jakarta (Jakarta, Bogor, Tangerang, Bekasi).

Questionnaires were distributed online through social media and obtained as many as 121 respondents and only 111 respondents who met the research criteria.

DANA uses advanced technology with a high level of security and guarantees 100% fund security. DANA offline transactions do not catch up with online transaction volume. The author proposes a study entitled Determinants of Sustainable Intentions to Use QR Codes in Urban Millennial Generation[17], [26], [27].

3.1 Demographics of Respondents

Characteristics of respondents will be described based on demographic variables, including:

3.1.1. Gender

74 women, while 37 men. Figure 5.01 shows that female respondents dominate overall with a percentage of 66.7% compared to only 33.3% of male respondents.

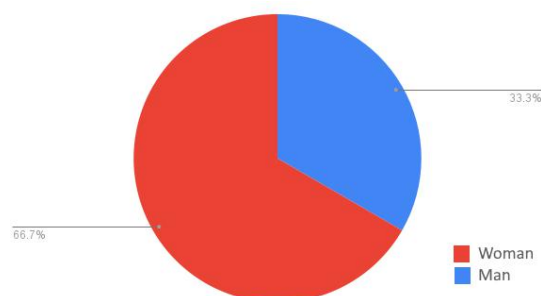


Figure 5.01 Gender of Respondents
Source: Data processed, 2020

3.1.2. Age

Millennials born between 1981 and 2000 aged 20 to 39 years in 2020. Figure 5 shows the age distribution of respondents based on the groups mentioned. 35.1% or 39 respondents were in the early Millennial group aged 20 to 26 years, while 57.7% or 64 respondents were in the mid Millennial group aged 27 to 33 years, while the remaining 7.2% or 8 respondents were in the late Millennial group aged 33 to 39 years.

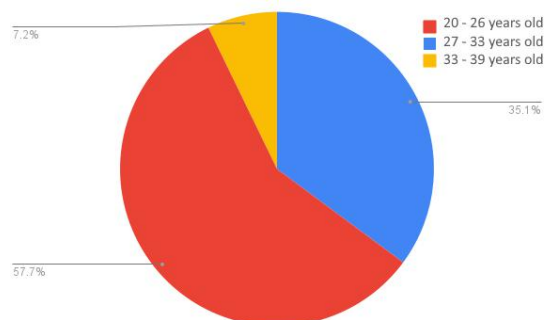


Figure 5.02 Age of Respondents
Source: Data processed, 2020

3.1.3. Domicile

South Jakarta is the area where the majority of respondents live, namely 37.80% or 42 people. Followed by Bekasi with a percentage of 17.10% or as many as 19 people. Then successively East Jakarta, Central Jakarta, Tangerang, West Jakarta, Bogor and finally North Jakarta.

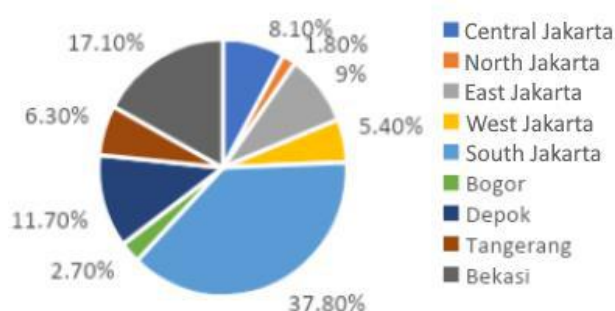


Figure 5.03 Domicile of Respondents
Source: Data processed 2020

3.1.4. The Education

The education of the most respondents is S1 with a percentage of 73.90% or as many as 82 people. While the education of SMA/SMK and S2 is 6.3% or 7 people respectively. The last is the dentist profession by 0.9% or 1 person.

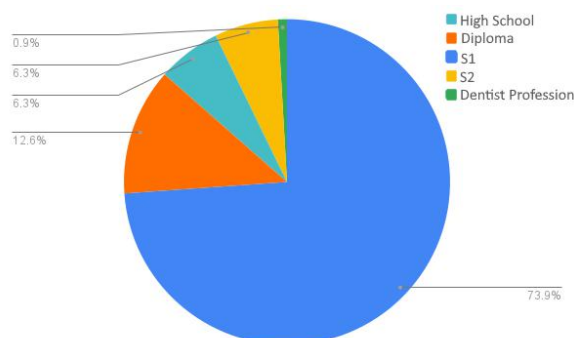


Figure 5.04 Education of Respondents
Source: Data processed 2020

3.1.5. Profession

QR Code Mobile Payment DANA mostly used by private employees with a percentage of 73.9% or as many as 82 people. Figure 5.04 shows the respondent's work based on the results of the study. More details can be seen in the following figure:

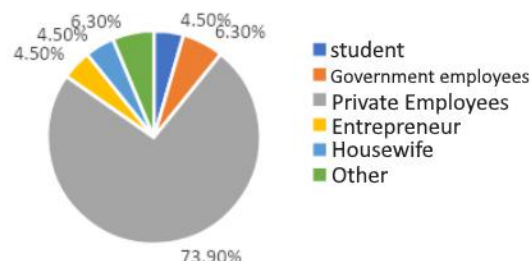


Figure 5.05 Respondent's Occupation
Source: Data processed 2020

3.1.6. Monthly

Income The respondents' monthly income is divided into five groups. As much as 54.10% or as many as 60 people with an income of IDR 4,000,000 - IDR 9,000,000. Meanwhile, 20.70% or as many as 23 people have an income of IDR 9,000,000 - IDR 14,000,000. 10.80% or 12 people with income <Rp 4,000,000. The remaining 8.10% or as many as 9 people with income of Rp. 14,000,000 – Rp. 19,000,000 and 6.3% or as many as 7 people with income > Rp. 19,000,000.

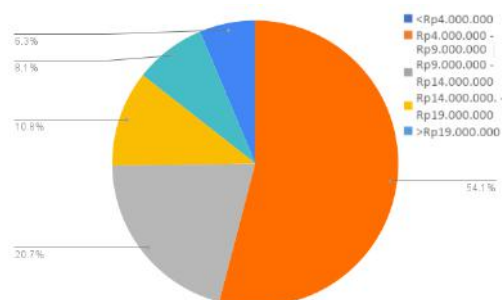


Figure 5.06 Respondents' Monthly Income
Source: Data processed 2020

3.1.7. Intensity of Use of QR Code Mobile Payment DANA

A total of 66.70 or as many as 74 respondents used QR Code Mobile Payment DANA <4 times. 25.20% of respondents used it 4-10 times, 3.60% used it 10-16 times a month and 1.8% did not use it at all.

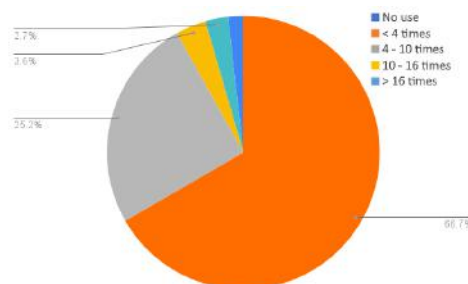


Figure 5.07 Intensity of Use of QR Code Mobile Payment DANA

Source: Data processed 2020

3.1.8. Transactions that have been carried out using the QR Code Mobile Payment DANA

88.3% of people use the QR Code Mobile Payment DANA for food and beverage transactions. As many as 27% or as many as 30 people use it for entertainment-related transactions, according to the MoneySupermarket.com survey for its DANA survey.

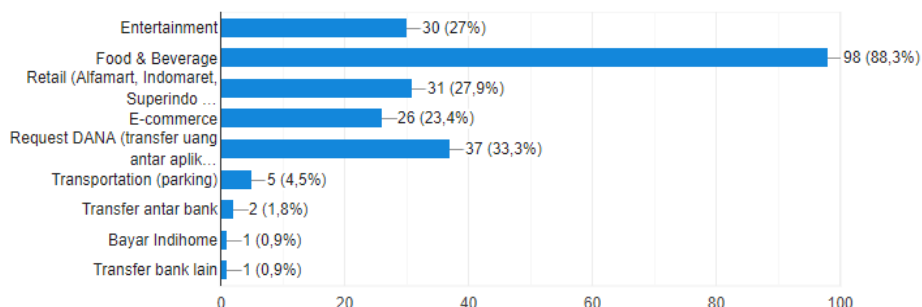


Figure 5.08 Transactions Ever Made Using the QR Code Mobile Payment DANA by Respondents

Source: Data processed 2020

3.2 The results of Data Processing

SEM-PLS are used to analyze the data in this study with the help of SmartPLS 3 software [6], [7], [28]. The analysis uses three stages of analysis, namely the outer model that describes the relationship between latent variables and their indicators, and the inner model and hypothesis testing.

3.2.1. Measurement Model (Outer Model)

An indicator is said to be valid if it has an outer loading value equal to 0.708 or greater. Reflective indicator loading can be evaluated by looking at the value of external loading. Where there is one indicator of the Continuance Intention variable, namely CON3, which is invalid, the author removes the indicator and continues testing.

Cronbach's alpha value is a measure of the reliability of a variable. A variable is said to be reliable if it has a composite reliability value above 0.7 and a maximum of 0.95 to avoid redundancy. The next stage in the measurement model is internal consistency reliability which is used to evaluate internal consistency.

	Cronbach's Alpha	rho_A	Composite Reliability
System Quality	0.819	0.831	0.881
Information Quality	0.889	0.89	0.924
Service Quality	0.848	0.858	0.897
Flow	0.864	0.864	0.917
Trust	0.866	0.865	0.909
User Satisfaction	0.936	0.936	0.954
Continuance Intention	0.827	0.842	0.92

Table 5.03 Results of Cronbach's Alpha and Composite Reliability

Source: Data processed SmartPLS 2020

Table 5:03 shows that there is one variable with a composite reliability value of more than 0.95, namely User Satisfaction of 0.954. The actual variable reliability is between Cronbach's alpha and the composite reliability value. It can be concluded that all variables in this study are reliable.

Convergent validity is Convergent validity used to measure the relationship between

variables and their indicators is the average variance extract (AVE) value. According to [9], the acceptable AVE value should be equal to or greater than 0.5. This test is assessed based on the correlation between item scores and construct scores.

Variable	AVE
Continuance Intention	0.852
Flow	0.786
Information Quality	0.752
Service Quality	0.686
System Quality	0.65
Trust	0.715
User Satisfaction	0.838

Table 5.01 Value of AVE
Source: Data processed SmartPLS 2020

AVE value greater than 0.5 means the average variable explains more than half of the indicator variance. Based on the results of the convergent validity test that the author has done, it can be concluded that the variables and indicators of this study are valid. The last stage in the measurement model test is to assess discriminant validity. Discriminant validity can be interpreted that a variable is unique and describes a phenomenon. It is the value of the cross loading indicators against each other that determines whether the model is valid.

	Continuance Intention	Flow	Information Quality	User Satisfaction	Service Quality	System Quality	Trust
CON1	0.935	0.665	0.559	0.694	0.657	0.593	0.635
CON2	0.911	0.577	0.434	0.574	0.607	0.481	0.562
FLOW1	0.622	0.887	0.502	0.671	0.644	0.551	0.653
FLOW2	0.591	0.889	0.554	0.681	0.669	0.575	0.673
FLOW3	0.585	0.884	0.55	0.689	0.648	0.636	0.601
INF1	0.477	0.547	0.843	0.61	0.634	0.704	0.604
INF2	0.421	0.521	0.886	0.56	0.594	0.694	0.556
INF3	0.514	0.546	0.923	0.591	0.672	0.695	0.591
INF4	0.465	0.475	0.813	0.616	0.628	0.587	0.578
SAT1	0.644	0.66	0.621	0.881	0.579	0.625	0.577
SAT2	0.652	0.684	0.676	0.925	0.677	0.577	0.68
SAT3	0.631	0.77	0.617	0.932	0.66	0.602	0.65
SAT4	0.603	0.694	0.598	0.924	0.605	0.577	0.635
SER1	0.564	0.582	0.581	0.495	0.873	0.57	0.572
SER2	0.513	0.574	0.479	0.436	0.794	0.479	0.47
SER3	0.61	0.691	0.639	0.664	0.866	0.694	0.733
SER4	0.569	0.575	0.69	0.643	0.775	0.697	0.655
SYS1	0.546	0.576	0.759	0.597	0.653	0.876	0.672
SYS2	0.51	0.567	0.588	0.485	0.665	0.832	0.577
SYS3	0.45	0.456	0.655	0.593	0.552	0.788	0.524
SYS4	0.367	0.537	0.468	0.408	0.54	0.723	0.473
TRU1	0.577	0.597	0.668	0.639	0.683	0.712	0.761
TRU2	0.562	0.608	0.517	0.531	0.568	0.485	0.843
TRU3	0.521	0.623	0.485	0.564	0.641	0.538	0.895
TRU4	0.532	0.615	0.588	0.601	0.625	0.619	0.878

Table 5.02 Rated Cross Loading Source: Data processed by SmartPLS 2020

Table 5.02 shows that all values of the cross loading variables targeted by the indicators are the largest compared to the values of other variables.

3.2.2. Structural Model (Inner model)

Structural model testing is done if there is no problem in the measurement model. Before entering into the structural model testing, the first thing that must be ensured is the collinearity between the independent variables (predictors) so that there is no bias in the regression results.

	Trust	Flow	User Satisfaction	Continuance Intention
System Quality	3,047	3,2	3,179	
Information Quality	2,866	2,926	2,867	
Service Quality	2,619	3,153	3,304	
Trust		2,587		2,335
Flow			2,332	2,941
User Satisfaction				2,699

Table 5.03 Value of VIF

Source: Data processed by SmartPLS 2020

Based on table 5.03 there is no collinearity problem in the variable predictor because the VIF value is <5.

In this study, we look at the effect of certain independent latent variables on the dependent latent variable. The greater the value of R², the better the prediction model proposed. R² is said to be strong if 0.75 is moderate, while 0.25 is considered weak.

	R Square
Trust	0.613
Flow	0.619
User Satisfaction	0.669
Continuance Intention	0.554

Table 5.04 R value²

Source: Data processed SMartPLS 2020

In this study, we looked at the effect of certain independent latent variables on the dependent latent variable. The greater the value of R², the better the prediction model proposed. R² is said to be strong if 0.75 is moderate, while 0.25 is considered weak. SmartPLS makes it easy for users to evaluate structural models using bootstrap functions. Bootstrap output results will be shown in Figure 5.09. The significance value used is 5% with a 95% confidence level and uses a two-tailed test.

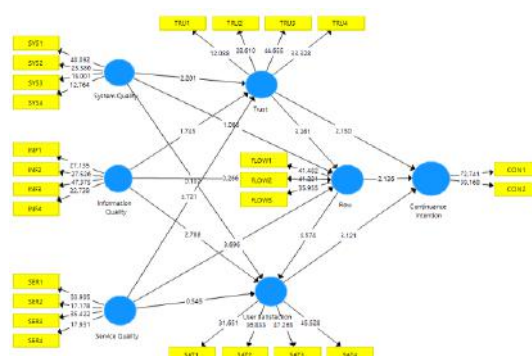


Figure 5.09 Result Path Diagram Bootstrapping

Source: SmartPLS 2020

Path coefficient is the final stage in the structural model that is used to evaluate the overall structural model or also known as hypothesis testing.

	Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Ket
Trust -> Continuance Intention	H1	0.24	0.227	0.112	2.15	0.032	Accepted
Flow -> Continuance Intention	H2	0.242	0.251	0.113	2.136	0.033	Accepted
User Satisfaction -> Continuance Intention	H3	0.339	0.339	0.108	3.121	0.002	Accepted
Trust -> Flow	H4	0.353	0.347	0.108	3.261	0.001	Accepted
Flow -> User Satisfaction	H5	0.521	0.515	0.114	4.574	0	Accepted
System Quality -> Trust	H6.a	0.243	0.246	0.111	2.201	0.028	Accepted
system Quality -> Flow	H6.b	0152	0159	0143	1:06	0:29	Rejected
Quality system -> User Satisfaction	H6.c	0011	0022	0113	0102	0919	Denied
Information Quality -> Trust	H7.a	0152	0158	0087	1745	0082	Denied
Information Quality -> Flow	H7. b	-0.03	-0.04	0.113	0.266	0.79	Rejected
Information Quality -> User Satisfaction	H7.c	0.314	0.321	0.112	2.788	0.006	Accepted
Service Quality -> Trust	H8.a	0.454	0.447	0.096	4.721	0	Accepted
Service Quality -> Flow	H8.b	0.381	0.391	0.103	3.696	0	Accepted
Service Quality -> User Satisfaction	H8.c	0.068	0.061	0.125	0.545	0.586	Rejected

Table 5.05 Hypothesis Test Value

Source: Data processed by SmartPLS 2020

The criteria for testing the hypothesis with t table is 1.96, namely: H0 is rejected if $|t_{\text{statistic}}| > t_{\text{table}}$ or p-value $< .$ Based on table 5.05 that H6.b, H6.c, H7.a, H7b, and H8.c the hypothesis is rejected because the $|t_{\text{statistic}}| < t_{\text{table}}$ and p-value $> .$ Meanwhile, H1, H2, H3, H4, H5, H6.a, H7.c, H8.a and H8.b were accepted because the $|t_{\text{statistic}}| > t_{\text{table}}$ or p-value $< .$

3.3. Discussion of Hypothesis Test Results

H1: Trust has a positive effect on Continuance Intention.

Study: The strong trust factor of DANA Mobile Payment QR Code users will lead to Continuance Intention or the intention to reuse continuously. The t-statistic value of 2.15 is greater than the t-table value of 1.96 and the p-value of 0.032 for this study. This of course includes major future uncertainties and risks such as user data theft, hackers, social engineering, etc.

H2: Flow has a positive effect on Continuance Intention.

The better the flow that users feel, the more interested they are in using DANA's QR Code Mobile Payment. This study also supports a research model on the effect of using QR Codes on online shopping sites. The hypothesis which states that Flow has a positive effect on Continuance Intention (H2) is accepted.

H3: User Satisfaction has a positive effect on Continuance Intention.

According to the research results, user satisfaction has a significant effect on user intentions. User Satisfaction is the strongest predictor variable that affects Continuance Intention in the IS context. The more satisfied users are in using the QR Code Mobile Payment DANA, the higher the tendency to use it continuously. This is what needs to be underlined by DANA as a QR Code provider, that customer satisfaction is inherent in the success of a technology product. The results of this study support the research model in the context of the Information System Success Model on mobile payments.

H4: Trust has a positive effect on Flow.

The greater the trust placed in DANA's QR Code Mobile Payment users, the more enjoyment they will experience. Users feel happy and get a lot of time to transact with the QR Code, according to DANA. A good user experience is necessary to create trust between the user and

the product or service. The relationship between Trust and Flow has a T statistic of 3.261 and a p-value of 0.001. If Trust has a significant effect on Flow, then H4 is accepted.

H5: Flow has a positive effect on User Satisfaction.

Table 5.05 shows the results of hypothesis testing for the Flow variable on User Satisfaction. The greater the flow perceived by the user, the more satisfied the user is. If Flow has a significant effect on user satisfaction, then H5 is accepted. The statistical T value of 4,574 is greater than the value of the T table and the p-value of 0 is less than 0.

H6.a: System Quality has a positive effect on Trust.

The transaction process using an easy-to-learn QR Code will expand market segmentation. DANA needs to improve the quality of the QR Code interface to make it easier to learn. Using a good system and reputation builds trust, so H6.a is accepted.

H6.b System Quality has an effect on Flow.

The System Quality variable on Flow has a T statistic of 1.06 and a p-value of 0.29. This means that the better the System Quality does not affect the flow felt by users of the QR Code Mobile Payment DANA. It can be seen that the SYS3 indicator, "Ease of learning" is the weakest indicator with an Outer Loadings value of only 0.456.

H6.c: System Quality has a positive effect on User Satisfaction.

H6.c is rejected. The results of this study also do not support the proprietary Information System Success Model .When viewed from the influence of the System Quality indicator on User Satisfaction, there are two indicators whose Cross Loading value is very small. The better the Quality of the System owned by DANA's QR Code Mobile Payment does not affect User Satisfaction. DANA must continue to improve systems, system security and technological innovation. This is very necessary because competitors such as GoPay and OVO are also very aggressive in technological innovation.

H7.a: Information Quality has a positive effect on Trust.

Information Quality on Trust has a T statistic of 1.745 and a p-value of 0.082, so that Information Quality has no effect on Trust. This shows that the quality of information perceived by users does not make users feel satisfied in transactions using the QR Code Mobile Payment DANA.

H7.b: Information Quality has a positive effect on Flow.

The results of this study do not support previous research conducted in which the study stated that Information Quality had a positive effect on Flow[18]. Based on the results of this study, it means that the better the Quality of Information perceived by the user does not affect the perceived Flow in using the QR Code Mobile Payment DANA.

H7.c: Information Quality has a positive effect on User Satisfaction.

The results of hypothesis testing in table 5.05 show that Information Quality on User satisfaction has a T-statistic value of 2.788 and a p-value of 0.006. DANA needs to increase its QR Code transaction output, with a more user friendly output.

H8.a: Service Quality has a positive effect on Trust.

The quality of service provided by a good mobile payment provider will build user trust in the provider[29]. DANA provides reliable customer service and is easy to contact if there are problems with QR Code user transactions. Customer-focused customer service will enhance a good customer experience.

H8.b: Service Quality has a positive effect on Flow

DANA can adopt AI-based customer service to be able to provide customer service that is able to solve all user difficulties[30]. Good and easy-to-reach customer service makes customers not worry about transaction problems using the DANA Mobile Payment QR Code, so they will spend a lot of time transacting without feeling worried.

H8.c: Service Quality has a positive effect on User Satisfaction

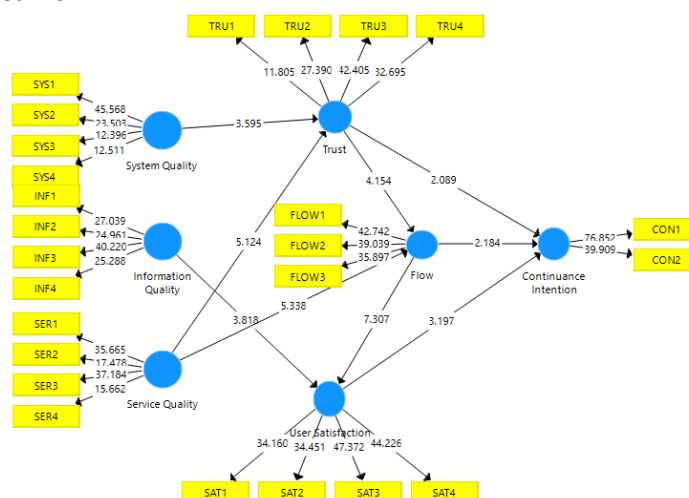
The results of this study do not support the Information Systems Success Model[24]and research[31]. The better the Quality of Service provided by DANA does not affect User Satisfaction. Table 5.06 shows the relationship between variables that can also be mediated by other variables.

	Original	Sample Mean (M)	Standard Deviation	T Statistics	P Values
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	Sampl e (O)		n (STDEV)	(O/STDE V)	
Information Quality -> Flow -> Continuance Intention	-0.007	-0.009	0.031	0.235	0.815
Service Quality -> Flow -> Continuance Intention	0.092	0.099	0.054	1.703	0.089
System Quality -> Flow -> Continuance Intention	0.037	0.037	0.042	0.883	0.378
Information Quality -> Trust -> Flow -> Continuance Intention	0.013	0.014	0.013	0.981	0.327
Service Quality -> Trust -> Flow -> Continuance Intention	0.039	0.04	0.027	1.465	0.144
Trust -> Flow -> Continuance Intention	0.085	0.089	0.054	1.569	0.117
System Quality -> Trust -> Flow -> Continuance Intention	0.021	0.022	0.017	1.199	0.231
Information Quality -> Trust -> Continuance Intention	0.037	0.035	0.026	1.396	0.163
Service Quality -> Trust -> Continuance Intention	0.109	0.104	0.06	1.81	0.071
System Quality -> Trust -> Continuance Intention	0.058	0.055	0.037	1.569	0.117
Information Quality -> Flow -> User Satisfaction -> Continuance Intention	-0.005	-0.009	0.022	0.236	0.813
Service Quality -> Flow -> User Satisfaction -> Continuance Intention	0.067	0.069	0.035	1.902	0.058
System Quality -> Flow -> User Satisfaction -> Continuance Intention	0.027	0.026	0.027	1.006	0.315
Information Quality -> Trust -> Flow -> User Satisfaction -> Continuance Intention	0.009	0.01	0.008	1.12	0.263
Service Quality -> Trust -> Flow -> User Satisfaction -> Continuance Intention	0.028	0.027	0.015	1.872	0.062
Flow -> User Satisfaction -> Continuance Intention	0.176	0.173	0.066	2.678	0.008
Trust -> Flow -> User Satisfaction -> Continuance Intention	0.062	0.061	0.033	1.879	0.061
System Quality -> Trust -> Flow -> User Satisfaction -> Continuance Intention	0.015	0.015	0.011	1.41	0.159
Information Quality -> User Satisfaction -> Continuance Intention	0.106	0.106	0.046	2.292	0.022
Service Quality -> User Satisfaction -> Continuance Intention	0.023	0.025	0.047	0.492	0.623
System Quality -> User Satisfaction -> Continuance Intention	0.004	0.008	0.04	0.098	0.922
Information Quality -> Trust -> Flow	0.054	0.055	0.037	1.441	0.15
Service Quality -> Trust -> Flow	0.16	0.155	0.059	2.721	0.007
System Quality -> Trust -> Flow	0.086	0.084	0.046	1.865	0.063
Information Quality -> Flow -> User Satisfaction	-0.016	-0.021	0.06	0.26	0.795
Service Quality -> Flow -> User Satisfaction	0.199	0.203	0.074	2.669	0.008
System Quality -> Flow -> User Satisfaction	0.079	0.076	0.072	1.094	0.274
Information Quality -> Trust -> Flow -> User Satisfaction	0.028	0.029	0.022	1.269	0.205
Service Quality -> Trust -> Flow -> User Satisfaction	0.083	0.082	0.042	1.993	0.047
Trust -> Flow -> User Satisfaction	0.184	0.184	0.082	2.245	0.025
System Quality -> Trust -> Flow -> User Satisfaction	0.045	0.045	0.029	1.526	0.128

Table 5.06 Value Indirect Effect Source
Data processed SmartPLS 2020

Table 5.06 shows that there are 9 hypotheses that have a significant effect. Based on hypothesis testing, the final research model formed is as follows: To achieve high trust from users, it takes a good quality system and good service quality and understands user needs. To feel the flow of pleasure in transacting using the QR Code Mobile Payment DANA, high trust is needed, as well as the quality of the system and services provided by DANA as a QR Code provider. endogenous variables. This means that the flow perceived by the user will be greater when the Trust variable mediates Service Quality. Subsequent mediation occurs between the variables Trust-Flow-User Satisfaction and Service Quality-Trust-Flow.



4. Conclusion

4.1. Conclusion.

QR Code Mobile Payment. FUND. Trust has a positive effect on Continuance Intention, Flow and User Satisfaction. The results of this study also prove that System Quality has a positive effect on Trust, Information Quality has a positive effect on User Satisfaction, Service Quality has a positive effect on Trust, and Service Quality has a positive effect on Flow. To achieve high trust from users, a quality and quality system is needed. good service and understand user needs. To feel the flow of pleasure in transacting using DANA's QR Code Mobile Payment, high trust is needed, as well as the quality of the systems and services provided by DANA as a QR Code provider.

4.2. Managerial Implications

DANA must increase users' interest in transacting using the QR Code continuously. This can be done by improving the quality of the system. With this, DANA must continue to innovate continuously to be able to achieve a quality system that can meet user expectations. System reliability and QR Code responsiveness are important factors in improving the quality of QRC Codes. High security is also important so that users do not need to spend a lot of money using the QR Code. To make customers feel the flow of pleasure when transacting with the QR Code, it can be done by increasing user trust and improving service quality. The quality of existing services should be further improved. Where AI-based customer service will be able to meet all user problems, because AI will be sourced from big data. Customer satisfaction can be increased by increasing the quality of information or output when transacting with QR Code. Increased user satisfaction can also be achieved by ensuring that users really feel the flow of pleasure in transacting using the QRC Code. Transaction output using QR Code is proof of transaction and transaction history.

4.3. Suggestion.

Further research is needed to better represent the Continuance Intention to use QR Codes strongly. It is not limited to one QR Code provider, so that further research can represent the behavior of QR Code users in general. Then, it is hoped that previous research can be used to explore the variables in the Information Systems Success Model.

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Motives For Purchase Of Skin Care Product Users (Phenomenology Study On Women In Dki Jakarta)

Luthfi Aulia Faza¹, Prima M. Agustini², Siti Maesaroh³, Andri Cahyo Purnomo⁴,
Efa Ayu Nabila⁵

Faculty of Economics and Social Sciences, Bakrie University^{1,2}, Faculty Science and
technology, University of Raharja^{3,4,5}

Kuningan, DKI Jakarta/(021) 5261448^{1,2}, Cikokol, Tangerang/(021) 5529586^{3,4,5}
Indonesia^{1,2,3,4,5}

e-mail: admisi@bakrie.ac.id¹, prima.agustini@bakrie.ac.id², siti.maesaroh@raharja.info³,
andricahyo@raharja.info⁴, efaayunabila@raharja.info⁵.



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Abstract

This study aims to analyze the purchasing motives of users of skin care products, and is a phenomenological study of women in DKI Jakarta. To find out this motive, researchers used a qualitative approach, which aims to explore the true meaning of women's motives for buying skin care products. The data used for this study are primary data and secondary data. The results of a research analysis using in depth interviews with women in DKI Jakarta who bought skin care products, that they made skin care purchases with Hedonic Shopping motives. Motivations for women in DKI Jakarta using skin care products were motives, namely Adventure shopping and Social Shopping, while utilitarian Shopping motivation is motivation needs.

Keywords: *Purchasing Motives, Hedonic Shopping, Utilitarian Shopping, Phenomenology*



1. Introduction

Every woman wants to have an attractive appearance compared to men. An attractive appearance in a woman is often associated with being beautiful, especially on the face. Women tend to want to look attractive from head to toe when in front of the opposite sex [1]. Novitalista, 2012: Beauty or beauty is a primary need that must be owned by every woman as a feminist. In the Big Indonesian Dictionary, beautiful is an adjective which means beautiful, beautiful, beautiful, and refers to physical parts such as a person's body or face.

Having a beautiful face for women is a demand to support her appearance in carrying out daily activities, both in doing professions and education[2]. The meaning of beauty has emerged with various meanings, basically beauty is always closely related to physical beauty, both face, body, and hair and everything that can be seen by sight (outer beauty). [3], [4] describes beauty as having white skin, having blue eyes, having long blonde hair and having a slim body, so that the size of a woman's beauty is like a barbie doll.

Cosmetics itself, according to the Food and Drug Inspection Agency (BPOM) No. HK.00.1745 is defined as a substance or preparation intended for use on the external parts of the human body[5]. Not a few cosmetic companies also issue skin care products. Make-up and personal care are increasingly becoming an integral part of the lifestyle of women in Indonesia.

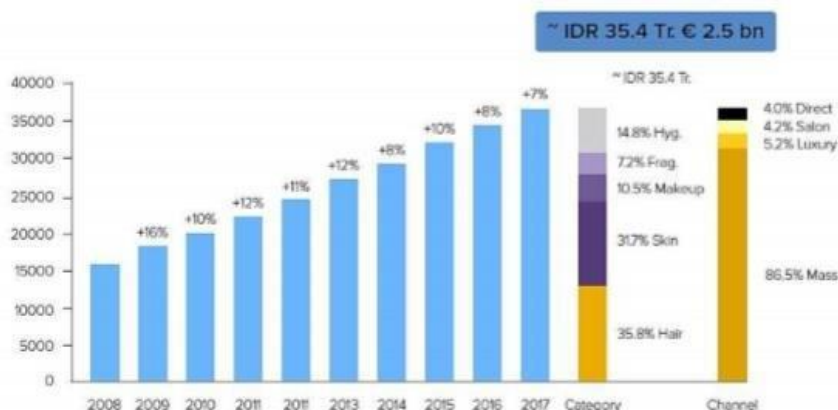


Figure 1.1 Indonesia Cosmetic Industry Market Growth
Source: Beauty Mass Survey 2018

As reported in the 2018 Eurocham position paper, Indonesia's cosmetic industry has increased in value from around IDR 15 Trillion in 2008 to IDR 355.4 trillion in 2017[6]. The level of development of the cosmetic industry throughout Indonesia has shown positive signs as well. During 2016-17, the Cosmetics industry grew by 20%. Below are the largest cosmetic companies in Indonesia and internationally: Table 1.1 Top 10 Largest International Cosmetic Companies[2], [7]

No	Company name	Brand
1	Unilever	Tresemme, Ponds, Citra, Vaseline, Clear, Axe, dll
2	Loreal	Loreal Paris, Maybelline, Garnier, Kerastase, The Body Shop, dll
3	P&G	SK-II, Pantene, Wella, Olay, Always, dan Head & Shoulders
4	Beiersdorf	Nivea, Eucerin dan La Prairie
5	Coty	Alexander McQueen, Bottega Venetta, Calvin Klein, Chloe,

		CK, Davidoff, Gucci, Hugo Boss, Jill Sander, Marc Jacobs, Miu Miu, Tiffany & Co
6	Estée Lauder Companies	Estée Lauder, Aerin, Bumble and Bumble, Becca, Clinique, La Mer MAC
7	Johnson & Johnson	Johnson & Johnson Baby, Clean & Clear, Neutrogena
8	Kao	Biore
9	LVMH (Louis Vuitton Moët Hennessy)	Benefit, Christian Dior, Fendi, Fresh, Guerlain, Kenzo, Loewe, Givenchy (parfum), Make Up For Ever
10	Shiseido Group	Shiseido, Shiseido Professional, Laura Mercier, Aqua Label, Issey Miyake, Majolika Majorca, Avène, Maquillage

Table 1.1 Top 10 Largest International Cosmetic Companies

No	Nama Perusahaan	Brand
1	PT Vitapharm	Viva Cosmetics
2	Martha Tilaar group	Sariayu Martha Tilaar, PAC, Caring Color
3	PT. Paragon Technology	Wardah, Make Over, Emina
4	PT. Kosmetikatama	Inez Cosmetics
5	Mineral Botanica	Mineral Botanica
6	PT. Gloria Origita Cosmetics	Purbasari
7	Lizzie Parra (Seorang Beauty Blogger)	BPL Lip Coat

Table 1.2 Top 7 Local Cosmetic Companies

As mentioned in the table above, The top five international cosmetic companies are Unilever, second is Loreal, third is P&G, fourth is Beiersdorf and fifth is Coty. For the top five local cosmetic companies there are PT. Vitapharm, Martha Tilaar Group, PT. Paragon Technology and the fifth is Mineral Botanica[8].

DKI Jakarta is home to a large area of non-Jakarta residents who work and carry out their activities in Jakarta, and in the afternoon or evening leave Jakarta. Beauty clinics offer all-in-one

treatment by diagnosing a person's skin condition and while providing care products that are adapted to these conditions. It is intended to provide added value to the development of science, especially those related to consumer motives. This research is expected to provide added value to the development of science, especially those related to consumer motives in purchasing products.

1.1 History and development of the cosmetic industry in Indonesia

In Indonesia, cosmetics have been known since the era of the kingdoms, as happened in the Mataram kingdom where noble daughters were accustomed to doing treatments using various natural ingredients that were processed traditionally. Wall Jellinek in 1970 cosmetics became a business tool. Considering that Indonesia has very many and diverse natural resources which are trusted, has properties not only as a medicine but also as a cosmetic. Indonesia's natural resources are believed to have good properties for the skin and body.

With the development of technology this natural wealth is utilized, managed, and used as the basic ingredients for making cosmetics. The cosmetic industry in Indonesia itself is still dominated by multinational cosmetic companies, such as Unilever, P&G, Johnson & Johnson, and others. There are also a few local cosmetic companies such as Martha Tilaar Group, PT. Mustika Ratu, Tbk, PT Gloria Origita Cosmetics[9].

1.2 The development of skin care products in Indonesia

With a large population and a majority of working age, Indonesia is one of the largest skin care markets in the world. The owner of the well-known Nivea brand, PT Beiersdorf Indonesia, expressed his optimism that their business will continue to grow. According to the same source, the skin care market is expected to experience higher demand in Indonesia in the future as the population grows. rapidly developing countries such as Indonesia, Turkey, India and Saudi Arabia [10].

Survey conducted in August 2018 by ZAP clinics and MarkPlus Inc. of 17,889 Indonesian women. Most popular skincare brands are dominated by foreign brands, namely SK II, Laneige, The Body Shop, Innisfree, Nature Republic, and Wardah [5].

There are so many skin care products out there that consumers are faced with many choices. For only one type of product, a company can issue several variants, senses, and benefits. Natasha Skincare's products are only available at its own authorized clinic which is under the auspices of the network. There are so many skin care products out there that consumers are faced with many choices. For only one type of product, a company can issue several variants, senses, and benefits. Natasha Skincare's products are only available at its own authorized clinic which is under the auspices of the network [12].

1.3 Level of Competition for Skin Care Products in Indonesia

The rise of skin care products circulating in the market is actually an advantage for consumers. The large market and high competition are a challenge for the company, as well as an opportunity for product development. This challenge becomes even greater for local companies with a wider range of multinationals. High competition in the skin care product category is well recognized by cosmetic companies. There are many ways that companies can do, such as creating new skin care products that suit the needs of their current consumers. This is supported by various promotional activities and activities that can raise awareness from consumers, both for new products. created as well as those that already exist.

1.4 Women Users of Skin Care Products or Skincare in Big Cities

From the Real Beauty survey that was conducted on about 2000 women in Asia including Indonesia, it was found that only 3 percent of Asian women and 1 percent of Indonesian women felt beautiful. This is because they see beauty based on a stereotype that is always shown by women with slender bodies, smooth skin, attractive faces, long necks and so on that are related to physical conditions as if they are the main requirements for a woman to be entitled to the title of beauty[13]. The existing stereotype does not bring out the beauty from within the individual which is actually no less important than physical appearance.

2. Research Method

2.1 Research Approach and Method

This study uses a qualitative research approach where qualitative research as a scientific method is often used and carried out by a group of researchers in the social sciences, including education[14]. The findings of this study suggest that qualitative research enriches the results of quantitative research [15], [16]. Qualitative research is carried out under natural conditions and is inventive in nature[17]. Phenomenon comes from the Greek word "phainesthai" which means to see, and is formed from the roots of fantasy, phantom, and phosphor which means light or light. This research emphasizes more on meaning and value bound[18], [19]. The author also uses the phenomenological method, which is defined as a symptom or something that shows.

2.2 Object of research

2.2.1 Primary data

In this study, the primary data that the author did was to conduct direct interviews with women who use skin care products in DKI Jakarta. In practice, interviews conducted by the author will be carried out freely and in-depth (in-depth). The freedom carried out in this research cannot be separated from the subject matter that will be asked to the respondent.

2.2.2 Secondary Data

In this study, the secondary data that the author did was to observe and study the literature. Observations researchers do to obtain data or information that is more natural.

2.3 Data collection technique

The following is a data collection technique that the author will do in this research:

2.3.1 Interview

The interview guide usually does not contain detailed questions, but is an outline that will be developed later by the researcher, taking into account the context and situation in the interview. This type of interview is often referred to as an in-depth interview. In this study, researchers will interview women who use skin care products to find out the motives for buying these products.

2.3.2 Observation

Observations are observations, but of course there is a difference between daily observations and observations for scientific research.

2.4 Literature review

The literature study is an attempt to collect data from books and the internet to obtain more in-depth information related to the research that the author will examine. Researchers can also get similar research related to their research, by reading. The data collection process carried out considers the principle of saturation.

2.4.1 Marketing Management

Marketing planning is used to plan and manage marketing activities so that they run well. It includes the target market, product development, pricing, distribution channels, communication and promotion[20]. In addition to marketing management in a company, marketing is an important factor. Marketing management is formulated as a management process, which includes planning, implementation and supervision of activities carried out by the company. Marketing activities strive for a product that is marketed to be accepted and liked by the market. Product introduction activities are very important to make the product known to consumers.

2.4.2 Marketing strategy

Marketing strategy as a process that includes analysis, planning, implementation, and control. Includes ideas, goods and services whose purpose is to produce satisfaction for the parties involved[21]. Strategy in marketing is also a fundamental tool that is planned to achieve company goals by developing a sustainable competitive advantage through the market entered and the marketing program used to serve the target market[22].

2.4.3 Consumer behavior

The term behavior is closely related to the object whose study is directed at human problems. To understand consumers and develop appropriate marketing strategies, one must understand what they think (cognition) and feel (influence), what they do (behavior), and what and where (circumstances) are influenced by what they think, feel, and feel. and by consumers[23]. The perpetrators of this behavior are individuals who have different uniqueness and will do it on their own initiative. Companies really need to understand consumer behavior so that they can provide satisfaction to their customers, and the occurrence of repetition can be avoided. Companies really need to understand consumer behavior, because it is expected that companies can provide satisfaction to their customers, so that they can make consumers decide not only to buy but also to use the products and services offered by the company, and the occurrence of repetition.

2.4.4 Buying decision

Before a consumer decides his choice in using/buying existing products and services, consumers will generally do several things until he will arrive at the decision-making stage. A decision involves a choice among or more alternative actions (or behaviors). The stages or decision-making processes that occur often unconsciously appear in the consumer's mind.

3. Findings

The number of cosmetic companies that issue skin care products in Indonesia is currently very large. The national cosmetic industry experienced a growth of more than 20% in 2018, the Minister of Industry Airlangga Hartanto says. Nowadays beauty skin care is an important thing for women in Indonesia.

"So, the growth is up to double digits or four times the national economic growth. The Ministry of Industry has placed the cosmetic industry as a mainstay sector as stated in the National Industrial Development Master Plan (RIPIN) for 2015-2035,"

With a high population and productive age, Indonesia is considered the largest skincare market in the world. Replacing the United States which is in third place, according to Euromonitor International. The rapid development of the skincare and cosmetics industry has made the growth of this business incre[24]. Supported by increased self-confidence and the role of women in various fields, the need for skincrease has also increased. This phenomenon makes companies compete to spread their wings in various places and innovate to meet consumer needs.

3.1 Skincare User News

Every user of skin care products (skincare) certainly has its own story, some have succeeded in getting the desired facial skin results, but some have not, and some are very crazy about Korean-style skin care[25], [26].

3.2 Research subject

In this paper, the author uses an in-depth interview technique as a technique to collect the necessary data on 9 informants who are women who use skin care products. The eight informants are as follows:

1. Dania (Female, 30 years old), Dania is an employee at PT. STAR Software Indonesia, he is a sales support. He is a skin care product user, he has been using skin care products for almost 5 years.
2. Annisa (Female, 25 years old), Annisa is an employee at an agency in the Pondok

- Indah area, South Jakarta, she is a graphic designer. He admits that he has been using skin care products since he was in high school.
3. Hani (Female, 35 years old), Hani is a Lecturer at Swiss German University which is located in the Tangerang area. He admits that he has been using skincare products every day since he was in his 30s.
 4. Jessica (Female, 26 years old), Jessica is an employee at e-commerce company Bukalapak.com. He has been a skin care product user since he was in college.
 5. Vivian (Female, 27 years), Vivian is an employee at the BAF company. He has been a skin care product user since graduating from college.
 6. Cilla (Female, 28 years), Cilla is an employee at a private television company in Jakarta. He has been a user of skin care products since he was a teenager.
 7. Hilda (Female, 27 years), Hilda is a journalist at an online media company in the South Jakarta area.
 8. Desi (Female, 26 years old), Desi is an employee of a private bank in the Sudirman area, South Jakarta.
 9. Ayu (Female, 24 years old), Ayu is a private employee at an IT startup.

3.3 Research result

The researcher discusses research on the purchase motives of users of skin care products (the phenomenological study of women in DKI Jakarta). The results of the research were obtained from the results of literature studies, observations, and in-depth interviews that have been obtained by researchers.

3.3.1. Purchase Motive

A motive is a state in a person's personality that drives an individual's desire to perform certain activities. The various motives as consumers are as follows:
Utilitarian Shopping motivation, is motivation that is obtained with the thought of getting the benefits of a desired product. Usually this motivation is also based on rational and objective thinking[27]. Hedonic Shopping motivation is motivation based on subjective or emotional thinking because it includes emotional responses, sensory pleasures, dreams, and aesthetic considerations[28].

3.3.1.1 Motives Hedonic Shopping

In the current digital era, buyers don't need to visit a store if they want to shop, now there are many brands of skincare that make websites [29], [30]. So apart from visiting a shop, buyers can make purchases on their website. Adventure shopping (Shopping is an adventure to get information) [31].

3.3.1.2. Motives Utilitarian Shopping

Shopping activities are seen as activities supported by a specific need to have a product, and most consumers today consider shopping activities as work. Like the informants whom the author interviewed, they have specific needs for a skincare product that ultimately encourage them to buy the product, not only that they also see the uses and benefits that they will get after using the product. The following is an excerpt from the author's interview with the informant.

3.4 Discussion

The results of the research above are the results of field research that has been carried out by the author for a period of two months starting from September 2019 by conducting nine interviews and in nine different places[32]. This study uses a qualitative research method with a descriptive approach about how the buying motives of users of skin care products are[33].

3.4.1 Purchase Motives for Skin Care Products Users

According to the purchase motives that the author wrote in the results of the research above, the nine informants made a purchase of a skincare product with different motives[34]. According to purchase motives, according to Arnold & Reynolds, six typologies of hedonic shopping motifs are grouped into six groups, namely adventure motives, socializing motives, gratification motives, idea motives, role motives and value motives, while for utilitarian shopping motives according to Babin & Kim.

3.4.2 Most Main Purchase Motive

According to the motives for purchasing skin care products, which the researchers have grouped above, there are three main purchase motives among other purchase motives. The table below shows the most important purchase motives made by each informant that the author interviewed.

3.5 Motive of Need

The need motive is the most basic motive in every human being, such as the need for shelter, food and other basic needs. The women who were interviewed by researchers made purchases of skin care products (skincare) because of the motive for the need to meet the needs of their skin. According to them, when they enter their thirties, they need extra skin care to reduce aging and other skin problems.

3.5.1. Meaning of Adventure shopping

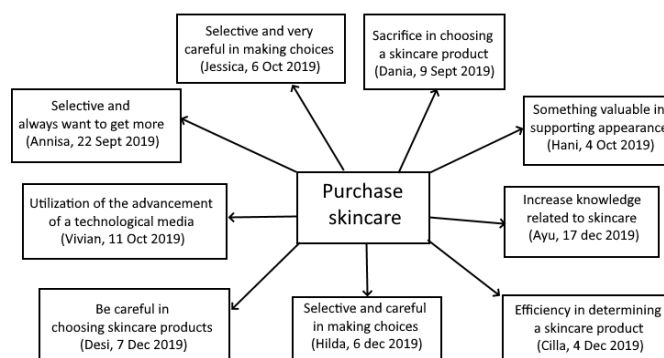
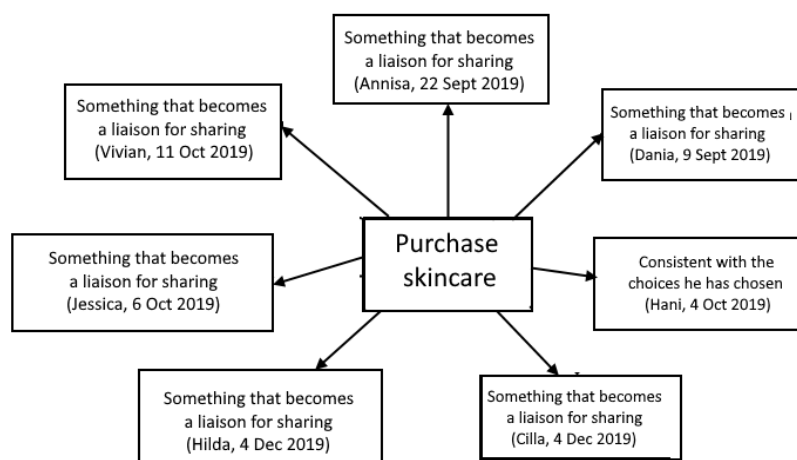


Figure 5.4 Meaning of Adventure shopping motif
Source: Processed by the Author

When made into a unified meaning, adventure shopping for women who use skin care products in this study is that the use of advances in technology media is a form of sacrifice in increasing knowledge. Adventure shopping motif causes a consumer to decide to use or buy a skin care product (skincare).

3.5.2 The Meaning of Social Shopping Motives

Figure 5.5 Meaning of Social Shopping Motives



Source: Processed by the Author

When made into a unified meaning, social shopping for women who use skin care products (skincare) in this study is something that becomes a liaison for sharing with closest friends or family to determine the choice of skincare products and creates consistency with the choices that have been chosen.

3.5.3 Meaning of Need Motive

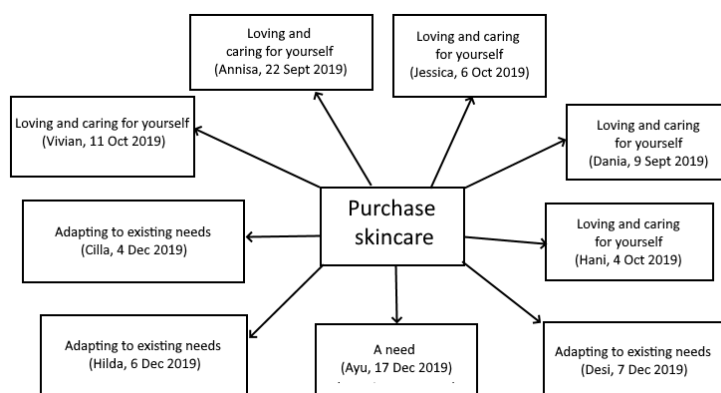


Figure 5.6 Meaning of Need Motives

Source: Processed by the Author

When made into a unified meaning, the meaning of needs for women who use skin care products (skincare) in this study is a form of love and concern for themselves and adapting to existing needs. From the meanings above, there is the same meaning, namely the need is a sense of affection and concern for oneself in determining skincare products.

3.5.4 Influence Shopping Motivation

In this study, researchers saw influencer motives in purchasing skin care products (skincare) made by female consumers. For example, a consumer wants to buy a skincare brand that is quite expensive and its use is very complex. In this case, influencers give a rational nature because they give logical considerations such as how much it costs, etc.

3.5.5 Phenomenological Review of Purchase Motives for Users of Skin Care Products

When associated with phenomenology, the author tries to put forward the theory above explaining that each audience has a different point of view in responding to or interpreting the phenomenon of the development of skin care products. Different motives in making purchases that will provide benefits and satisfaction felt by the audience. This phenomenon is currently rife among women, because at this time of the year it is considered to provide benefits for their facial skin.

4. Conclusion

The conclusions that can be drawn from all the results of research and discussion are: The motives of female informants in purchasing skin care products are to fulfill shopping needs, and to regard shopping activities as an adventure, and finally to socialize with friends and family at the time of shop.

Female consumers feel that buying skin care products is a necessity that they must fulfill, because they need to meet the nutritional needs of their facial skin. This purchase motive is also the most dominant motive among the other motives. Facial skin problems such as acne, dry and dull skin, and wrinkles can be resolved by addressing this one motive. Of the six hedonic shopping motives, there are only two that encourage informants to purchase skin care products. The motives are Adventure shopping and Social Shopping. Female consumers feel that buying skincare products is an adventure because there is a lot of information they need to find out. And female consumers also feel that by purchasing skin product, they can socialize with friends and family and can create a sense of togetherness. The occurrence of a decision to purchase skin care products (skincare) for women in DKI Jakarta is due to encouragement from the environment around them who continues to provide information regarding the skin care products they want to look for or use. The impetus that arises from the surrounding environment is very high in someone deciding to make a purchase, according to the company's founder and director of sales and marketing, Priscila Domingo.

4.1 Advice

Based on the conclusion above which states that female informants make purchases of skin care products (skincare) with the motivation of shopping needs, Adventure shopping and Social shopping.

4.1.1 Academic Advice

Further research is expected to examine other things related to utilitarian and hedonic values. It is hoped that further studies will be able to use more diverse research methods, taking informants who are more varied in terms of age of work, location, etc. For further researchers, it must be remembered that in this study using a typology of hedonic shopping motivation and utilitarian shopping motivation, it is necessary to explore first for future researchers who also want to analyze purchase motives.

4.1.2 Practical Advice

People should try to see the phenomenon of beauty as a Barbie Culture phenomenon. Beauty is not only limited to physical beauty, but inner beauty also has an important role. An early adult woman in caring for and obtaining beauty should not be too pushy. However, it should be adjusted to the abilities it has.

4.1.3 Advice for Industry Players

Here are some suggestions that can be given to companies engaged in the skin care product industry. Companies must be able to understand the behavior of consumers who will become the target market for their products. There are many variations of various types of skin care products (skincare) in each type of category that the brand issues, but there are still

many gaps that the company can explore from each consumer. Every company needs to know what trends are developing at this time, including knowing what consumer needs they need, such as wanting to reduce wrinkles on the face, wanting to have a glowing face, and product trends that most consumers are looking for, such as whitening products, or products to treat wrinkles on the face.

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- ### Motives For Purchase Of ...

Analysis of The Effect of Community's Role in CSR Activities on The Image of The Company of Minarak Brantas Gas, Inc.



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John Basuki Rahmad¹, Suwandi², Chaidir Kurnia Thoullah Soedaryono³, Luthfia Fauzia Dewi Aryanti⁴, Dwi Apraliasari⁵

Faculty of Economics and Social Sciences, Bakrie University^{1,2}, Faculty Science and technology, University of Raharja^{3,4,5}

Kuningan, DKI Jakarta/(021) 5261448^{1,2}, Cikokol, Tangerang/(021) 5529586^{3,4,5}
Indonesia^{1,2,3,4,5}

e-mail: admisi@bakrie.ac.id¹, suwandi@bakrie.ac.id², chaidir.soedaryono@raharja.info³,
fiafauzia@raharja.info⁴, dwi.apraliasari@raharja.info⁵,



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Abstract

A study of the impact of Community Perception and Community Participation on the Implementation of Corporate Social Responsibility (CSR) Activities has been published. The independent variables in this study are Community Perception of CSR Activities (X1), Community Participation in CSR activities (X2) and Community Image (Y). This research is located in Kalidawir Village and KedungBanteng Village, Tanggulangin Subdistrict, Sidoarjo Regency. The sampling technique in this study uses probability sampling techniques with simple random sampling methods. This study uses descriptive analysis and path analysis to determine the results of hypothesis analysis.

This study shows that there is a significant direct effect of people's perceptions on CSR activities (X1) on the implementation of CSR activities (Z) with the significance of variable X1 of 0.004 (<0.05). There is a significant direct effect of people's perceptions on CSR activities (X1) on the company's image (Y) with the significance of variable X1 of 0,000 (<0.05). There is a significant direct effect of community participation in CSR activities (X2) on the company's image (Y) with the significance of t variable X2 of 0,000 or less. There is a significant indirect effect of public perception on corporate image (X1) through the implementation of CSR activities (Z) with the significance of variables X1 on Y through Z of 0.013 <0.05. The results of testing the indirect effect shows that there is also a significant direct effect of this variable on the company's image.

Keywords: *community perception, community participation, implementation of corporate social responsibility (CSR) activities, company image*



1. Introduction

Corporate Social Responsibility (CSR) or corporate social responsibility has a very important role both for the community and for the company itself. CSR aims to improve the quality of life of employees and their families as well as improving local communities and society as a whole. A good social environment will support the success of the company's operations for a long time, so that business continuity will be maintained[1]. Corporate Social Responsibility (CSR) or corporate social responsibility in Indonesia is regulated by law. The government issued Government Regulation (PP) No. 47 of 2012 as the implementing regulation of Article 74 paragraph 1 of the Law on Limited Liability Companies (PT) above. Good perception and participation in CSR programs are two important things to achieve the successful implementation of CSR.

The perception of community members towards certain programs is the main basis or basis for the emergence of a willingness to be involved and play an active role in every activity and program, both from the government and companies. They found that there was a significant influence between public perception consisting of attention, understanding and memory variables on the implementation variable of Corporate Social Responsibility. Barriers that often arise when public participation in a government program is not optimal can be internally, in the form of socio-cultural barriers, and externally, obstacles from the local government bureaucracy. Internal barriers are obstacles from within the community itself, which is the reluctance of most community members to be directly involved in a program of activities[2]. External factors are factors from outside that can encourage or hinder participation, including the role of stakeholders and the existence of opportunities.

CSR has proven to be a mediating or intervening variable in the relationship between public perception and company image[3]. CSR programs that are useful and in accordance with the needs of the community will have a positive impact on the image of the company concerned. The seismic survey activities will definitely come into contact with the surrounding community where the survey activities are carried out. The community around the company's operations are afraid and worried about the recurrence of the incident so that they rejected the drilling of a new gas well. Social conditions such as these are still an obstacle as well as a challenge for the mining company. Social conditions such as these are still an obstacle as well as a challenge for the Minarak Brantas Gas, Inc. company.

2. Research Method

2.1. object, type, research method

The object of this research is the community of Kalidawir village and Kali Banteng village, Tanggulangin district, Sidoarjo regency, recipients of the CSR program from 2018 to 2109, especially the community development program from the Minarak Brantas Gas, Inc[4], [5]. company. Descriptive statistics are statistics that function to describe or provide an overview of the object under study through sample or population data as they are, without analyzing and making conclusions that apply to the public[6], [7]. This study was designed using a combination of a descriptive and quantitative approach[8]. The research method according to [9] is defined as: "A scientific way to obtain data with certain goals and uses". The scientific method means that research activities are based on scientific characteristics, namely rational, empirical, and systematic. This method is used to test the relationship between several independent variables and one dependent variable.

2.2 Population and Sample

The population in this study was the recipient community of the Minarak Brantas Gas, Inc. CSR program[10]. The sampling technique uses a probability sampling technique or sampling opportunity, which is a sampling technique that provides equal opportunities for each element (member) of the population to be selected as a sample member using simple random sampling method or simple random sample. In this study, 84 community members were taken as respondents.

2.3 Data collection technique

In this study, the data collection methods used are as follows:

- Library Research

Library Research is a process of collecting theoretical data through books, literature, scientific works and company reports related to the problems studied by the author.

- Field Research (Field Research)

Field Research is an actual data collection process by distributing questionnaires.

2.4 Literature Review

2.4.1 Perception

Perception is organizing[11], interpreting the stimulus it senses so that it is a meaningful and integrated response within the individual. In human perception there are different points of view in sensing. Stimulus in perception can come from outside, but can also come inside the individual himself. Most of the perception is through the sense of sight[12].

2.4.2 Participation

2.4.2.1 Type of Participation Stage

Community participation in various CSR programs refers to the four stages of Cohen and Uphoff in [13], namely:

1. The decision-making stage or planning stage is in the planning and implementation of a program. For example, in the reforestation program which is on the company's agenda, the community is asked to determine what seeds to plant because they are the ones who understand better what types of plants are most suitable in their area.
2. The implementation stage is the most important stage in development, because the core of development is its implementation. The tangible forms of participation at this stage are classified into three, namely participation in the form of thought contributions, material contributions, and forms of action as a project member.
3. The stage of enjoying the results of a community project is an indicator of the success of the project. The greater the benefits, the more likely it is that the project has succeeded in hitting the target.
4. The evaluation stage, this stage is considered important because community participation at this stage is feedback that can provide input for improving the implementation of the next project.

The dominant drive for achievement owned by respondents is the desire to add new experiences and knowledge. The respondent's dominant affiliation drive is the want to add friends and share opinions with others[14]. Public perception also shows a significant relationship to the level of participation[15], [16]. This positive perception arises because respondents have good knowledge and experience about the implementation of CSR program activities so that with this positive perception, respondents tend to actively participate in community activities[17], [18]. The level of willingness of program participants tends to be relatively high, meaning that the desire of participants to participate in economic empowerment programs is relatively high and participants have high expectations for the program. The level of opportunity is the factor that tends to have the most relationship with the level of participant participation.

2.4.3 Corporate Social Responsibility (CSR) or Corporate Social Responsibility

ISO 26000 also emphasizes the principle of social responsibility. There are seven principles as follows [1]:

- Accountability
- Transparency
- Ethical behavior
- Respect for stakeholder interests
- Compliance with the law
- Respect for international norms of behavior
- Human Rights Enforcement

If a company carries out a CSR program, it is hoped that the company's sustainability will be well guaranteed and form or create a more prosperous and independent community life. CSR programs are more appropriate if they are classified as investments and must be a business strategy of the company. This is also explained by [1] which states that the implementation of Corporate Social Responsibility (CSR) has benefits both for the company and the community.

2.4.4 Purpose and Benefits of Corporate Social Responsibility (CSR)

In any business, what is expected is the sustainability and stability of the business because sustainability will bring the maximum profit for the company. CSR is in line with the guarantee of the company's operational sustainability, as stated by Wibisono in [1]. It is natural for a company to pay attention to the interests of the community. Companies must realize that they operate within a community environment[19]. This social activity functions as a compensation or reciprocal effort for the control of natural resources or economic resources by the company which is sometimes expansive and exploratory[2], [20]. Business and society should have a symbiotic relationship of mutualism to get support from the community. Corporate Social Responsibility (CSR) is one way to reduce or even avoid social conflicts. 40% of companies implement CSR as part of their corporate social responsibility activities. The highest percentage of companies implementing CSR was because they want to build a company image which is 40%.

2.4.5 Company Image

2.4.5.1 The Process of Forming Company Image

Seftiani[21] explains the process of forming a corporate image as shown in the chart below.

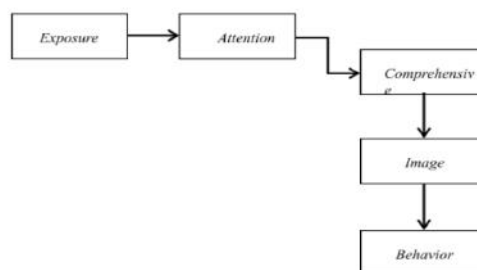


Figure 1. the process of forming a corporate.

Based on Figure 3.1 above, the process of forming a corporate image takes place in several stages, namely:

1. The object knows (sees or hears) the efforts made by the company in shaping the company's image.

2. Pay attention to the company's efforts.
3. After the efforts of the object's attention try to understand all that is in the company's efforts.
4. The formation of a corporate image on the object.
5. The corporate image that is formed will determine the behavior of the target object.

2.4.6 Framework

CSR activities carried out by a company will have an impact on the company itself and on the people who live in the location where CSR is implemented[22], [23]. There are factors that influence a person or group to participate in these activities, namely internal and external factors. The impacts that can be felt by the community include improving living standards and sustainable institutions[24]. On the other hand, the implementation of CSR activities that are in accordance with the needs and expectations of the community will improve the company's image[25]. Based on the literature review that has been described previously, the authors formulate the framework of thought in this research as described in the image below.

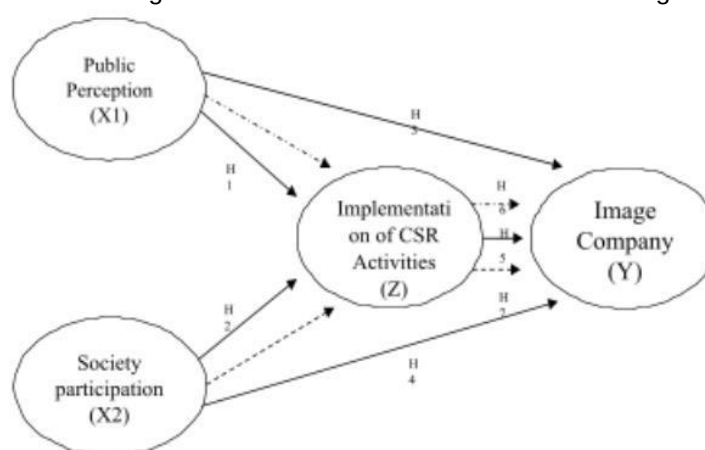


Figure 3.2.
Framework

2.5 Research Instrument Test

The purpose of testing an instrument is to get the value of validity (validity) and reliability (reliability) of all questions that will be used as a measuring tool. Instruments that are not tested for validity and reliability will produce data that is difficult to believe in truth.

2.6 Data analysis technique

2.6.1 Normality test

A good regression model is to have a normally distributed residual value. The normality test is to see whether the residual value is normally distributed or not. So the normality tests are not carried out on each variable but on the residual values of each variable.

2.6.2 Multicollinearity Test

If there is a high correlation between the independent variables and the dependent variable in a multiple linear regression model, the relationship between them and each other is likely to be disturbed.

2.6.3 Autocorrelation Test

The autocorrelation test is to see whether there is a correlation between a period t and the previous period ($t - 1$). The regression analysis shows the effect of the independent variables on the dependent variable, so there should be no correlation between observations and previous observation data.

2.6.4 Heteroscedasticity Test

Regression models that meet the requirements of the heteroscedasticity test are those where there is a similarity in variance from the residuals of one observation to another, which is fixed or has an inequality of variance.

2.6.5 Hypothesis testing

Path analysis or more widely known as Path Analysis is a method of decomposition of correlations into different parts to interpret an effect. Path analysis is used to find out whether the data support the theory, which is a priori hypothesized, which includes structural relationships between the measured variables.

3. Findings

3.1 Research result

Based on the hypothesis that has been formulated in this study in order to be tested, it is necessary to carry out a test using the parametric statistical method, in which the method requires that the data for each variable to be analyzed must meet the standards based on the criteria for the data to be normally distributed and the data must be reliable[26]. The data for each variable to be analyzed must meet the standards based on the criteria for the data to be normally distributed and the data must be reliable[27]. Data that meet these requirements and criteria will be tested and described below, both in determining the level of validity and reliability. This study uses primary data[28]. Data were collected by distributing questionnaires, namely by giving written statements to respondents. Based on 84 pre-selected respondents, the researcher circulated a questionnaire to each respondent. In the following, an overview of the characteristics of the respondents will be given which is expressed in the form of tabulation of the identities of 84 respondents.

Table 3.1.

Characteristics of Research Respondents Based on Gender

No.	Gender	Number of (people)	Percentase (%)
1	Man	44	52%
2	Woman	40	48%
Total		84	100%

Source: Questionnaire processed data (2020)

Based on Table 3.1 above, it shows that for the male gender there are more numbers than the female sex, as many as 44 respondents for men compared to 40 respondents for women.

Table 3.2.

Characteristics of Research Respondents Based on Marital Status

No.	Status	Number of (people)	Percentage(%)
1	Married	58	69%
2	Not Married	26	31%
Total		84	100%

Source: Questionnaire processed data (2020)

Based on Table 3.2 above, it shows that for marital status in general, 58 people are married and 26 people are not married.

Table 3.3.
Characteristics of Research Respondents Based on Age Data

No.	Ages	Number of People	Percentage (%)
1	< 20 Yr	7	8%
2	20 – 29 Yr	35	42%
3	30 – 39 Yr	28	33%
4	40 – 59 Yr	14	17%
Total		84	100%

Source: Questionnaire processed data (2020)

The majority of respondents were aged between 20-29, namely 35 respondents or equivalent to 42%. And the least are respondents aged < 20 years, namely as many as 7 respondents. This is an illustration that some people who receive CSR programs from Minarak Brantas Gas, Inc. belong to the productive age.

3.4.

Characteristics of Research Respondents Based on Residence

No.	Alamat	Number of people	Percentage(%)
1	Desa Kalidawir	37	44%
2	Desa Kedung Banteng	47	56%
Jumlah		84	100%

Source: Questionnaire processed data (2020)

Based on Table 3.4 above, it shows that the location where the respondents live in this study is more than KedungBanteng Village, namely 47 people or 56%.

Table 3.5.

Characteristics of Research Respondents Based on Occupation

No.	Job	Number of people	Percentage(%)
1	Government employees	8	10%
2	Private Employees	26	31%
3	Entrepreneurs	18	21%
4	Farmers	14	17%
5	Professionals	1	1%
6	Other	17	20%
Total		84	100%

Source: Questionnaire processed data (2020)

In this study, the highest number of respondents worked as private employees, as many as 26 people or 31%. The lowest respondent is working as a professional as many as 1 person.

3.1.1 Validity and Reliability Test

Data were collected by distributing questionnaires, namely by giving written statements to respondents. This questionnaire is closed in nature where the answers are already available. A trial test was conducted on 30 respondents outside the research sample to measure the validity and reliability of the measuring instrument.

3.1.1.1. Validity test

Test of validity of instrument is to determine the degree of accuracy of the instrument to collect research data. An instrument is said to be valid if it has the ability to measure what it is supposed to measure[29]. The type of validity used in this study is construct validity, which includes understanding the theoretical arguments that underlie the measurements obtained.

The results of data processing for all statements in the public perception instrument on CSR activities consisting of 9 statement items (Appendix), are in Table 3.5.

as follows :

Table 3.6.
Instrument Validity per Item for Community Perception Variables in CSR Activities

Questions number	rcount	$r_{critical}$	Decision
1	0,810	0,30	Valid
2	0,866	0,30	Valid
3	0,757	0,30	Valid
4	0,719	0,30	Valid
5	0,668	0,30	Valid
6	0,746	0,30	Valid
7	0,841	0,30	Valid
8	0,912	0,30	Valid
9	0,850	0,30	Valid

Source: Questionnaire processed data (2020)

All statements have an rcount value greater than 0.30 so that all statements on the community perception variable on CSR activities (X1) can be used in collecting data for this study.

The results of data processing for all statements in the instrument of community participation in CSR activities consisting of 9 statement items (Appendix), are in Table 3.7. as follows :

Table 3.7.
Instrument Validity per Item for Community Participation Variables in CSR Activities

Question Number	rcount	$r_{critical}$	Decision
1	0,755	0,30	Valid
2	0,892	0,30	Valid
3	0,804	0,30	Valid
4	0,773	0,30	Valid
5	0,834	0,30	Valid
6	0,854	0,30	Valid
7	0,889	0,30	Valid
8	0,893	0,30	Valid
9	0,755	0,30	Valid

Source: Questionnaire processed data (2020)

All statements have an rcount value greater than 0.30 so that all statements on the community participation variable in CSR activities (X2) can be used in collecting data for this research. Based on Table 3.6. above, the results are based on the results of a study published in Social Science and Human Development (CSR).

The results of data processing for all statements in the instrument for implementing Corporate Social Responsibility (CSR) activities which consist of 10 statement items (Appendix), are in Table 5.8. as follows :

Table 3.8.
Instrument Validity per Item for Activity Implementation Variables Corporate Social Responsibility (CSR)

Question Number	rcount	$r_{critical}$	Decision
1	0,807	0,30	Valid
2	0,869	0,30	Valid
3	0,843	0,30	Valid
4	0,876	0,30	Valid

5	0,819	0,30	Valid
6	0,748	0,30	Valid
7	0,595	0,30	Valid
8	0,766	0,30	Valid
9	0,869	0,30	Valid
10	0,752	0,30	Valid

Source: Questionnaire processed data (2020)

All statements have an rcount value greater than 0.30 so that all statements on the variable implementation of Corporate Social Responsibility (CSR) (Z) activities can be used in this research data collection. Based on Table 3.8. above, the results are based on the results obtained for the variable implementation of CSR (Z), where Z is the number of people involved in such activities.

The results of data processing for all statements in the company image instrument consisting of 9 statement items (Appendix), are in Table 3.9. as follows :

Table 3.9.
Instrument Validity per Item for Company Image Variable

Question Number	rcount	r _{critical}	Decision
1	0,891	0,30	Valid
2	0,676	0,30	Valid
3	0,904	0,30	Valid
4	0,796	0,30	Valid
5	0,815	0,30	Valid
6	0,839	0,30	Valid
7	0,655	0,30	Valid
8	0,875	0,30	Valid
9	0,904	0,30	Valid

Source: Questionnaire processed data (2020)

All statements in Table 3.9. have an r_{count} value greater than 0.30 so that all statements on the corporate image variable (Y) can be used in collecting data for this study.

3.1.1.2. Reliability Test

The reliability test is used to measure the consistency or stability of a measurement instrument. In this reliability test, the SPSS program with Cronbach's Alpha method was used. The reliability test shows the extent of which the measuring instrument gives relatively no difference when repeated measurements of the same symptoms are made at different times. The variables used are as follows:

Table 3.10.
Instrument Reliability Test Results

Variabel	Cronbach Alpha	r _{critical}	Decision
Public perception on CSR activities (X1)	0,928	0,60	Reliabel
Community participation in CSR activities(X2)	0,939	0,60	Reliabel
Implementation of Corporate Social Responsibility activities (CSR) (Z)	0,935	0,60	Reliabel
Company Image (Y)	0,933	0,60	Reliabel

Source: Questionnaire processed data (2020)

Thus, it can be concluded that the instruments of public perception on CSR activities (X1),

community participation in CSR activities (X2), implementation of Corporate Social Responsibility (CSR) activities (Z) and company image (Y) are considered reliable.

3.2 Primary Data Processing Results

This is an analysis of the correlation between corporate description and implementation of Corporate Social Responsibility (CSR) activities. The researchers describe the description and related variables. Descriptions of the related variables are corporate image (Y), public perception of CSR activities (X1), community participation (X2) and implementation (Z).

Table 5.11.

Distribution of data for each variable

	Public Perception_X1	Society participation_X2	Implementati on Activity CSR_Z	Company Image_Y
N Valid	84	84	84	84
Missing	0	0	0	0
Mean	33,5595	31,0710	37,0952	32,5952
Mode	31,00	30,00	40,00	30,00
Std. Deviation	5,68310	5,44859	5,78660	5,25522
Variance	32,298	29,687	33,485	27,617
Range	24,00	25,00	28,00	23,00
Minimum	20,00	20,00	20,00	19,00
Maximum	44,00	45,00	48,00	42,00
Sum	2819,00	2823,00	3116,00	2738,00

Source: SPSS processed data (2020)

Based on Table 3.11, it can be broken down based on each of the following variables:

3.2.1 Community perception variable on CSR activities (X1)

It can be seen based on the variable of public perception on CSR activities that the lowest (minimum) score obtained is 20 and the highest (maximum) score is 44. Table 5.11 also shows the data range (range) of 24; the average data (mean) is 33.5595; the most frequently occurring data (mode) is 31; while the standard deviation (std. deviation) is 5.68310.

3.2.2 Variable community participation in CSR activities (X2)

It can be seen based on the community participation variable in CSR activities that the lowest (minimum) score obtained is 20 and the highest (maximum) score is 45. Table 5.13 also shows the data range (range) of 25; the average data (mean) of 31.0710; the most frequently occurring data (mode) is 30; while the standard deviation (std. deviation) is 5.44859.

3.2.3 Variable implementation of Corporate Social Responsibility / CSR (Z)

It can be seen based on the variable implementation of Corporate Social Responsibility (CSR) activities that the lowest (minimum) score obtained is 20 and the highest (maximum) score is 48. Table 5.11 also shows the data range (range) of 28; the average data (mean) is 37.0952; the most frequently occurring data (mode) is 40; while the standard deviation (std. deviation) is 5.78660.

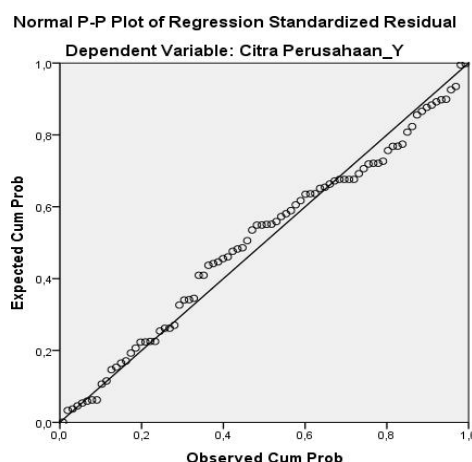
3.2.4 Company image variable (Y)

It can be seen based on the corporate image variable that the lowest (minimum) score obtained is 19 and the highest (maximum) score is 42. Table 5.11 also shows the data range (range) of 23; the average data (mean) of 32.5952; the most frequently occurring data (mode) is 30; while the standard deviation (std. deviation) is 5.25522.

3.3 Assumption Test

3.3.1. Normality test

A good regression model should be normally distributed or close to normal. The normality test aims to test whether in the regression model the dependent variable (ie corporate image) and the independent variable both have a normal distribution. To test whether the data distribution is normal, it can be done with a graph [30] the way is to look at the normal graph plot.



Normality test is used to test whether the data is normally distributed. In this study, the normal distribution of data was tested using the Kolmogorov-Smirnov test. Results influence public perception on CSR activities, community participation in CSR and corporate image.

Table 5.12 Kolmogorov-Smirnov . Test Results
One-Sample Kolmogorov-Smirnov Test

		Unstandardize d Residual
N		84
Normal Parameters ^{a,b}	Mean	0E-7
	Std. Deviation	2,92643649
Most Extreme Differences	Absolute	,089
	Positive	,089
	Negative	-,075
Kolmogorov-Smirnov Z		,816
Asymp. Sig. (2-tailed)		,518

a. Test distribution is Normal.

b. Calculated from data.

Source: SPSS processed data (2020)

3.3.2. Multicollinearity Test

The results of the multicollinearity test are used to determine whether or not there is a deviation from the classical assumption. Test methods include looking at the value of the inflation factor (VIF) in the regression, comparing the individual determinant coefficient (r^2) with the value of the determinant simultaneously (R^2). There are several test methods that can be used, including using the R^2 eigenvalue and condition index. The condition that must be met in the regression model is the absence of multicollinearity.

Table 3.13 Multicollinearity Test Results Coefficients^a

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Persepsi Masyarakat_X1	,317	3,155

1	Partisipasi Masyarakat_X2	,232	4,310
	Pelaksanaan Kegiatan CSR_Z	,257	3,885

a. Dependent Variable: Citra Perusahaan_Y
Source: SPSS processed data (2020)

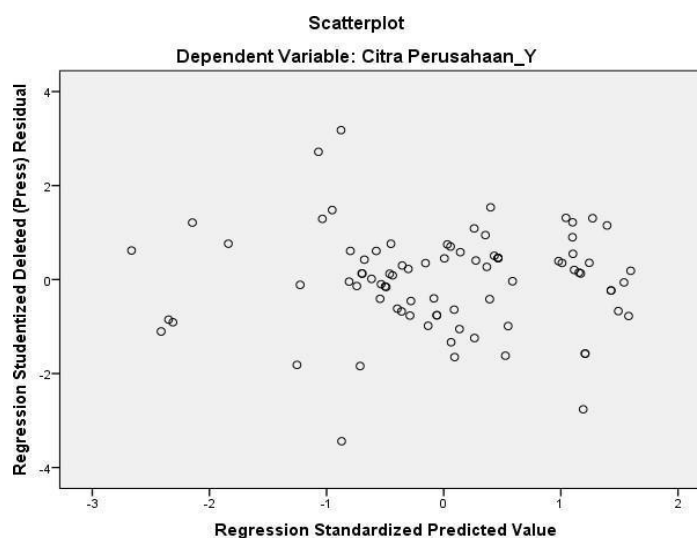
If the VIF value of each predictor does not exceed 5 and the t value is far from 1, it can be concluded that there is no multicollinearity between the independent variables in this study. Community participation in CSR activities is 4,310 and the implementation of Corporate Social Responsibility (CSR) activities is 3,885.

3.3.3 Autocorrelation Test

This test is used to determine the extent of the influence of the independent variable on the dependent variable. For the purposes of the test, it is adjusted to the Durbin Watson criteria, namely that if the Durbin Watson is -2 to 2, no autocorrelation is found. Autocorrelation is a condition in which there is a correlation or relationship between observations. In regression estimation, it is necessary to detect whether or not there is autocorrelation in the built model. Autocorrelation Ships are more common in time series data than cross sectional data.

3.3.4 Heteroscedasticity Test

Detection of heteroscedasticity can be done using the scatter plot method by plotting the ZPRED value (prediction value) with SRESID (residual value). It can be seen that the points with a pattern spread randomly at positions above and below the number 0 on the Y axis. Based on these results, it can be concluded that there are no symptoms of this type of deviation in the regression model.



Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,831 ^a	,690	,678	2,98080	1,654

Source: SPSS processed data (2020)
Figure 5.2 Heteroscedasticity Test with Scatterplot

Table 5.14 Table of Heteroscedasticity Test Results Coefficientsa

Model	Sig.
(Constant)	,155

1	Public Perception_X1	,420
	Society participation_X2	,771
	Activity Implementation CSR_Z	,325

Dependent Variable: RES2

Source: SPSS processed data (2020)

There is no heteroscedasticity in the variable implementation of Corporate Social Responsibility (CSR) activities. The significance value of the community perception variable in CSR activities is 0.420 which is greater than 0.05, meaning that there is no heteroscedasticity in the community's perception value.

3.4 Findings and Discussion of Research Results

Based on the results of the analysis, the findings of the research are described as follows:

Table 5.28 Result of Path Analysis of Direct Effect Hypothesis

Model	Variabel	α	Sig	Conclusion
1	Public perception of CSR activities on the implementation of CSR activities at Minarak Brantas Gas, Inc.	0,05	0,004	Significant
	Community participation in CSR activities for the implementation of CSR activities at Minarak Brantas Gas, Inc.	0,05	0,000	Significant
2	Public perception of CSR activities on corporate image at Minarak Brantas Gas, Inc.	0,05	0,000	Significant
	Community participation in CSR activities on the corporate image of Minarak Brantas Gas, Inc.	0,05	0,000	Significant
	Implementation of CSR activities on corporate image at Minarak Brantas Gas, Inc.	0,05	0,000	Significant

Table 5.29 Result of Path Analysis of Indirect Effect Hypothesis

Intervening	Variabel	α	Sig	Conclusion
1	Public perception of CSR activities on the company's image through the implementation of CSR activities at Minarak Brantas Gas, Inc.	0,05	0,013	Significant
2	Community participation in CSR activities towards the company's image through the implementation of CSR activities at Minarak Brantas Gas, Inc.	0,05	0,000	Significant

1. There is a significant chance that H_0 is rejected or H_a is accepted when the significance of the X1 variable on Z is $0.004 < 0.05$.

2. There is a significant influence of community participation on the implementation of Corporate Social Responsibility (CSR) activities at Minarak Brantas Gas, Inc. Based on hypothesis testing in sub structure 1, the significance of the X2 variable on Z is $0.000 < 0.05$.
3. There is a significant effect of the X1 variable at Y on corporate image at Minarak Brantas Gas, Inc. Based on hypothesis testing in sub structure 2, it can be concluded that H_0 is rejected or H_a is accepted. This is where there is a large direct influence on public perception of CSR activities at the company.
4. There is a significant influence of community participation in CSR activities on the company's image at Minarak Brantas Gas, Inc. Based on hypothesis testing in sub structure 2, it shows the significance of the X2 variable at Y of $0.000 < 0.05$. It can be concluded that H_0 is rejected or H_a is accepted.
5. The significance of the variable Z on Y is $0.000 < 0.05$. Where there is a significant direct influence on the implementation of Corporate Social Responsibility (CSR) activities on the company's image at Minarak Brantas Gas, Inc. It can be concluded that H_0 is rejected or H_a is accepted.
6. There is a significant indirect effect of public perception on CSR activities on corporate image through the implementation of Corporate Social Responsibility (CSR) activities at Minarak Brantas Gas, Inc. Hypothesis testing shows the significance of the variable X1 to Y through Z of $0.013 < 0.05$. H_0 is rejected or H_a is accepted.
7. There is a significant indirect effect of community participation in CSR activities on the company's image through the implementation of Corporate Social Responsibility (CSR) activities at Minarak Brantas Gas, Inc. Hypothesis testing shows the significance of the variable X2 to Y through Z of $0.000 < 0.05$.

A good perception from the people of Kalidawir and Kedung Banteng villages on the implementation of CSR activities carried out by Minarak Brantas Gas, Inc[15]. affects the success of the corporate social responsibility (CSR) activities. The existence of an open forum for the community to participate can be explained from the indicators, namely: information that is easily understood by the public and positive attention from the public for the information that has been conveyed by the company. Community participation in the implementation of CSR activities as well as access for the community to express opinions in the decision-making process are also important indicators of a good CSR experience.

CSR activities that have an impact on increasing community capacity will affect the public's assessment of the company which will ultimately improve the company's image. In Kalidawir and Kedung Banteng villages, the community has felt the benefits of CSR activities carried out by Minarak Brantas Gas, Inc. This is indicated by the good perception and participation of the people of the two villages. The successful implementation of CSR activities by the company will also have an effect on improving its corporate image in the eyes of the community. This means that by increasing public perception and community participation in CSR accommodations, the implementation of these activities also increases.

3.5 Implications of Research Results

Based on this, the implementation of CSR accommodations can be improved through the company's corporate social responsibility. Based on this, the company's image can be improved through the implementation of Corporate Social activities Responsibility (CSR) with the independent variable community perception and community participation in CSR activities. Based on the foregoing, the implications of the research results are as follows:

3.5.1 Managerial Implications

Based on the results of the study, it is known that the variables of community perception and community participation in the CSR activity variables have a significant effect on the implementation of Corporate Social Responsibility (CSR) activities, which in turn have an effect on the company's image. The implications of the results of this study for the management of CSR activities is to increase public perception and participation.

3.5.2 Academic Implication

Based on the results of this study, it is expected to open further studies regarding the analysis of the company's CSR program activities. This is due to the importance of CSR program activities both for the community around the company's operations and for the company itself.

3.5.3 Implications of Further Research

For further research, in order to continue to make improvements and refinements regarding the analysis study of the company's CSR activity program. This can be done by exploring other variables that can improve the management of CSR programs and improve the company's image in the eyes of the public.

4. Conclusion

4.1 Conclusion

Based on the hypothesis testing conducted in the previous chapter, it can be concluded, There is a significant effect of public perception on the implementation of CSR at Minarak Brantas Gas, Inc. Public perception in the form of understanding and positive assessment has an impact on the accommodation of CSR activities carried out by Minarak Brantas Gas. Community participation has a significant impact on the implementation of CSR activities at Minarak Brantas Gas, Inc. Community participation in the planning, implementation, utilization and evaluation stages of CSR activities has an impact on its implementation, according to researchers. Public perception of Minarak Brantas Gas' CSR activities has an impact on the image of the company in the eyes of the community around the company's operational area.

Community participation in the planning, implementation and evaluation stages of CSR activities has an impact on the image of Minarak Brantas Gas, Inc. in the eyes of the community around the company's operational areas. There is a significant effect of community participation on corporate image at Minarak Brantas Gas Inc. The image of Minarak Brantas Gas, Inc. has an impact on the company's image in the eyes of the community around its operational areas. The partial hypothesis testing shows that there is a significant effect on the implementation of Corporate Social Responsibility (CSR) activities at Minarak Brantas Gas, Inc., where the obtained significance <0.05 is accepted. Testing the indirect effect hypothesis obtained a significance calculation result of <0.05 , meaning that there is a mediating effect between public perceptions of CSR activities on corporate image through the implementation of Corporate Social Responsibility (CSR) activities at Minarak Brantas Gas, Inc. which means H_a is accepted. Testing the indirect effect hypothesis obtained a significance calculation result of <0.05 , meaning that there is a mediating effect between community participation in CSR activities on corporate image through the implementation of Corporate Social Responsibility (CSR) activities at Minarak Brantas Gas Inc. which means H_a is accepted.

4.2 Advice

Minarak Brantas Gas Company, Inc. it is necessary to continuously build and create positive perceptions from the community by providing comprehensive information about CSR activities carried out by the company so that it will provide positive understanding and assessment from the community around the company's operational areas. Minarak Brantas Gas Company, Inc. it is necessary to continuously increase community participation in CSR activities carried out by the company by involving the community and opening the widest possible space and access for the community to participate at every stage of CSR activities

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Analysis of Factors Affecting Customer Satisfaction at PT.OSO Gallery

Karendita Dayri Prawira¹, B. P. Kusumo Bintoro², Rachmat Hadis³, Warseno⁴, Yochebed Anggraini Terah⁵

Faculty of Economics and Social Sciences, Bakrie University^{1,2}, Faculty Science and technology University of Raharja^{3,4,5}
Kuningan, DKI Jakarta/(021) 5261448^{1,2}, Cikokol, Tangerang/(021) 5529586^{3,4,5}
Indonesia^{1,2,3,4,5}

e-mail: admisi@bakrie.ac.id¹, kusumo.bintoro@bakrie.ac.id², rachmat.hadis@raharja.info³, warseno@raharja.info⁴, yochebed@raharja.info⁵.



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Abstract

This study aims to identify factors affecting customer satisfaction in PT.OSO sekuritas cabang galeri Universitas MH. Thamrin and describe it based on customer perceptions. This research uses a qualitative approach with case study strategy. Data collection techniques used are interviews, observation, and document review. The participants of this study 25 customers with different backgrounds (student or employee). The result of study shows that factors affecting customer satisfaction in PT.OSO sekuritas cabang galeri Universitas MH. Thamrin Branch is the excellence of the relationship between the employee and the costume, accuracy in satisfying customer desires or demand and adequate facilities in the investment gallery. This strategy will always be improved by the employees to provide customer satisfaction in the long term.

Keywords: Customer satisfaction, service quality, customer relation, customer loyalty.



1. Introduction

Competitive advantage is a series of processes that develop and must be managed continuously by the company. Along with the development of science and technology, business competition has also become very tight. According to Kotler in [1], [2]"A well-designed marketing strategy is necessary to maintain and develop the business in a highly competitive business world", in line with that of course the company must form the foundation of a good marketing strategy.

Table 1.1 Stock Transaction Data of PT. OSO Securities University MH Thamrin Cab Thamrin

Year	Value	Customer
November/2018	756.986.379	33
Desember/2018	3.106.144.632	36
January/2019	11.777.128.600	58
February/2019	8.263.105.500	81
March/2019	7.446.384700	96
April/2019	3.213.555.000	101

PT. OSO Securities need to identify what factors are become a determinant of satisfaction and customer satisfaction at the Thamrin University Branch. Customers of a security including PT. OSO Sekuritas, Universitas MH Thamrin Gallery Branch have several securities accounts in other securities. This phenomenon raises the fundamental question of what strategy should be applied by the company to be able to increase satisfaction that has an impact on customers[3].

The Investment Gallery of the Indonesia Stock Exchange (IDX) is a means to introduce the Capital Market from an early age to the academic world. The IDX Investment Gallery with the 3 in 1 concept, which is a collaboration between IDX, Universities and Securities Companies, is expected to be a bridge to mastery of science and practice in the capital market. For universities, there is a strategic alliance with capital market players (IDX, AB, Data Vendors) Increase the Brand Name and Selling Value of the college. For Stock Exchange Member Companies, as a promotional media step among students/academics and as a media for recruitment of reliable Capital Market HR. For data vendors, it does not issue hardware investments for the IDX corner & Capital Market Lab.

Study seeks to explore problems from the perspective of customers or how customers perceive these factors. PT. OSO Sekuritas, MH Thamrin University Gallery Branch, aims to find out what factors affect Service Quality at PT. There are important determinants that can lead to high customer satisfaction and these factors will be identified in this study[4]. The purpose of this study was to identify the determinants that affect customer satisfaction at PT. OSO Sekuritas, MH Thamrin University Gallery Branch and further describes it based on customer perceptions. Although customer satisfaction is an important thing in the service of transacting in a security, there has not been much research and information on this matter.

A study of the factors that influence customer satisfaction would be a very important and useful discussion in the formulation of a customer satisfaction strategy that is contextual and relevant for each security[5]. By discussing these factors, securities can formulate appropriate and appropriate strategies so that they can provide input for management in designing good marketing strategies. This research explores what factors make customers of a security company feel satisfied to be customers. This research has 3 (three) limitations. The scope of the research location is one of the concerns in this study, which is only limited to being carried out at PT. OSO Sekuritas, MH Thamrin University Gallery Branch. Other things that are not related to this, such as marketing strategies, are not explored in this report.

2. Research Method

2.1 Qualitative Descriptive

MH Thamrin University Gallery is located at MH University of Phnom Penh (MH) in Indonesia. Researchers assess whether the services provided to customers are good enough where there is no gap in expectations with perceptions[6], [7]. Qualitative descriptive research seeks to describe all existing symptoms or conditions, namely the state of symptoms according to what they were at the time the research was conducted.

2.2 Research paradigm

With a qualitative approach, researchers can explore research problems by exploring phenomena. Researchers study participants in their environment because the participants are in a natural setting. Quantitative research is not in accordance with this study because in quantitative research the variables must have been known from the start. [8] states that qualitative research is an activity that places researchers in reality. Meanwhile, what will be done in this research is to identify the factors and then conduct an exploration of these factors.

Qualitative research begins with assumptions, views of reality, and the study of problems that question the meaning of the individual or group in question[9]. Qualitative researchers collect data in the natural environment of the people and places studied, and then analyze the data inductively and establish patterns or themes. With open-ended questions, participants are free to respond in their own words. Compared to quantitative research, qualitative research is more flexible.

2.3 Research Methods and Strategies

The qualitative approach used in this research is a case study[10]–[12]. Case study research is a qualitative approach that explores bounded systems (cases) or several bounded systems[13], [14]. In this case, the case to be studied is a single case at the Yogyakarta Branch of Kanisius Foundation[15], [16]. To enrich the data, the customers who were involved as participants were chosen as varied as possible in terms of gender and customer status.

2.4 Research Location

PT. OSO Sekuritas Cab. Thamrin is an investment gallery formed by 3 parties, namely Universitas MH Thamrin, Program Management and the Indonesia Stock Exchange. Currently, the gallery is in quite a dilemma because many customers have stock or securities accounts of more than 1 securities company.

2.5 Research subject

The subjects of this research are customers of PT. OSO Sekuritas Cab. MH Thamrin. Spradley reveals that qualitative research does not use the term population, but it is called a social situation or social situation which consists of three elements, namely place, actors, and activity.

2.6 Research Participants

The research subject or someone who provides information related to the research title is PT. OSO Sekuritas, MH Thamrin University Gallery Branch, located in East Jakarta. Informants are people expected to provide information about situations and conditions in the background[17], [18]. The social situation can be expressed as an object of research that wants to know what is happening in it.

In this study, the most common sampling method used in qualitative research is purposive sampling. Purposive sampling is a sampling strategy that is carried out by determining research participants with criteria that are relevant to certain research questions. In this study, the researcher deliberately chooses the location and research participants to

understand the phenomenon. Employees of PT were selected based on their experience as lecturers, students and employees of PT[19], [20].

2.7 Method of collecting data

Data collection techniques are the most important step in research, because the main purpose of research is to obtain data, namely:

3.7.1 Observation

Observation aims to observe the subject and object of research, so that researchers can understand the actual conditions[21]. Observation is non-participatory, that is, the researcher is outside the system being observed. The importance of observation is the ability to determine the initial factors of behavior and to accurately describe the reactions of individuals observed under certain conditions. Observations in qualitative research are carried out on real situations that are reasonable, without being prepared, changed or held specifically for research purposes.

3.7.2 Interview

With interviews, researchers will find out more in-depth things about informants in interpreting situations and phenomena that occur, where this cannot be found through observation[4]. In conducting interviews, researchers prepared research instruments in the form of written questions to be asked, and recorded what was stated by the informants, therefore the types of interviews used by researchers included in the type of structured interviews[22]. Interview is the process of obtaining information for research purposes by means of question and answer. In this study, researchers conducted interviews with PT. OSO Sekuritas Cab. MH Thamrin University which is considered to be able to provide the information needed for research.

2.7.3 Documentation

Research results from observations or interviews will be more credible if they are supported by the relevant documents. Documentation studies are collecting documents and data needed in research problems and then examining them intensely so that they support and add to the belief and evidence of an incident. The documents used in this study are a list of research respondents, photos of customer behavior in transactions at PT. OSO Sekuritas Cab. Gallery MH Thamrin University.

2.7.4 review documentation

Documents related to the research were studied to get a more complete picture. The documents include the investment gallery of PT. OSO Sekuritas Cab, Vision and Mission to become a leading financial company. To be a safe and profitable place for investors to invest in the Indonesia Stock Exchange.

3.8 Literature Review

3.8.1 Introduce

The function of literature review in qualitative research is as a comparison and explanatory material for research findings. In some qualitative studies, researchers use literature review to support the findings. Qualitative research does not base its theory on the concepts presented in the literature review. Researchers are more interested in how the findings relate to pre-existing ideas: whether the research findings support or modify existing ideas and practices

3.8.2 Service Quality

Service Quality can be identified by comparing customer perceptions of the service they actually receive with the actual service they expect. The conclusion of service quality is the

assessment given by the customer from comparing the company's performance with the customer's own expectations. It is the main thing that is seriously considered by the company.

3.8.3 Konsep Customer Satisfaction

In the concept of customer satisfaction there are two elements that influence, namely expectations and performance. Performance is the consumer's perception of what is received after consuming a product or service[23]. Expectation is a consumer's estimate of what will be received if he consumes a product (goods or service) customer satisfaction can be described as shown in the following figure:

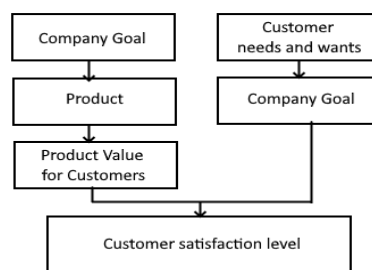


Figure 3.8.1 Concept of Customer Satisfaction

3.9 Data analysis technique

Descriptive research is research based on descriptive data from status, circumstances, attitudes, relationships or thinking systems[24]. The data analysis process begins by examining all available data from various sources, namely through observation, interviews and documentation[25]. If the interviewee's answers after being analyzed feel unsatisfactory, the researcher will continue the question again.

3.9.1 Data Reduction (Data Reduction)

Data reduction is the process of selecting, separating, paying attention to simplification, abstracting and transforming rough data that emerges from written records in the field. Reducing data means summarizing, choosing the main things, focusing on the things that are important, and looking for themes and patterns.

3.9.2 Data Display (Data Display)

Presentation of data is the process of making it easier for researchers to see the overall picture or a particular part of the research. The presentation of the data is done by describing the results of the interviews as outlined in the form of a description with narrative text, and supported by documents.

3.9.3 Conclusion Drawing

In this study, conclusions are drawn by taking the essence of a series of research categories based on observations and interviews[26]. The researcher tries to analyze and look for patterns, themes, similar relationships, things that often arise, hypotheses and so on which are outlined in tentative conclusions.

3.10 Triangulation

Triangulation is a technique to check the validity of data from various different points of view. It reduces as much as possible the bias that occurs during data collection and analysis.

3.10.1 Triangulation of various methods

Triangulation of various methods is done by comparing the data obtained in different ways, such as observation, interviews, and document review. This triangulation is carried out if the data from each source is different until the truth is doubted. The truth can be obtained by comparing the data generated by each method.

3.10.2 Triangulation of various researchers.

Qualitative research adheres to the view that reality is plural and it is possible for each researcher to see a phenomenon differently because of their subjectivity.

3.10.3 Triangulation of various theories

Triangulation is the process of comparing research findings with relevant theories to avoid the researcher's individual bias on the findings. This triangulation can increase the depth of understanding if researchers are able to explore theoretical knowledge in depth on the results of data analysis that has been obtained.

3.11 Research Process

The data collection process to be carried out in this study includes the following stages:

3.11.1 The process of entering the research site

Before entering the research location to obtain data, the researcher first asked permission from the leader of the investment gallery and other informants involved in this research.

3.11.2 While at the research location (getting along)

In an interview, a researcher tries to make a personal and intimate relationship with the research subject, seeks information and various complete data sources and tries to capture the meaning of the various information received and observed phenomena[27]. Therefore, the researcher tries as wisely as possible so as not to offend the informants formally or informally.

3.11.3 Data collection (data logging)

At this stage, the researcher carried out the data collection process that had been determined based on the research focus. The data collection methods used in this study are as follows:

- a. Observation
- b. Interview
- c. Documentation.

3. Findings

3.1 Introduction

This research is qualitative research so that the data obtained in the form of words, rather than numbers. The data were obtained through interviews, observation and document review. Interviews conducted by researchers at PT. OSO Sekuritas, MH Thamrin University Gallery Branch, Jakarta, Indonesia.

3.2 Characteristics of Research Participants

In this study, the determination of participants begins with classifying the customers. Age, gender and how long have you been a customer are considered. The aim is to see what point of need is really needed by all these classifications in order to feel satisfaction in transacting at PT. OSO Sekuritas.

Participants in this study amounted to 25 customers. Based on the type of status, there were 6 female participants and 19 male participants. And includes 12 people (48%) students, 4 people (16%) lecturers, 9 people (36%) employees.

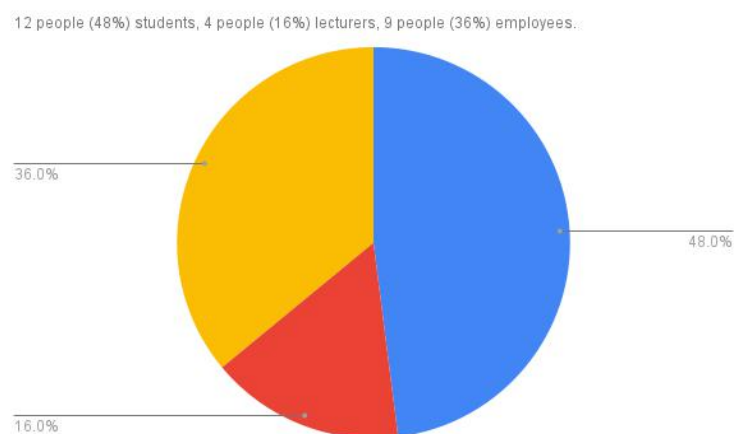


Figure 5.1: Composition of Participants by Status.
Based on gender, there are 19 male (76%) and 6 females (24%).

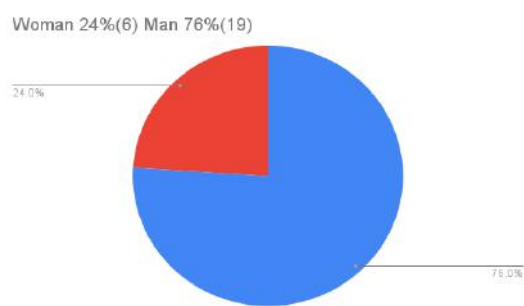


Figure 5.2: Composition of Participants by Gender.

3.3 Research result

Data analysis was carried out by arranging data in the form of interview transcripts obtained from the results of questions and answers with several subjects according to predetermined characteristics[28], [29].

3.3.1 Positive Themes

What is meant by positive themes are factors that are seen by the participants as positive, satisfying, and become reasons for them to stay as customers at PT. OSO Securities Gallery Branch MH Thamrin University.

3.3.2 Tangibles

The customers of PT. OSO Sekuritas Gallery Branch, University of MH Thamrin feel that the facilities provided by the Gallery have fulfilled their needs. The Gallery room meets IDX standards and computer equipment, as well as fast internet access. This is how the participants felt.

3.3.3 Reliability

Must be in accordance with customer expectations means timely performance, error-free service, sympathetic attitude and high accuracy. That timely, accurate, and high-accuracy services result in customers continuing to transact at PT. OSO Sekuritas, MH Thamrin University Gallery Branch.

3.3.4 Responsiveness

A willingness to help and provide fast (responsive) and appropriate service to customers by delivering clear information. Researchers see that in a securities company, staff or equity sales are needed who can anticipate changes quickly from live trade when the stock market is open on a daily basis.

3.3.5 Empathy

The empathy dimension consists of three sub-dimensions, namely access, communication and listening ability. Good relations or customer relations that are built by Staff or Equity Sales are very good and have positive synergies. Researchers see from the side of good relations with customers as very good for business.

3.3.6 Negative Themes

What is meant by negative themes are factors that are seen by participants as negative, unsatisfactory, and need to be improved/improved so that they remain in PT. OSO Sekuritas, MH Thamrin University Gallery Branch. If these things are not fixed or improved, these things have the potential to make customers decide to leave PT. OSO Sekuritas, MH Thamrin University Gallery Branch.

3.3.7 Assurance

It is a guarantee and certainty, namely knowledge, courtesy, and the ability of company employees to foster customer trust in the company.

1. Competence, The expertise and skills that service providers must possess in providing their services to customers.
2. Credibility, Honesty and responsibility of the service provider so that customers can trust the service provider.
3. Courtesy, Ethics of courtesy, respect and friendliness of the service provider to its customers when providing services.
4. Security (Security / Security), A sense of security, feeling free from fear and free from doubts about the services provided by the service provider to its customers.

In financial services companies, more specifically, are Securities, on the one hand, they have a fairly high level of risk if in the implementation of services, the analysis and recommendations of the Securities company are inaccurate. One of the weaknesses of this accuracy is seen from the competence side, an Equity Sales.

3.4 Discussion

PT. OSO Sekuritas Gallery Branch, University of MH Thamrin is a true customer because of the convenience they get with the service quality provided by all employees[30], [31]. This convenience is due to employees having a very close relationship with customers and responding quickly to customer needs at any time[32]. Simamora believes that good customer service can have a very positive impact on the bottom line of a company's bottom line as well as its reputation[33]. At PT. OSO Sekuritas Gallery Branch, Universitas MH Thamrin, providing the best service and creating a sense of security and comfort for all customers is the primary thing. If these basic needs are relatively fulfilled, a higher need emerges, namely the emergence of high loyalty from customers. The investment gallery at PT. OSO Sekuritas Gallery Branch, Universitas MH Thamrin is not their primary need but a good service that shows their loyalty, says Lupiyoadi[34]. Several participants stated that the facilities were quite complete and comfortable at the investment gallery. To be in accordance with customer expectations means timely performance, error-free service, sympathetic attitude and high accuracy.

Regarding Customer Satisfaction, based on the data obtained from the research, the following things can be done by PT. OSO Sekuritas, MH Thamrin University Gallery Branch.

1. Improving the quality of Fundamental and Technical Analysis for Staff or Equity Sales at PT. OSO Sekuritas, MH Thamrin University Gallery Branch. So that the stock recommendations given are accurate.

2. Continuous Capital Market Education with carefully prepared modules.
3. Speeding up the process of opening account openings so that customers can make transactions quickly, it is recommended to ask the head office to create an online-based account opening application.

4. Conclusion

4.1 Conclusion

PT OSO Sekuritas, MH Thamrin University Gallery Branch. This study is a study of the factors that affect service quality to customers of PT. The basic idea is that Service Quality is the basis of service companies. Staff and Equity Sales are the key for the company to realize the company's Investment Gallery. From the research data that the author, at PT OSO Sekuritas Gallery Branch MH Thamrin, can conclude the following:

1. First, regarding the facilities that have been provided at the Investment Gallery according to customers who have been interviewed, the facilities are already considered good. So, according to the researcher, the existing facilities are well maintained.
2. Second, regarding whether employees have created a comfortable and pleasant atmosphere when customers come to the gallery, according to customers who have been interviewed it is very good. The synergy that occurs is expected to grow positively continuously.
3. Third, regarding the response of employees to requests and needs from customers, according to customers who have been interviewed, that is responsive (responsive) to satisfied customer needs. According to researchers to be more maintained and improved.
4. Fourth, the services expected by the customers interviewed are improvements in terms of education and faster account opening services. According to researcher PT OSO Sekuritas Galeri Branch, MH Thamrin, they must immediately change the way of working in the process of opening an Account, so that the process can be faster and not repeated again.
5. Fifth, the suggestions and criticisms that were clarified by some of the customers who have been interviewed, namely that there is continuous education, accurate stock recommendations, galleries to be expanded and additional PCs. According to researchers in the future, this gallery will become stronger, so that more staff are needed so that they are consistent in serving customers for the better.

4.2 Limitations

This study has several limitations. Future research can get rid of this limitation. The limitations of this study are:

A study by PT OSO Sekuritas, Galeri branch MH Thamrin has explored the factors of satisfaction in service to customers at a branch of the company. From the customers' point of view, this research has not explored the things that have been done and planned to be carried out by PT OSO Sekuritas. The focus of this research is customer satisfaction. Other things outside of this, such as customer loyalty or customer loyalty are not examined in depth.

4.3 Suggestion

Based on the results of the study, the researchers tried to formulate several things for the development of human resource governance at PT. OSO Gallery Branch MH Thamrin. PT. OSO Gallery Branch MH Thamrin needs to immediately formulate a strategy in marketing, namely to create an SDP (sales deployment program), to train existing staff or Equity Sales. The results showed that the synergy built by the Equity Sales team of PT OSO Sekuritas was one of the factors that led to customer satisfaction in transactions at the gallery branch.

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The Effect of New Therapy Zinc on Perinatal Mortality, Prematurity and Placental Ablation

Sardjana Atmadja¹

Faculty of Medicine of Syarif Hidayatullah Islamic University¹

Jl. Ir H. Juanda No. 95, Cemp. White, District. Ciputat Tim., South Tangerang City, Banten¹
Indonesia¹

e-mail: sardjana@uinjkt.ac.id¹



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Abstract

Zinc is essential for life and is a part of zinc finger proteins, which perhaps represent the largest class of DNA-binding proteins. Zinc finger protein controlled gene expression may be a fundamental aspect of development as well as other processes. Nearly 30 elements are accepted as being essential for some or all organisms. Knowledge of the amounts of zinc in food is necessary for the understanding of the very complex system of zinc metabolism. Zinc content in leucocytes, mononuclear cells, red cells and platelets could be used as a measure of possible zinc deficiency. Almost 300 different enzymes, which include the synthesis and/or degradation of all major metabolites, have zinc as an integral component. AE has been interpreted as being a zinc-deficiency disease. The signs and symptoms of AE are reserved by zinc therapy. The recommended daily intake of zinc in pregnancy and lactation is 15 mg in Sweden and the Scandinavian countries. A woman on continuous zinc therapy for AE had two normal pregnancies. Other contributors to this volume will review these data.

Keywords: Zinc

1. Introduction

Zinc is essential for life. It is necessary for growth and is a part of zinc finger proteins, which perhaps represent the largest class of DNA-binding proteins. Zinc finger protein controlled gene expression may be a fundamental aspect of development as well as other processes[1]. The requirements for zinc and the other essential chemical elements of the periodic system are the most basic needs to be met with in pregnancy. Nearly 30 elements are accepted as being essential for some or all organisms[2]. Knowledge of the amounts of zinc in food, its bioavailability, uptake mechanisms, distribution, redistribution, storing, elimination and specific zinc-dependent processes is necessary for the understanding of the very complex system of zinc metabolism.

Measurement of serum, plasma, salivary, seminal, hair or amniotic fluid zinc concentrations; urinary, sweat, and fecal zinc excretion; and estimations of zinc content in leucocytes, mononuclear cells, red cells, of platelets have all been used in clinical work[3]. Almost 300 different enzymes, which include the synthesis and/or degradation of all major metabolites, have zinc as an integral component. Yet it has been possible to agree upon one specific enzyme activity that could be used as a measure of possible zinc deficiency in clinical routine[4].

In human, acrodermatitis enteropathica (AE) has been interpreted as being a zinc-deficiency disease. The signs and symptoms of AE are reserved by zinc therapy. Seven pregnancies have been reported in AE women not on zinc therapy[5]. Two AE mothers gave birth to babies with



malformations, one had an anencephalic fetus, the other an achondroplastic dwarf. Two other babies were of low birth weight. A woman on continuous zinc therapy for AE had two normal pregnancies.

In experimental animal studies, very important and comprehensive work has been done. Studies of zinc deficiency induced in different ways have shown that a normal and adequate zinc balance is necessary for formal fertility, implantation of the egg, normal fetal development, normal pregnancy and parturition, lactation, and further infant growth and development. Other contributors to this volume will review these data[6].

The present officially recommended daily dietary safe adequate intake of zinc in pregnancy and lactation is 15 mg in Sweden and the Scandinavian countries. The calculated mean daily dietary zinc intake in young first-time pregnant women in Sweden was 9.4 mg. available data indicate that the real intake of zinc in other well-development countries with high socioeconomic status is lower the recommended[7].

2. Research Method

Jameson: Zinc Therapy in Pregnancy

Allowance. When the diets are low in protein content, zinc intake is still lower, which has been studied in patients on chronic dialysis, for example. Maternity zinc deficiency can cause **disruption of the physical and intellectual development of the fetus** [8]. **For pregnant women who consume zinc 15mg per day, the fetus will show the development of liver function and motor yang good**, the fetus will be more active compared with pregnant women who did not take zinc properly[9]. Zinc reacts as a neurotransmitter that plays a role in the maturation of cells as well as in early growth and development of fetal life sar af and their intelligence in the future. In short it functions and Benefits of Zinc:

- improve brain function
- strengthen the fetus for pregnant women
- prevent jaundice in babies born early
- overcome weak memory
- prostate problems for men

2.1 Bioavailability

Bioavailability of zinc from food is variable and is influenced by many factors, such as the dietary contents of calcium; trace elements such as iron, copper and tin; heavy metals such as cadmium, mercury and lead [10]; the amounts and types of fibers, tannins, phytates, oxalates and soy protein; drug treatment such as antacids, ethambutol, hydroxyquinolines, penicillamine, phenytoin, tetracycline, diazepam, disulfiram, acetazolamid, captopril and metronidazol; and the function of the proximal gastrointestinal area and gastric acid production, which in turn is effectively inhibited by histamine receptor blockers, protone pump inhibitors and anticholinergic drugs. Adults on a diet containing 10.7 mg of zinc and rich in fibres and oxalic acid had a negative zinc balance[11], [12]. Zinc absorption was impaired when 16 g of bran was added to a diet giving 12.9 mg of zinc. Relatively small amounts of animal protein could significantly improve the value of a legume-based meal as a source of zinc. The amount of zinc absorbed from the meals was strongly correlated with both the protein and zinc content[13]. The fermentation of bread containing bran reduced the phytic acid content and increased zinc absorption from such bread. Food preparation that decreased the phytic acid content improved zinc absorption. Milk as well as lactose-free milk significantly reduced zinc absorption in a group of women.

2.2 Uptake

Uptake of trace elements is an active, controlled process in the proximal part of the gastrointestinal area. The production of the low-molecular-weight protein metallothionein in the mucosal cells is induced by copper, zinc, and heavy metals such as cadmium and mercury, but also by acute-phase reactions, ACTH, corticosteroids, and interleukin-1 release[14]. Metallothionein-metal complexes could be retained in the mucosal cells and expelled into the lumen. The binding protein may act as a barrier blocking the unnecessary uptake. Manganese

and iron share absorptive pathways different from the absorption of zinc. Manganese inhibited iron absorption but not zinc. An intraluminal interaction may occur between zinc five-fold in excess to iron in water solution, but not with a hamburger meal[15]. Zinc uptake from oral test solutions is reduced in patients with proximal intestinal damage and villous atrophy of varying degree. Patients with folate deficiency had a lower uptake than those who had gotten folate therapy before testing, indicating that folate deficiency in some way accelerates the defects in zinc mucosal uptake. In patients with intestinal bypass operations, Crohn's disease, and in pancreatic insufficiency, zinc uptake from test doses is reduced. When the proximal gastrointestinal surface is damaged, either by gastric resections, autoimmune mucosal gastric atrophy of different degrees, duodenitis, or villous damage of increasing degree (as in celiac disease), there is a stepwise increase in the frequency of zinc deficiency of zinc deficiency. Zinc deficiency in these situations is more frequently met with than folate deficiency. When folate deficiency is present, it is almost always simultaneous with zinc deficiency.

2.3 Distribution

Plasma zinc levels in man follow a circadian variation. The time course of plasma cortisol fluctuations paralleled that of zinc. Circulating zinc levels in blood decrease in acute-phase reactions as fever increases, which was shown already by Vikbladh in 1951. Later on Falchuk showed that ACTH administration reduced serum zinc and that the response dependent on the initial serum zinc content. Both in the acute disease and during ACTH infusion, the decrements in total serum zinc were the consequences of reductions in the zinc content of the proteins in the fraction consisting of albumin and β -globulins. Later it was found that the acute-phase reaction induces increased production of metallothionein, which subsequently redistributes zinc. A similar redistribution takes place for iron but is effected by specific iron-binding proteins and parallels that of zinc.

Depressed levels of transport proteins are found secondary to zinc deficiency. Such low levels of albumin, transferrin, and prealbumin in serum were improved or corrected when zinc therapy was given[16]. Similar effects, including improved levels of retinol binding protein and coagulation factors, were registered in patients with alcoholic liver disease after zinc supplementation. A redistribution of plasma zinc between albumin and α -2-macroglobulin takes place in the second and third trimesters of pregnancy, which might represent an adaptive response designed to reduce eventual adverse effects of lowered plasma zinc concentrations on the developing fetus. Depressed serum zinc levels were found in diabetic patients with secondary organ complications when compared with those without complications. The lowered zinc levels could not be explained by lowered albumin levels and were probably secondary to hyperzincuria. Particularly low zinc levels were found in a group of diabetic males with polyneuropathy and impotence.

In catabolism there is a redistribution of elements. Plasma or serum zinc levels are falsely or secondarily increased. The same redistribution happens in hemolysis and if blood samples are drawn after prolonged stasis. Zinc is stored in the liver. Patients treated with diuretics had lower liver zinc content than untreated ones. Zinc stores in young women seem to be small and were easily depleted when an experimental zinc-deficient food was given. Low hepatic zinc levels indicating zinc deficiency occur not only in alcoholic cirrhosis but also in less advanced alcoholic as well as in nonalcoholic liver disease, as chronic active hepatitis and chronic persistent hepatitis[17]. A change in zinc distribution is also found in thyroid disease. In hyperthyroidism serum zinc levels were increased and whole-blood zinc reduced. In hypothyroidism the reverse was observed; serum zinc levels were decreased and whole-blood zinc increased.

2.4 Elimination

Elimination of zinc is mainly enteral. Increased zinc losses are seen in acute and chronic diarrheas. In steatorrhea there are complex losses of different elements and lipid-soluble vitamins. The more lipids lost, the lower are the serum zinc levels[18]. Evidence of zinc deficiency in patient with chronic inflammatory bowel disease has been presented. Long-time treatment with chelating drugs, for example ethambutol, affects zinc nutrition and induces damage to the tapetum lucidum in the eye. To counteract this, zinc therapy has been suggested. Several of the drugs mentioned earlier could also affect uptake and distribution of zinc and other metals and alter their elimination, and thus could have teratogenic potential. The elimination of

zinc is increased in polyuric subjects, for example, in diabetics with bad metabolic control, in alcoholics, and in hypertensive subjects treated with diuretic drugs that result in lowered liver zinc levels. Cutaneous zinc losses increase when sweat losses are increased, as well as in patients with burn and dermatitis[19]. Zinc deficiency could also be manifested as skin changes with hyperkeratosis and dermatitis. The zinc content of normal hair is high compared with other tissue. Serum zinc levels are low in a great number of disease and conditions known to cause alopecia. Zinc balance has been studied in young, nonpregnant women who were given an experimental diet containing 0.17 mg zinc daily. During the study serum zinc levels decreased 21 to 47%, and urinary zinc excretion decreased. Within one month 7 out of 10 subjects developed symptoms of sore throat, diarrhea, taste complaints, and dermatological changes. It was suggested that accessible zinc stores were not extensive and that depletion of these stores caused the fall in serum zinc.

2.5 Zinc in Pregnancy

Zinc balance has been studied in pregnancy. A mean total daily zinc loss of 3.6 mg/day was found. The apparent net zinc absorption was 25% of the mean intake of 29.4 mg zinc/day. In another study the mean prestudy intake was 17 mg zinc/day and during the study 20 mg zinc/day was given[7]. The apparent retention was 2.4 mg zinc/day; dermal losses were not measured. The fasting salivary zinc levels were significantly lower than in controls and increased as the study, which involved higher zinc intake than before, proceeded. Serum zinc levels increased slightly as did urinary zinc excretion. The total zinc requirement during the last half of human pregnancy may be about 2.6 mg absorbed zinc/day[20]. We have studied zinc metabolism in human pregnancy prospectively on the theory that serum zinc levels during pregnancy reflect the patients actual zinc status. We wanted to examine whether serum zinc measurement could prove useful in predicting complications affecting mother and/or child and if zinc therapy could be of any benefit[9].

We found that the serum zinc levels decreased gradually during the first and second trimester, as was already shown by Berfenstam in 1952. A selected group of normal women, however, who gave birth to normal infants by normal deliveries at the normal time, showed a very slight and slow fall in serum zinc concentrations during their pregnancies. No recordings were distinctly outside the normal range of serum zinc for non pregnant, healthy, fertile women of the same age and social background[8]. Women delivering before or after normal term had lower serum zinc concentrations during their early pregnancies than women delivering in the 40th week of gestation. Women with abnormal deliveries, especially inefficient labor and atonic bleeding, showed lower mean zinc concentration during early pregnancy than women with normal deliveries. Women who gave birth to immature or dysmature infants showed lower mean serum zinc concentration during early pregnancy than women with normal deliveries and normal infants. In our first studies we registered ten infants with congenital malformations. In six cases maternal serum zinc levels were the lowest we registered compared with levels in mothers with the same length of gestation and normal babies. A few mother who later developed missed abortions showed lower serum zinc levels than those who aborted spontaneously.

2.6 Zinc Therapy

The first zinc therapy trial included a group of 20 women with unsatisfactory hemoglobin levels, in spite of treatment with iron and vitamin supplementation, who also had low serum zinc levels. Seven women were assigned at random to zinc therapy, the others to control. Zinc therapy, in a manner similar to the accepted, usual iron therapy, was given in a dose of 90 mg Zn/day as citrate. After one week's therapy, serum zinc levels and urinary zinc excretion increased significantly. Three women on zinc therapy reported improvement in sense of taste[12]. The zinc-treated women had a more favorable outcome of their pregnancies, another duration of labor, and less bleeding. Side effects were not seen.

In a further study were recorded serum zinc values 312 women in the 14th week of gestation. Half of those with initially low serum zinc levels < 10 $\mu\text{mol/l}$, were randomly assigned to oral zinc therapy, half to control. Zinc sulphate in an effervescent preparation giving citrate corresponding to 45 mg Zn/day was given throughout pregnancy to 64 women during the second and third trimester. The frequency of normal deliveries with normal babies was higher,

63%, in the therapy group than in the control group of 69 women with initially low serum zinc levels (48%) and compared with the women initially high serum zinc levels (55%). The number of prolonged gestations and postmature babies was reduced in the zinc therapy group. Untreated women with initial serum zinc levels below the mean, $10.3 \mu\text{mol/l}$, and subsequently decreasing levels, 14th to 36th week, delivered normal infants normally only in 26% of the cases. Side effects of zinc treatment, expect nausea in some cases, were not registered[21]. Serum copper levels in the 36th week of gestation did not differ between the zinc treatment and the low control groups. From these two small randomized studies we learned that oral zinc therapy for women with low serum zinc levels in early pregnancy was tolerated and could reduce some of the risks we earlier had identified.

On the basis of our experiences, an open zinc therapy study was started on the theory that low fasting serum zinc indicated zinc deficiency, which could be treated. The results have been published. All pregnancies during a period of four years (2011 through 2014) in the small country of Soderhamn were included. The area has nearly 32,000 inhabitants and one mother care unit (MCU) at the hospital in Soderhamn. A total of 1345 pregnant women registered at the MCU during these years. One woman emigrated, 17 had legal abortions, and 96 had spontaneous abortions. The remaining 1231 mothers gave birth to 1235 children. Additionally, 60 to 70 women per year had legal abortions performed, but were never registered at the MCU. Fasting serum zinc (fS-Zn) analysis was done when gestational problems, anemia, fatigue, or cravings appeared, or if earlier pregnancies had been complicated by miscarriages or abnormal deliveries, as an active measure with the intention of discovering zinc deficiency[22]. In follow-up controls during the second and third trimester, serum zinc samples were drawn more than two hours after breakfast but before noon. Serum zinc was assayed by atomic absorption spectrophotometry. All sampling and handling were carefully standardized in order to avoid stasis, hemolysis, and contamination. In 1984 all mothers ($n = 352$) had their zinc levels controlled at the first MCU visit (mean ninth week of gestation). Zinc therapy was given if fS-Zn was lower than normal according to the length of gestation ($<10.5 \mu\text{mol/l}$ in the first or second trimester, $< 9.5 \mu\text{mol/l}$ in the third)[20]. The normal zinc dose was 22.5 mg Zn as citrate from an effervescent zinc sulphate preparation giving citrate. The dose was increased to 45 mg or in some cases to 90 mg/day if fS-Zn levels did not increase. In 1986 a multivitamin preparation containing zinc citrate corresponding to 15 mg Zn was also used. Iron therapy was given if B-hemoglobin levels decreased 115 g/l . Iron preparations were not administered within four hours of the zinc dosage.

Pregnancy controls followed the same standardized Swedish MCU scheme all four years. Delivery records were also kept according to such standard protocols. Diagnostical procedures followed the official statistical WHO classification. Perinatal mortality was defined according to the WHO recommendations of March 30, 2011. Preterm delivery was defined as birth before 37 completed weeks of gestation. The perinatal period commences at 22 weeks of gestation and ends seven completed days after birth. The study was approved by the Swedish Board of Health and Welfare and the Ethics Committee of the University.

The controls 2012 showed a mean fS-Zn of $11.3 \mu\text{mol/l}$; SD of 1.6; $n = 352$. mean B-hemoglobin was 128 g/l ; SD was 9. S-albumin and fS-Zn correlated positively, $r=0.43$. No correlation was found between fS-Zn and B-hemoglobin, S-alkaline phosphatase, or S-urea.

Zinc therapy was given totally to 598 women, noncompliers included. Compliance was controlled by interview and was high. During the first year of the study, the changes in serum zinc between the first and third trimester were calculated. Untreated women showed decreasing levels: mean $-1.4 \mu\text{mol/l}$; SD = 2.9; $n = 25$; $p < 0.05$. Those on 22.5 mg Zn showed: mean $0.72 \mu\text{mol/l}$; SD = 2.2; $n = 32$; $p < 0.01$. Those on 45 mg Zn showed: mean $2.18 \mu\text{mol/l}$; SD = 1.9; $n = 13$; $p < 0.005$.

In the zinc-treated group, two children died perinatally (2/598 deliveries). Thirteen children died perinatally among 633 women without any zinc supplementation. The null hypothesis of an even distribution of perinatal fetal deaths could be rejected using Fisher's exact probability test, $pp < 0.01$.

Preterm delivery occurred in 82 cases. These 82 mothers gave birth to 84 babies. In the zinc therapy group 36 out of 598 (6%) gave birth preterm to 38 babies; one was born in the 30th and another in the 31st week; the others were born later than the 33rd week, 20 of these in the 36th week of gestation. In the unsupplemented group 46 out of 633 (7.3%) gave birth to 46 preterm

babies, 14 of which were born before the 33rd week of gestation, eight of which before the 27th week. Thus 2 out of 598 women treated with zinc and 14 out of 633 untreated women had preterm deliveries before the 33rd week of gestation[23]. The null hypothesis of an even distribution of preterm deliveries irrespective of therapy can be rejected using the chi-square test with Yates's correction, $p < 0.01$.

Placenta ablation, totally or partially, occurred in 8/633 unsupplemented cases but did not occur among 598 women on zinc therapy. The null hypothesis can be rejected using Fisher's exact probability test, $pp = 0.008$.

Spontaneous abortions occurred in 96 out of 1327 registered pregnancies (7.8%), 17 legal abortions excluded. Among women who had their zinc therapy instituted early in pregnancy before the 22nd week of gestation, 5 out of 177 cases had spontaneous abortions (2.8%); among those untreated before the 22nd week, 99 out of 1150 (7.9%) aborted. The null hypothesis of an even distribution of the abortions irrespective of therapy can be rejected using the chi-square test, $p < 0.05$.

Side effects from zinc therapy were not seen except for nausea in some cases. Serum copper levels in the third trimester were not altered with zinc therapy. The frequencies of diabetes and hypertension as well as smoking did not differ between the groups. Normal fS-Zn levels in healthy, fertile women from this part of Sweden were mean $12.3 \mu\text{mol/l}$ (SD = 1.0), S-albumin mean 44.2 g/l (SD = 2.3). Women using contraceptive pills had a mean fS-Zn of $11.8 \mu\text{mol/l}$ (SD = 1.3), S-albumin mean 40.8 g/l (SD = 2.2). Fasting serum zinc levels in 86 women aged 16 to 44 years from an ongoing series of biopsies from patients with nonulcer dyspepsia but with normal duodenal mucosa and gastric function were mean $12.0 \mu\text{mol/l}$ (SD = 1.7) corrected for the albumin variation $12.0 \mu\text{mol/l}$ (SD = 1.5).

3. Findings

3.1 Discussion

The growing fetus accumulates essential elements from the maternal plasma across the fetomaternal membranes in the yolk sac early in pregnancy, later across the placenta. Thus knowledge of plasma or serum zinc variation in pregnancy is essential. A normal weight gain in pregnancy of 10 to 12 kilos entails a need for 300 to 360 mg zinc to be accumulated, if total body zinc is accepted to be just over 2000 mg. The zinc content in food parallels the protein and energy intake, but the bioavailability of zinc is reduced when protein content is low, when phytate and fiber content is high, and when there is competition with, for example, increased amounts of calcium, copper, iron, tin, heavy metals, or chelating drugs. The recommended daily dietary zinc intake in pregnant women was just over 9 mg/day. Thirty-five to forty percent of our daily mean energy intake comes from fat. The saturated fat intake from dairy products is high, as is the calcium intake. Iron fortification of flour in Sweden is a rule; 6.5 mg Fe/100 g is added to sifted flour. The mean intake of magnesium, selenium, and vegetables is also often low[24], [25].

The more pronounced gastric mucosal atrophic lesions are, the more that uptake of essential elements is impaired. Autoimmune atrophic gastritis is a disease that is common and is associated with postpartum thyroiditis and also celiac disease. Celiac disease has a prevalence today of 3 to 4 promille. Women with celiac disease but on a normal diet had a shorter reproductive period and a higher incidence of abortions, stillbirths, and neonatal death than those on a gluten-free diet. A connection between celiac disease, infertility, and fetal malformations in zinc-deficient women has also been shown[26], [27]. The more manifest the proximal duodenal mucosal lesions are, the more often zinc deficiency is found, and the more pronounced is the deficiency. When proximal intestinal mucosal changes develop, zinc deficiency is the first and most evident aberration to appear. When folate deficiency is present, it is almost always preceded by zinc deficiency. Folate uptake from the proximal gut is impaired by zinc deficiency, and it is suggested that folate conjugase, an enzyme that hydrolyzes complex folates to monofolate, is a zinc-dependent enzyme. Bioavailability and uptake of essential nutrients is reduced in patients with intestinal bypass shunt operations. A high frequency of small-for-gestational-age (SGA) infants and congenital malformations has also been registered in women with such shunts. Bioavailability, uptake, and enteral elimination of zinc and other essential elements and lipid-soluble vitamins is impaired or increased when malabsorption of lipids takes place resulting in steatorrhea. The fat lost in stools, the lower the serum zinc levels were.

Poorly controlled diabetes with high levels of glycosylated hemoglobin has an increased risk of spontaneous abortion. Higher abortion rates were associated with more advanced White classification. The frequency of abnormal pregnancies and fetal malformations is high in diabetes unless an intensive diabetic treatment regimen is instituted before conception[28].

Renal elimination of zinc is increased in polyuria, for example, from alcohol, thiazids and other diuretic drugs, or from aminoaciduria. Hyperzincuria is documented to occur when there is excessive tissue breakdown. Zinc and other metals could be chelated by oligopeptides and amino acids and eliminated as complexes in the urine. Alcoholic liver disease is associated with low serum-, and granulocyte-zinc levels and hyperzincuria. Some of the laboratory values improved when zinc therapy was given to alcoholics. It is proposed that the diminished maternal zinc levels in alcoholic pregnancies represented the primary mechanism underlying the alcohol-induced fetal dysmorphogenesis. Even a moderate consumption of alcohol during pregnancy is a risk factor spontaneous abortion.

Smoking during pregnancy is associated with a reduction in birth weight, an increase in perinatal mortality, and more frequent spontaneous abortions. Maternal age in it self has no effect on standardized fetal birth weight, but among smokers the reduction in standardized birth weight becomes more pronounced with increasing maternal age. The ratio placental zinc to cadmium is positively related to infant birth weight in pregnant smokers[29]. Increased parity related to increased levels of placental cadmium in smokers and with decreased placental zinc in smokers and non-smokers. The result are consistent with a depletion of body zinc stores with increasing parity and the very long biological half-life of cadmium in the body[30].

Many groups have studied the possible association between maternal and fetal serum zinc concentrations and pregnancy outcome, which was reviewed earlier. A positive association between maternal serum zinc concentration measured early in pregnancy and birth weight was found in a large study. Maternal serum zinc concentration could be used to identify women at higher risk of giving birth to a low-birth weight infant and was a more significant predictor than almost all known risk factors.

Low levels of maternal plasma zinc were associated with mild toxemia, vaginitis, and postdates in the antenatal period. During the intrapartum period, low plasma zinc levels were associated with a prolonged latent phase, a protracted active phase, labor > 20 hours, second stage > 2.5 hours, and cervical and vaginal lacerations. Low levels of maternal alkaline phosphatase were strongly associated with a history of previous stillbirth. It was concluded that a low plasma zinc level is a valid predictor of pregnancy complications and abnormal labor[31].

In a study of plasma zinc and copper concentration and plasma volume in normal pregnancies and women being at risk of delivering a growth-retarded baby, it was found that the intravascular mass of zinc was significantly reduced in the risk group. Another study of zinc and copper concentrations in plasma and urinary zinc excretion compared Hindu vegetarians, meat eaters, and European women. The Hindus had significantly lower zinc levels and higher copper levels, and those who were vegetarians lower protein and zinc intake[32]. Gestation in Hindus was shorter, and their infants were lighter. Low-birthweight and light-for-date infants were much more often registered among the Hindus. It was concluded that no association was found between crude or adjusted birth weight and any of the measures of zinc or copper status in either ethnic group. However, the presence of low-birthweight infants was in fact increased at a rate that was highly statistically significant among Hindus, who had lower zinc intake from food, lower plasma zinc levels, and higher copper levels, figures that seriously question the conclusion.

The levels of zinc in plasma, erythrocytes, and polymorphonuclear (PMN) and mononuclear (MN) white cells were measured after delivery in women giving birth to babies that were appropriate for gestational age (AGA) or SGA babies. PMN and MN zinc levels were significantly lower in SGA mothers, irrespective of smoking was done after delivery, a stressful situation that alters zinc distribution, as discussed earlier.

Maternal leucocyte zinc concentrations were measured at the beginning of the third trimester of pregnancy and were compared with the weight centiles of their subsequently delivered babies. Early third-trimester maternal leucocyte zinc concentrations were significantly associated with birthweight centiles. Low levels may be used to predict intrauterine growth retardation.

Amniotic fluid zinc levels were significantly lower in cases of mild or severe fetal hypotrophy compared with normal pregnancies. A positive linear correlation was found between the zinc concentration of amniotic fluid and fetal weight and length. Placental zinc was also lower than in normal pregnancies. No such correlation was found between amniotic fluid zinc concentration and birth weight in another study[33]. The serum zinc concentrations in women whose pregnancies were anencephalic were significantly lower than in the normal controls. Zinc and

selenium status was assessed in normal pregnancies and in pregnancies with neural tube defects or raised plasma α -fetoprotein, but no detectable fetal abnormality. Significantly lower leucocyte concentrations of zinc and of selenium were found in the abnormal gestation.

Serum and hair zinc concentrations have been studied in samples from 29 mothers who gave birth to fetuses with neural tube defects, mainly anencephaly. Mean maternal hair and serum zinc levels were significantly lower than in normal controls. Mean fetal plasma zinc was lower and mean hair zinc concentration was higher than in controls[34]. Increased hair zinc concentration was probably explained by severe deficiency and severely diminished growth of the hair. Maternal zinc deficiency was thought to be one of the factors responsible for neural tube defects. In a study of Chinese women, a strong positive correlation was found between maternal serum zinc concentrations and birth weight, and a negative correlation was found with zinc level in hair. Congenital abnormality and abortion or low birth weight were not associated with low concentrations of zinc "in plasma or hair". The conclusions drawn are contradictory to the findings in the study.

In a large population-based study concerning cardiovascular malformations, it was found after adjustment for confounding factors that infants with certain cardiovascular malformations were significantly more likely than were controls to have low birth weight for gestational age.

Abruption placenta was studied in a series of 23,043 consecutive deliveries[32]. The findings were an increased risk of abruption with high parity, and simultaneously a high incidence of unsuccessful pregnancies and premature, undersized, and malformed infants. Major congenital malformations were found in 4.5% of the infants from gestations terminating with abruptio placenta, compared with an overall incidence of 1.3%, a highly significant difference. In three cases, the infant was anencephalic. A constant relationship between abruption placenta and folic acid deficiency was demonstrated. Abruptio occurred in approximately 1% of pregnancies. Hypothetically, women who also suffer from abruption placenta represent a group of undiagnosed cases of celiac disease. Peripheral placental separation is significantly associated with premature labor and premature rupture of the membranes. The perinatal associated with peripheral placental separation is largely that of prematurity. Premature rupture of membranes (PROM) indicates an increased risk of obstetric complications such as dystocia and perinatal infections. An index from zinc analyses of maternal whole blood, scalp hair, pubic hair, and colostrums was significantly lower in patients with PROM than in patients without. The results suggested that subnormal tissue zinc content in pregnancy might play a role as a causative factor in PROM.

The many findings of signs and symptoms associated with low serum, plasma, leucocyte, monocyte, and amniotic fluid zinc levels in pregnancy make the suspicions of an existing zinc deficiency syndrome more probable, especially as some of these findings are present in acrodermatitis enteropathica[35]. Positive effects of zinc therapy or dietary changes resulting in increasing serum zinc levels and a reduction of the frequency of maternal and fetal complications would provide the answer. The results from our two randomized studies and the following open-intervention trial were described earlier. In a small supplementation study, 15 mg Zn daily produced an increase in maternal serum alkaline phosphatase. Serum copper levels were changed. In a double-blind study, zinc supplementation was given to low-income, pregnant teenagers. The zinc supplement, 20 mg/day, did not affect mean serum zinc concentrations or hair zinc levels but significantly reduced the number of women with very low serum zinc value late in pregnancy. Supplementation did not affect the outcome of pregnancy, but the incidence of hypertensive disorders of pregnancy was higher in the controls. However, hospital records were lost for 21% of the teenagers. As many as 50% (53/105) of the teenagers gave birth to infants with one or more anomalies. The first visit to the clinic was not made until the 17th week of pregnancy. Thus, the results of the study are difficult to interpret. Pregnant women in a study group of 179 cases received 20 mg zinc aspartate daily. Therapy began between the 12th and 34th week. The control group consisted of 345 randomly selected patients next in the birth register of the clinic. Maternal and fetal complications occurred less often in both pregnancy and labor in patients who received zinc therapy. The incidence of small-for-date and large-for-date babies was higher in the control group[36]. Preterm labor and premature separation of the placenta occurred less often in the zinc therapy group.

In a double-blind zinc trial in low-income, pregnant adolescents, 652 subjects were enrolled. Women with < 25 weeks' gestation were randomized to placebo or 30 mg Zn/day as gluconate. Response to zinc was related to maternal weight. Infants of normal-weight mothers given zinc had reduced rates of prematurity and needed assisted respiration less often than controls. Underweight multiparas given zinc had longer gestational lengths than did subjects given the

placebo. Zinc supplementation improved pregnancy outcome in normal-weight women and in underweight multiparas. The zinc group had a positive toxemia screen more often. It was concluded that zinc supplementation was with reduction in premature births and neonatal morbidity.

Another blind, randomized controlled trial enrolled 494 women, mainly of the middle class. Zinc was given as sulphate corresponding to 20 mg Zn daily. Zinc therapy did not change median zinc concentrations in leucocytes, when controlled at the 28-to 32-week visit compared with controls. One case in the zinc group and five cases in the control group ended in spontaneous abortion or were terminated. There were three perinatal deaths in each group. Compliance was just over 50% at 28 to 32 weeks, approaching two-thirds by the time of delivery. It was concluded that zinc supplementation did not seem to offer any benefits to the mother or her fetus. However, because zinc therapy was given irrespective of initial zinc status and compliance was low, the study lost its power. The researchers ought to have included four or five times as many women in order to find a reliable answer. Thus their final conclusion is probably not relevant.

Finally, another double-blind, randomized trial of oral supplementation was carried out with 22.5 mg zinc daily as citrate in an effervescent preparation. Fifty-six women at risk of delivering a small-for-gestational-age baby received either a zinc supplement or a placebo during the last two trimesters of pregnancy. Zinc therapy significantly reduced the incidence of intrauterine growth retardation, and most measured indices of labor and health were better in the supplemented group.

4. Conclusion

Zinc is present in and indispensable to all forms of life. Zinc is essential for the normal growth of human beings, and zinc proteins have been shown to be involved in the transcription and translation of the genetic material. Zinc deficiency has been incriminated in infertility, abortions, malformations, fetal intrauterine growth retardation, premature and postmature births, perinatal death, and abnormal deliveries with dystocia and placental ablation. Risk groups for developing zinc deficiency, which in turn might modify the expression of the underlying disease, are found among those with insufficient food intake, especially in protein malnutrition; abnormal mucosal uptake, as in celiac disease, abnormal interretinal losses, as in steatorrhea and inflammatory bowel disease; abnormal renal excretion, as in diabetes with insufficient metabolic control; alcoholism; and treatment with diuretic drugs. Zinc deficiency could be identified by means of fasting serum or plasma samples or the more laborious estimation of zinc in leucocytes or monocytes if sampling and handling is carefully performed and if stressful situations and acute-phase reactions as fever, delivery, or abortion are avoided. Zinc therapy in identified low-zinc groups has given favorable results and has reduced the frequencies of premature birth, placental ablation, perinatal death, and postmaturity. It is suggested, as we did in 1980, that these data are compatible with the presence of a zinc-deficiency syndrome in pregnancy, which includes increased maternal morbidity, abnormal taste sensations, abnormally short or prolonged gestations, inefficient labor, atonic bleeding, and increased risks to the fetus such as malformations, growth retardation, prematurity, postmaturity, and perinatal death.

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The Impact Of Online System on Health During Covid 19: A Comprehensive Study



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Bhupesh Rawat¹, Ankur Singh Bist², Untung Rahardja³, Chandra Lukita⁴, Dwi Apriliasari⁵

Graphic Era Hill University, Bhimtal Campus¹, University of Raharja²
Road Society Area, Oghal Bhatta, Clement Town, Dehradun, Uttarakhand 248002^{1,2,4},
Cikokol, Tangerang/(021) 55295863^{3,5}
India^{1,2,4}, Indonesia^{3,5}

e-mail: bhr222@gmail.com¹, ankur1990bist@gmail.com², untung@raharja.info³,
chandralukita@cic.ac.id⁴, dwi.apriliasari@raharja.info⁵



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Abstract

COVID-19 creates an unprecedented situation before humanity. Covid-19 has changed lives in all aspects, from education, industry and social life. However, the existence of Covid-19 has greatly impacted the field of education, where the applicable learning methods usually need to make drastic changes to decide the spread of Covid-19. The education sector is turning to online education because it is not possible to call students in schools and colleges. Technology online education is proving itself to be a cure for catastrophe and filling gaps. There are major challenges regarding student health due to the high use of mobile, tablet and computer screens. There are problems regarding student health in the application of technology online learning, in this paper we make a detailed study of the same problem with the ultimate goal of research to find out the preventive measures. In this paper, we use the literature study method to explore negative cases in terms of obtaining negative reasoning due to excessive screen use during the COVID-19 scenario.

Keywords: COVID-19, health, computer screen, online education



1. Introduction

COVID-19 (Coronavirus Diseases 2019) has impacted the life of each segment of individuals from businessmen, farmer, middle-class group to teachers and learners equally [1]. Face to face teaching-learning came to a standstill and educational institutions had to adopt online learning management systems to continue their academic activities such as teaching learning, evaluation, examination and result declaration among others. A large number of learning management software or digital platforms came up to meet this demand in the market. Some of the exams [2]. Some of this technology software are CANVAS, Google Classroom, Blackboard Learn and Moodle among others. Although these technology platforms are free to use, their full features are available only on purchase. Moreover, although they provide several advantages, in contrast, to face to face learning such as easily track learners' progress and performance, reduced learning and development cost, organizing e-learning content at one location among others the learners and faculties also face several health issues due to their high usage and more dependency on them [3]. The health issues could be seen in terms of physical, mental and physiological which ultimately leads to anxiety and stress among other problems. From our study of existing papers on this issue we have found that no paper covers all the aspects of health issues caused by excessive use of online systems. In order to fill this gap, we have taken up a study which comprehensively covers all the aspects of health issues and also suggest measures to deal with them.

In this paper we focus on how the usage of technology e-learning platforms affects the health of people in general and learners and faculties in particular in an educational institution and at what level and how these impacts can be alleviated by using some simple solutions [4]. The study discusses the effect of using online learning platforms on mental, physical and psychological health in different age groups and also tries to find out which age group has affected the most and also suggests ways on how to overcome these health issues [5].

This paper is organized as follows: Firstly, we provide an overview of various health problems faced by learners during online learning [6]. This is followed by a discussion on which age group has affected the most and why. Then, we discuss how these problems are affecting the performance of learners. We conclude the paper by providing solutions on how the impact of these problems can be reduced.

2. Research Method

In this paper, we use the literature study method in obtaining material sources related to this paper, to be investigated as a benchmark for the course of this research.

2.1 Impact on Health due to Online education system during COVID-19

There are various benefits of online education but it's causing various disorders:

1. Stress
2. Eye problems
3. Headaches



Fig 1. Online classes and health issues

Above mentioned effects are quite direct if students spend a long time in front of technology media electronics such as computer/mobile/ tablet screen. The situation becomes worse in case of students of a small age group or students that are suffering from any other eye disorders and related diseases. Other than this COVID-19 impacted health in following categories [7].

2.2 Emotional Health

Everyone cannot afford technology media electronics such as computers/tablet especially in low income group countries so it's creating kind of discrimination and effecting students emotionally [8]. Internet usage requires cost, and every student family cannot afford it. Back of the mind financially weak students feel depressed [9] [10]. There are several aspects of emotional health such as stress which can manifest itself in the form of the following:

- Feelings of fear, anger, sadness, worry, numbness, or frustration.
- Changes in appetite, energy, desires, and interests.
- Difficulty concentrating and making decisions.
- Difficulty sleeping or nightmares.
- Physical reactions, such as headaches, body pains, stomach problems, and skin rashes.
- Worsening of chronic health problems. Worsening of mental health conditions.
 - Students may feel heightened anxiety about keeping up to date with their schoolwork
 - Other teens may have trouble concentrating or staying focused while at home
 - For some adolescents and young adults, being in front of others on video can lead to its own anxieties
 - Students may find it difficult to receive the extra education support they need to succeed

2.3 Social Health

Due to isolation, no one is meeting and just looking at screens for information. Learning and mental growth requires social engagement especially in small kids but works for all. It is creating issues at the level of social health. The ministry of human resource development (MHRD) recommended just 30 hours of screen time for pre-primary students, two classes of

45 minutes each for classes 1 to 8 and four classes of 45 minutes each for classes 9 to 12, but that's not working, parents allege [11] [12]. Many schools are not following the directions, which anyway are not binding [3]. Many children developed fever and headaches after attending online classes [13].

Some parents are reporting mental health issues too due to excessive use of gadgets. Baljinder Singh of Sector 21, Chandigarh, suspects his children have increased mood swings now [14]. "They are already cooped up at home and are getting cranky and restless. After their online classes I find they are unable to focus on their work and suffer from headaches," he says [3]. Opticians say more cases of children with complaints of eye strain are coming to them. "At least three or four people come in every day to get their children's eyes tested because of increased screen time," says Samrat Arora, the general secretary of the Chandigarh Optical Association, who runs an eye care center in Sector 22 [15] [16]. "We prescribe blue light filtering glasses and anti-fatigue lenses to these children, which cost about Rs 1,200 and more [3] [17]."

3. Result and Discussion

Changes in the learning system that occurred during the pandemic have become a hot topic that is growing every day to see the advantages and negative impacts of technology given to changes in online learning methods. There is a change in online learning methods, as for the impact on increasing technology and the use of smartphones, computer screens and tablets among students [19]. There is an increase in the use of electronic media to open social media and learning media, there are negative impacts that occur due to excessive use. Negative Reasoning and suicidal tendencies The Covid-19 situation results in excessive free time in front of youth and people of different age groups. Studies say that the use of social media and negative keyword searches through the internet increased during this period [20]. This leads to depression and suicidal tendencies. Job loss, unemployment and migration are making the situation worse. Governments in different parts of the world are dealing with this issue at their discretion and trying to resolve the situation.

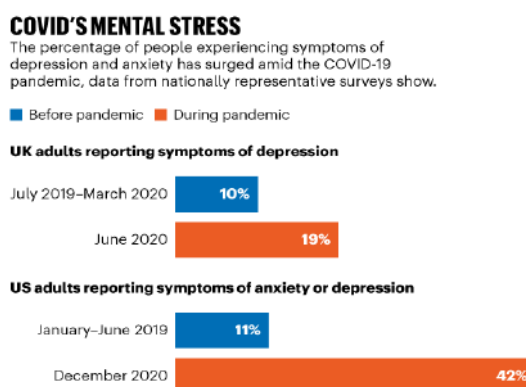


Fig 2. Depression spike in COVID-19 [21]

Following figure depicts the negative effects of excessive use of social media as it's already discussed about massive usage of it during the pandemic.

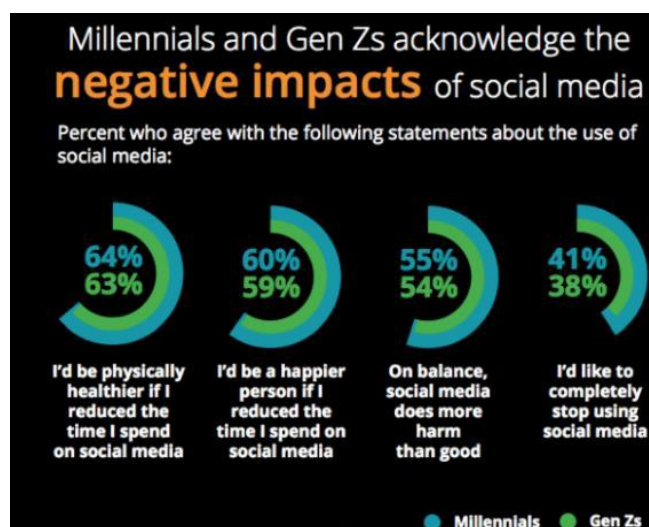


Fig 3. Negative impact of using social media [22].

Physical health It is reported that students attending online classes are becoming lazy as they are not doing physical activity such as exercise and their concentration becomes poor day by day. In other studies, it is found that learners are having joint pain as they are sitting all day long to attend online classes [23]. Lack of physical activity leads to bad effects on mental health as well which ultimately affects the mood also. All the assignments, notes, quizzes are coming online, and learners must study them online only to complete their assignments which is also severely affecting their health. Constant seating in one position, No exercise involved this all will lead to problems related Posture, backache etc [24].

Exposing children to screens from a young age for online classes is not right. It can hamper their growth and development. The radiation emitted from the screens can stress children's eyes and could lead to eyesight problems throughout their lives. Watching a screen is also a stationary activity that can make children inactive and dull, affecting their thinking skills. Connecting with academic peers, communicating with the instructor, and maintaining a personal social life can become a challenge when all interactions take place remotely.

It can lead to social isolation, ultimately resulting in decreased academic achievement and even mental illnesses such as depression. Procrastination has been a major problem affecting online courses. Students tend to wait for the assignment due dates approach before completing coursework, often submitting within an hour of the deadline. Gradually the fear of deadlines alters the learners' sleeping schedule too. Spending an extended amount of time on a computer can have negative physical effects on your body. Sometimes, because of procrastination, new e-Learners may find themselves studying and completing assignments for sessions lasting several hours. This behavior can lead to a wide range of health risks to them in future [25].

Based on the problems that occur, this study will describe the **Handling of Health Problems due to the Online Education System during COVID-19**: To continue effective online education, the above health problems need to be addressed in a timely manner before reaching an advanced stage. There are several ways to deal with stress as mentioned below [26] [27]:

- Do not spend too much time on your computer screen and mobile screen watching, reading and listening news stories as these platforms offer all types of negative news which affects the mood of people and hence leads to depression, anxiety and all sorts of emotional problems [28].
- Moreover, one should take a small break from continuous watching of programs on a computer screen or television which also gives time to refresh and re-energize the human being [29].

- Another very important point to consider here is to take care of your body by taking deep breaths, stretching or meditating [30].
- A good balanced diet helps to maintain body and mind as well.
- Exercise regularly and it also slows impact of COVID-19.

4. Conclusion

In this paper we are discussing the impact of using excessive system screens in different scenarios and found various issues associated. Later we identified initiation of negative reasoning and suicidal tendencies in different age groups. Subsequently different countermeasures are also highlighted to tackle the issue. This study will be helpful to handle concerned issues in the present and future. Future work will include study about in-depth medical reasons and cure at medical level.

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Quantum Computing and AI: Impacts & Possibilities



Bhupesh Rawat¹, Nidhi Mehra², Ankur Singh Bist³, Muhamad Yusup⁴, Yulia Putri Ayu Sanjaya⁵

Graphic Era Hill University^{1,2,3}, University of Raharja^{4,5}
Road Society Area, Oghal Bhatta, Clement Town, Dehradun, Uttarakhand 248002^{1,2,3},
Cikokol, Tangerang/(021) 55295863^{4,5}
India^{1,2,3}, Indonesia^{4,5}

e-mail: bhr222@gmail.com¹, nidhigehu@gmail.com², ankur1990bist@gmail.com³,
yusup@raharja.info⁴, yulia.putri@raharja.info⁵

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Abstract

Quantum computing is one of the emerging technologies. Different communities and research organizations are working to bring quantum computing applications into reality. Artificial Intelligence is another emerging area and getting stable with time. This paper, the main objective is to find out the impact of quantum computing research growth for AI applications. Thus, the method used in this study uses computational methods. so that this research can be concluded regarding the growing impact of quantum computing research for a given AI application. This paper also presents the impact and possibilities of quantum computing in the field of artificial intelligence.

Keywords: Quantum Computing, Blockchain, Artificial Intelligence.



1. Introduction

Honeywell, among others, has started investing in this technology. In many ways, quantum computing is like classical computing, storing data in the form of bits, i.e. 0 or 1. [1] However, quantum computing encodes information in the quantum bit or qubit, making it possible to store multiple states of data simultaneously. This is where the role of quantum mechanics concepts such as superposition and entanglement comes. Quantum computing works differently from traditional computing because it follows the same physical rule that an atom follows to manipulate information [2]. It is reported that quantum computing can help artificial intelligence in many ways, such as processing huge complex datasets and evolving algorithms to allow better learning, reasoning, and understanding. Several possibilities are there for machine learning algorithms and natural language processing in quantum computing. For example, recently, a natural language processing algorithm has been executed on quantum computing, which results in a "meaning aware" algorithm [3]. The meaning of meaning awareness is that now the computer can understand the individual words and the whole sentence. This awareness can be expanded to entire phrases that result in real-time speech without requiring guesswork, which is state of the art today. With the help of quantum computing, it is also possible to run machine learning and deep learning algorithms faster than their classical computers. Quantum computers using quantum physics can have computer results more accurately than their counterparts [4].

This paper discusses the impact and possibilities of integrating quantum computing with artificial intelligence in detail. How can we reduce the error further with their integration is the focus of this paper? [5]

2. Research Question

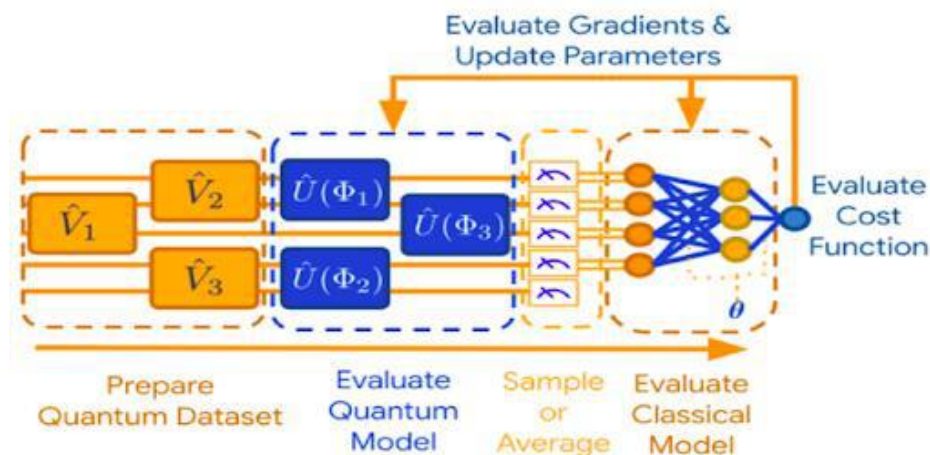
- RQ1 : How will quantum computing improve and transform machine learning and artificial intelligence capabilities?
Answering this question will provide deep insight to researchers and scientists about what aspect of quantum computing can help improve the performance of AI applications.[6]
- RQ2 : What are the possibilities of quantum computing that can be analyzed and explored for the overall growth of AI applications
Answering this question will give a new perspective to the research community about unexplored areas of quantum computing that will help efficiently solve AI problems.[7]

3. AI transformation with Quantum Computing

Quantum computing and AI will be merged to get an optimized solution that can generate world-class results. There are various possibilities with Quantum AI. Many research articles are popping out to show the significance of this combination [8]

There are the following possibilities with Quantum AI. Different libraries are on the way to support this innovation for developers. [9]

1. AI Learning process enhancement with Quantum algorithms.
2. AI neural search enhancement with Quantum algorithms.
3. Quantum computing and game theory touch AI for dealing with stochastic scenarios



Picture 1. Quantum Computing and AI [10]

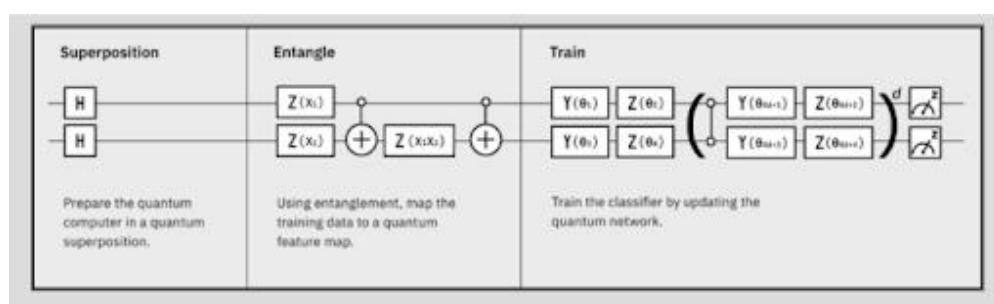
```
# A hybrid quantum-classical model.
model = tf.keras.Sequential([
    # Quantum circuit data comes in inside of tensors.
    tf.keras.Input(shape=(), dtype=tf.dtypes.string),

    # Parametrized Quantum Circuit (PQC) provides output
    # data from the input circuits run on a quantum computer.
    tfq.layers.PQC(my_circuit, [cirq.Z(q1), cirq.X(q0)]),

    # Output data from quantum computer passed through model.
    tf.keras.layers.Dense(50)
])
```

Picture 2. TensorFlow Quantum Library [11]

In the coming time, designing quantum-based AI learning algorithms will allow us to solve typical problems more quickly and help to speed up areas like AI training, pattern recognition, and fraud analysis[12]. Qiskit is an open-source quantum computing framework developed by the IBM Quantum community[13]. The purpose is to test AI and quantum computing for each other. Researchers can decode machine learning situations into inputs for QiskAqua algorithms and execute them on real quantum machines[14].



Picture 3. Quantum Classifier [15]

4. Optimization

It is a well-known fact that classical or traditional computing methods are not able to solve complex machine learning problems efficiently. To address this issue, quantum computing has come into the picture[16]. According to reports, the performance of machine learning algorithms dealing with a dataset of high dimensional vector space suffers in performance using classical computers[17]. Quantum computing gives two very important techniques, quantum parallelization, and quantum associative memories, which are said to speed up the performance or reduce the computation time and can be used to solve complex machine learning tasks both for optimization and learning[18]. It is worth noting that quantum computers are good at dealing with tensor and dot matrices in a higher dimension. This feature turns out to be very useful in reducing the time of machine learning algorithms[19]. In one of the reports, it is found that quantum computers can factor integers in polynomial time, which is normally not possible by classical computers[20]. In machine learning, there are several problems that can not be solved in the given time frame and are intractable[21]. Heuristics techniques are used to solve such intractable problems with given available resources[22]. This is where quantum computing can be used to speed up the computation time[23].



Picture 4. Quantum Computing.

5. Simulation

Quantum simulators are software programs that run on classical computers and make it possible to run and test quantum programs in an environment that predicts how qubits react to different operations[24]. There are a variety of problems, ranging from the simulation of materials or chemistry processes to optimization, for which very efficient quantum algorithms have been developed so that they can be solved by quantum computers way faster than by any other classical one[25]. They have a wide range of applications, including drug, material design, industrial process, and data processing, among others. There are a few problems where quantum computing can provide significant speed, in other words, as a function of qubits, while in some other problems, it can yield modest results[26].

6. Conclusion

Artificial Intelligence and Quantum Computing are both appliances of science and engineering[27]. The use of computational capabilities of Quantum computing in the processing of large and complex datasets of Artificial intelligence is popular as Quantum Artificial Intelligence. When technology giants succeed in building quantum computers, it will tremendously change the computational power, time, and speed [28].

On the other hand, there are several challenges in implementing quantum computing in AI applications – Mapping of a qubit, Maintaining qubit quality, Scalability, Noise

distortion, Skilled developer and Substantial ecosystem, open-source modeling, and training framework, etc [29]. For AI researchers, optimization and sampling are especially important because they enable machine learning models to be trained faster and with greater accuracy and also develop a quantum algorithm for learning and decision problems that perform better than classical AI algorithms. So quantum computing and AI need to meet various milestones to increase potential in quantum computing AI.

In this paper, a brief discussion on the impact of quantum computing research growth for AI applications is given. This paper also presents the impacts and possibilities of quantum computing in the field of artificial intelligence [30].

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Analysis Of Deep Learning Techniques For Chest X-Ray Classification In Context Of Covid-19

Vertika Agarwal¹, M. C. Lohani², Ankur Singh Bist³, Eka Purnama Harahap⁴, Alfiah Khoirunisa⁵

Graphic Era Hill University, Bhimtal^{1,2,3}, University of Raharja^{4,5}
Road Society Area, Oghal Bhatta, Clement Town, Dehradun, Uttarakhand^{1,2,3},
Modern, Jl. Jenderal Sudirman No.40, RT.002/RW.006, Cikokol, Kec. Tangerang, Kota
Tangerang, Banten^{4,5}
India^{1,2,3}, Indonesia^{4,5}

e-mail: vertika.agarwal21@gmail.com¹, d.director.bmt@gehu.ac.in²,
ankur1990bist@gmail.com³, ekapurnamaharahap@raharja.info⁴, alfiah@raharja.info⁵.



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Abstract

Coronaviruses (COV) are a large family of viruses that cause illness ranging from common cold to more severe disease such as MIDDLE EAST RESPIRATORY SYNDROME (MERS-COV) and SEVERE ACUTE RESPIRATORY SYNDROME (SARS-COV). Common signs of infection include respiratory symptoms, Fever, Cough, Shortness of breath and breathing difficulties. In severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death. 3-Tier strategy is employed by the government to combat this virus i.e., Track, Test and Treat. So, there is a need to increase the testing speed but the main stumbling block is the time RT-PCR takes which is around 2-3 days. In this situation, the recent research using Radiology imaging (such as Xray) techniques can be proven helpful to detect Covid 19. Latest deep learning techniques applied to X Ray scans which rapidly detect the disease and thus reducing the time for testing. Moreover, it is accurate as compared to RT-PCR test where nose and mouth swabs are taken by a lab technician which is prone to error. In this survey paper, ten different DL Techniques are surveyed which performs X Ray classification with different accuracy. Different combinations of Datasets are employed by these algorithms to improve the performance of their proposed model. Our paper evaluates the performance of each algorithm based on two parameters -Accuracy and Sensitivity.

Keywords: Blockchain, privacy preservation, vehicle network.



1. Introduction

With the advent of Deep learning techniques, clinical analysis can be done with much more accuracy and efficiency. It significantly speeds up the processing of data needed to obtain the information, responses and recommendation to manage and combat the covid 19 pandemic. Deep learning techniques perform feature extraction automatically rather manually and thus achieve recognition accuracy at a higher level than ever before. Deep learning employs Convolutional neural network which perform feature extraction. A CNN convolves learned feature with input data and use 2D convolutional layer, making this architecture suitable for processing 2D images. CNN learned to detect different features of image by using tens or hundreds of hidden layers [1]. The relevant features are not pretrained; they are learned while the network trains on a collection of images [2]. This automated feature extraction makes deep learning models highly accurate for computer vision tasks such as object classification [3]. Every hidden layer increases the complexity of the learned image features [4]. The two most common ways researchers use deep learning to perform object classification are:

1.1 Training from Scratch

Training a deep architecture from scratch, requires a very large labelled data set. A new designed network architecture will learn the features from the dataset and is tested for its performance. This proves beneficial when a new algorithm is used for designing the layered architecture [5]. This is a less common approach because with the large amount of data and rate of learning, these networks typically take days or weeks to train and it is not economical.

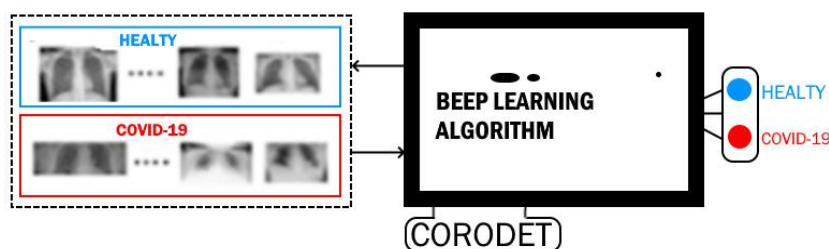


fig 1. Deep Learning Model Using Training From Scratch.

1.2 Transfer Learning

Most deep learning applications use the transfer learning approach. It is a process that involves fine-tuning a pretrained model [6]. In this, a model developed for a particular task is reused as the starting point for a model on a second task, such as AlexNet CNN model is trained on Image net database but by applying TL approach it can be used for other classification problems. Only classification layer needs to be trained according to the problem at hand. This will significantly reduce the time that would have been elapsed if network need to be trained from scratch [7]. Transfer learning can be accomplished with three different scenarios a) "Shallow tuning": which adapts only the classification layer to cope with the new task. b) "Deep tuning": which aims to retrain all the parameters of a pretrained network from end-to-end manner. c) "Fine tuning" that aims to gradually train more layers by tuning the learning parameters until the significant performance boost is achieved. Transfer learning via fine tuning mechanism shows outstanding performance in ChestXray classification [8]. Figure below illustrates the application of TL technique in Deep learning architecture in Chest X Ray classification.

Depending upon different types of layered CNN architecture, we have different DL algorithms which give different accuracy [9]. Deep CNN has been successfully applied in many problems such as classification of skin cancer, classification of brain diseases, detection of breast cancer, lung segmentation [10]. Beside its superior performance as compared to machine learning, Deep learning comes with drawback:

1. It is a data hungry network so the size of the dataset is small, it may not give optimal performance.

2. Due to its complexity of multiple layer hidden architecture, it requires expensive GPUs which make it a costly technique.

This paper is organized as follows: In section 2, Ten different CNN architectures are described. Section 3 compares the above-described architectures in terms of Accuracy and Sensitivity [11]. Section 4 discusses the future research opportunities and conclusion followed by References.

2. Research Method

BRIEF DESCRIPTION OF DEEP LEARNING ARCHITECTURES:

2.1 Xception Model

It is a Convolutional neural network architecture based entirely on depth wise separable convolution layers. Xception stands for "Extreme Inception". The Xception architecture [5] has 36 convolutional layers forming the feature extraction base of the network [12]. The 36 convolutional layers are structured into 14 modules, all of which have linear residual connections around them, except for the first and last modules. In short, the Xception architecture is a linear stack of depth wise separable convolution layers with residual connections [13]. This makes the architecture very easy to define and modify. It is a modification of inception net. Its parameter size is similar to Inception net but performs better as compared to Inception net [14].

DATASET: Xception net makes use of data from Kaggle repository.

MODELS	ACCURACY
XCEPTION NET	97.97%
INCEPTION NET	96%
RESNET	93%

2.2 COVID-AID

COVID AID [2]: Covid19 AI detector, a novel deep NN based model to triage patients for appropriate testing [15]. This model contains pretrained CheXnet with 121-layer Densenet. DenseNet is quite similar to ResNet with some differences. ResNet uses an additive method which merges the previous layer (identity) with the future layer, whereas DenseNet concatenates the output of the previous layer with the future layer [16]. An output of the previous layer acts as an input of the second layer by using composite function operation. This composite operation consists of the convolution layer, pooling layer, batch normalization, and non-linear activation layer. These connections mean that the network has $L(L+1)/2$ direct connections. L is the number of layers in the architecture [17].

Deep CNN backbone followed by fully connected layer. **COVID AID achieves an accuracy of 90.5%**

Two stage training is used:

1. Densenet's backbone weights are frozen and only the final connected layer is trained. Batch size=16, No. of epochs=30 and lowest validation loss is selected for the next stage.
2. In the second step, network weights are initialized from above but the whole network is trained end to end.

DATASET: 1) Covid chest Xray images 2) Chest Xray pneumonia.

2.3 Detrac Deep Model

DETRAC [17] method of image classification is used which consists of three phases. First phase: Train the pretrained CNN model (Alex net, vgg19, ResNet, google net, squeeze net) to extract deep local features from image. Second phase: Training is accomplished using sophisticated gradient descent optimization method [18]. Third phase: Composition layer to refine the final classification layer of images. This method can detect irregularities in the dataset by investigating class boundaries using class decomposition. For decomposition of classes Kmean clustering method is used [19].

DATASET: i) 80 samples from Japanese Society of Radiological Technology ii) Covid-19 Image data collection.

MODELS	ACCURACY	SENSITIVITY
ALEXNET	95.66%	97.53%
VGG19	97.35%	98.23%
RESNET	95.12%	97.91%
GOOGLNET	94.71%	97.88%
SQUEEZENET	94.90%	95.70%

2.4 Instacovnet Model

InstaCovNet-19[13] is a deep convolutional architecture (DCNN) used for the detection of patients with COVID-19 using chest Xray images [20]. Transfer Learning and multiple pre-trained DCNNs are used like Inception v3, MobileNetV2, ResNet101, NASNet and Xception. These models were first imported with their pre-trained weights matrix (on ImageNet). Then these models were fine-tuned for the dataset. The fine-tuned models were then combined using the Integrated Stacking technique, making the stacked model a larger and more robust model. Two image preprocessing techniques are used i) fuzzy color image enhancement ii) stacking.

DATASET: i) COVID19 Radiography database by Kaggleii) ChestXray dataset

MODELS	ACCURACY	SENSITIVITY
COVIDDIAGNOSIS NET	98.33%	NA
CORONET	89.6%	NA
RESNET50+DCNN	NA	NA
COVIDNET	93.3%	NA
DARKCOVIDNET	87.02%	NA
MOBILENETV2	94.72%	NA
COVIDAID	92.3%	NA
INSTACOVNET19	99.08%	NA

2.5 CORODET

CORODET [5] is a Novel CNN model which uses ChestXray images to detect Covid. It's a new 22Layer CNN model [21]. It consists of 9-layer Conv2d followed by Maxpooling2D,9-layer Conv2d followed by Max Pooling and at last Flatten layer followed by Dense layer. Adam optimizer has been used. Training is carried out for 50 epochs with learning rate=.0001.

DATASET: COVID-R dataset has been used which consists of 2843 Covid19 images,3108 Normal images,1439 Pneumonia images.

MODELS	ACCURACY	SENSITIVITY
SETHY AND BEHR	95.38%	NA
HEMDAN	90%	NA
NARIN	98%	NA
WANG	82.9%	NA
ZHANG	90.8%	NA
OZTURK	98.08%	NA
KHAN	99%	NA
CORODET	99.1%	NA

2.6 CVDNET

CVDNET [1], a deep CNN model is used to classify COVID-19 images from normal and other pneumonia cases using Chest X ray images. It is based on a residual neural network and uses two parallel levels with different kernel size to capture local and global features of input. This architecture is trained on a small dataset but achieves promising results [22]. For the convolution, it employs the concept of residual technique which enhances the performance of this model.

DATASET:Kaggle Covid 19 Radiography database. Total images are 2905.Out of which Normal (1341), Covid19(219), Viral Pneumonia (1345) images are used.

MODELS	ACCURACY	SENSITIVITY
COVIDNET	92.4%	NA

COVIDX-NET	92%	NA
RESNET50+SVM CLASSIFIER	95.38%	NA
DARKCOVIDNET	87.02%	NA
VGG19	93.48%	NA
RESNET+LOCATION ATTENTION	86.7%	NA
MINCEPTION	73.1%	74%
COVNET	96%	90%
DEEP PNEUMONIA	86%	NA
DROP WEIGHT BAYESIAN CNN	92.90%	NA
DEEP CNN BACKBONE NETWORK	96.69%	96.84%
CORONET	89.6%	NA

2.7 DEEP CORONET

Deep coronet [19] is a new approach based on the deep LSTM model. Instead of a transfer-learning approach, the deep LSTM model is designed from scratch. Preprocessing of image is done using sobel gradient and Marker-controlled Watershed segmentation (MCWS) are applied to raw images followed by deep LSTM model which increases classification performance[23]. Deep LSTM model consists of sequence data creating block and LSTM network sequence data creating block consists of convolution operation, Batch Normalization, Relulayer. The LSTM model is a modified version of recurrent neural networks[24]. This layer is followed by fully connected layer, Relu and dropout fully connected which give output to SoftMax layer which give probable scores of classes [25].

DATASETS: Covid 19 and Normal CX images are taken from Kaggle repository.

MODELS	ACCURACY	SENSITIVITY
DARKCOVIDNET	87.02%	92.18%
COVID DIAGNOSIS NET	98.26%	99.13%
PRETRAINED CNNS	93.48%	92.85%
COVIDNET	92.64%	91.37%
DEEP FEATURES RESNET-50, SVM	95.38%	NA
DEEP CNNS	90.0%	100%
DEEP CNN RESNET 50	98%	NA
DRE NET, DEEP CNN	86%	96.4%
DEEPCNN, INCEPTION, TRANSFER LEARNING	89.50%	87%
NCOVNET, TRANSFERLEARNING, DEEP CNN	88.10%	97.62%
DEEP CNN, SVM	98.97%	89.39%
PROPOSED METHOD	100%	100%

2.8 ENSEMBLE DEEP LEARNING-EDL AVID

Ensemble deep learning [16] is a hybrid learning paradigm which is able to produce effective results by combining various machine learning models intelligently[26]. Combined strength of models offset individual model variances and biases and provide composite prediction where the final accuracy is better than accuracy of individual model. In EDLCOVID, instead of taking multiple models for ensembling, multiple model snapshots of a deep learning networkCOVIDNET has been taken.COVIDNET network is used with its multiple snapshots and cosine annealing learning rate is used to change the learning rate aggressively but systematically to generate different model weights over training epochs by allowing the learning rate to start high and decrease to minimum value zero at relatively rapid speed[27].

COVIDX DATASET:It is a combination of five different datasets: Actual med covid 19 dataset, Covid19 Image data collection, Covid19 radiography database collection,Covid19 CXR dataset Initiative, RSNA pneumonia detection challenge.

MODELS	ACCURACY	SENSITIVITY
COVIDNETM1	93.50%	92.2%
COVIDNETM2	94%	93%
COVIDNETM3	92.50%	93.12%
COVIDNETM4	94.50%	94%
COVIDNETM5	94.50%	95%
COVIDNETM6	93.50%	92.3%
EDL COVID	95%	94.9%

2.9 DENSENET 121

Dense blocks [14] are first proposed by Huang which introduces dense connectivity, means each layer receives signal from all its preceding layers combined by channel wise concatenation resulting into low information bottleneck[28]. Dense net integrates the properties of identity mappings, deep supervision, reduced feature redundancy and diversified depth allowing feature reuse and making it a good feature extractor[29]. Dense net with different depths are Densenet121,169,209,264 are there but Dense net 121 found to be more accurate.The number 121 indicates the number of layers and is calculated as: $5+(6+12+24+16)*2=121$ where 5 (convolution and pooling layer),3(Transition layer(6,12,24)),1 classification layer(16),2 dense block(1*1 and 3*3conv)

DATASET: Covid19 dataset and pneumonia dataset

MODELS	ACCURACY	SENSITIVITY
VGG19	94.74%	N.A.
INCEPTIONV3	97.37%	N.A.
RESNET50	94.08%	N.A.
RESNET50V2	94.08%	N.A.
MOBILENET	95.4%	N.A.
MOBILENETV2	95.4%	N.A.
DENSENET121	98.69%	N.A.
NASNETMOBILE	97.37%	N.A.

A new family of models based on the efficient Net family [8] is explored for detection of chest X ray images. Its baseline architecture consists of Mobile Inverted Bottleneck convolution as a basic component (MBConv). It starts from a high quality yet compact base line model and uniformly scales each of its three dimensions) depthii) width iii) resolution with fixed set of scaling coefficients. Architecture B1 to B7 are derived from B0. Efficient net family has models of high performance and low computational cost. Efficient net B3X model found to most accurately classify chest Xray images. Efficient net employs Batch normalization, Drop out and switch activation function

DATASET:i)RSNA pneumonia detection challenge ii) Covid19 image data collection iii) HCV-UFPR COVID 19

MODELS	ACCURACY	SENSITIVITY	POSITIVE PREDICTION
EFFICIENTNET B0X	90.0%	93.5%	100.0%
EFFICIENTNET B1X	91.8%	87.1%	100.0%
EFFICIENTNET B2X	90.0%	77.4%	100.0%
EFFICIENTNET B3X	93.9%	96.8%	100.0%
EFFICIENTNET B4X	93.0%	90.3%	93.3%
EFFICIENTNET B5X	92.2%	93.5%	90.6%
MOBILENET	90.4%	83.8%	100.0%
MOBILENETV2	90.0%	87.1%	96.4%
RESNET50	83.5%	70.9%	81.4%
VGG16	77.0%	67.7%	63.64%
VGG19	75.3%	77.4%	50%

3. Findings

Comparison Of Above-Described Deep Learning Methodology

Ten different deep learning methodologies are surveyed and their performance are analyzed on the basis of two parameters: Accuracy and Sensitivity.

MODELS	ACCURACY	SENSITIVITY
XCEPTION MODEL	97.97%	NA
COVID AID	90.5%	100%
DETRAC MODEL	97.35%	98.23%
INSTACOVNET MODEL	99.08%	NA
CORODET	99.1%	NA
CVDNET	96.69%	96.84%
DEEP CORONET	100%	100%
EDL COVID	95%	95.2%
DENSENET121	98.69%	NA
EFFICIENTB3X	93.9%	96.8%

4. Conclusion

In this paper, ten different approaches of Deep learning are surveyed. However, it cannot be said that methods are completely superior to each other due to different datasets. Deep coronet method reaches 100% accuracy but due to application of MCWS segmentation in its preprocessing stage its computation cost has increased. In the future, more organized datasets can be employed to increase the reliability of these models. Moreover, beside Covid 19 and pneumonia detection, these models can be employed to detect other respiratory diseases [30]. As covid 19 poses a huge challenge which affects the economic prosperity of almost every country, its diagnosis at a rapid rate is of utmost importance. ChestXray scans prove to be an efficient, less time consuming and economical method for its diagnosis. When Chest Xray scans are carried out with an efficient Deep learning algorithm, it will boost the diagnosis rate and hence help in combating the pandemic.

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E-Training System To Improve HR Capability at Indofood Factory Using Codeigniter Framework

Fifit Alfiah¹, Faiz Muhammad Syam², Dini Anggrayni³

Teknik Informatika–Sains and technology Faculty - Raharja University¹, Master of Informatics Engineering - Raharja University², Master of Computer Science - Budi Luhur University³
Jenderal Sudirman No.40, Cikokol, Kota Tangerang ^{1,2}, Jl. Ciledug Raya, Petukangan Utara, Jakarta ³
Indonesia^{1,2,3}

e-mail: fifitalfiah@raharja.info¹, faizmsyam@gmail.com², dinianggrayni@live.com³

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Abstract

Digital developments on a global scale are now growing very rapidly, especially with the emergence of a covid-19 pandemic that has made all institutions, both education, offices and various other types of institutions, begin to adapt to the use of computers and mobile phones, where everything is based on IoT Internet of Thing, namely all types. the activities are carried out online, besides that, there are many obstacles, such as the amount of time wasted because they have to prepare training classrooms, prepare ppt slides for each training session, and prepare training questions which will then be printed and distributed to training participants. A lot of costs and energy are wasted in conducting training, especially if you have to do training at the branch office and the work of employees is not controlled when they have to do training. For this reason, it is necessary to build an information system for the training department to provide informative training data and to automate the recording of training history. To support the program design process developed by implementing a throw-away prototype model, using the PHP programming language with CodeIgniter Framework, database design using the PostgreSQL database. With the training department information system, the process of delivering training information is faster and more informative, facilitating the process of recording employee training history, and reducing the use of paper because it is computerized making it easier to conduct training and shorten the training process.

Keywords: *E-Training, CodeIgniter Framework, PostgreSQL, Employee.*

1. Introduction

Digital developments on a global scale are now growing very rapidly, especially with the emergence of a covid-19 pandemic that has made all institutions, both education, offices and various other types of institutions, begin to adapt to the use of computers and mobile phones, where everything is based on IoT Internet of Thing, namely all types [1].

In this case, there are many ways that a company can improve the quality of good performance. One of the ways is to increase the productivity of existing employees, so that employees have skills and knowledge on the job. Therefore is expected to provide better performance results [2]. The role of the company to increase the productivity of a company's employees are very important. Companies that have a desire to compete in the industrial market, of course, will pay more attention to performance and capabilities of its employees and provide training and knowledge that is felt to increase a person's productivity [3].

A lot of time is wasted because you have to prepare a training class room, prepare ppt slides every time you conduct training, and prepare training questions that then will be printed



and distributed to the training participants [4]. The amount of cost and energy wasted in doing training, especially if you have to do training in the office branch. Uncontrolled work of employees when they have to do training [5].

Literature Review

Coupled with the emergence of the COVID-19 pandemic in Indonesia in March 2020 which requires all activities in various fields to be carried out online [6], so that all work processes are required to take a holiday or be carried out online in unpredictable times [7]. Thus, various aspects of the industry are competing in creating a web-based or mobile-based system [8] so that it can be done anytime and anywhere, as well as this e-training system that must be made online in order to facilitate the learning process [9] related to the industrial sector that is carried out in accordance with the Standards. Operational Procedures of the company [10].

The use of application programs such as E-Training is expected to be able to increase productivity and be able to increase one's knowledge of employees [11]. In addition, with the E-Training application program [12], of course, will be able to assist the company in providing training which of course does not need to take a long time to provide Training manually [13]. In this case, by using the program E-Training applications can certainly help companies more and will be much more efficient and effective [14].

This research focuses on creating a training application system that can help HRD at Indofood factories [15]. This system application will be designed using the CodeIgniter framework and also bootstrap as a web design template. [16] Researchers conducted a case study at PT Indofood Fritolay Makmur because it did not have the existence of an application program that can assist in performing employee training [17]. At PT. Indofood Fritolay Makmur itself in training is still classified as manual, because it still has to be in a certain class or room if you want to do training [18]. On the other hand trained employees can also come from branch offices outside the city, so that requires a lot of time, money and energy needed to do training because they have to go to the branch office [19].

2. Research Method

There are 2 research methods used in this study, namely the system development method (SDLC), namely the Throw-away Prototyping method and the program using the CodeIgniter Framework.

2.1 Throw-away Prototyping Method

The throw-away prototyping approach is a detailed specification of system requirements that has been known from the start, so that this approach can reduce the risk of unmet system requirements. The overall throw-away prototyping methodology uses an analysis phase that aims to gather information and develop ideas for system concepts. The stages of throw-away prototyping can be seen in the following figure:

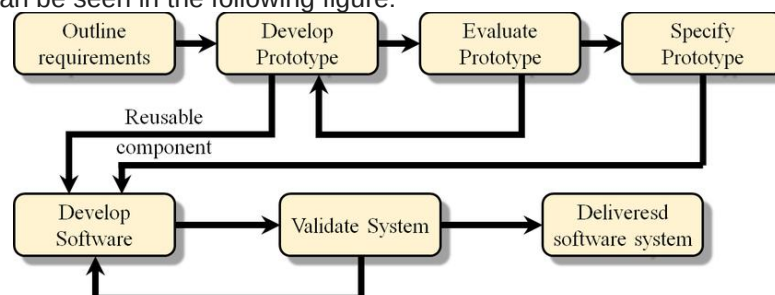


Figure 1. Throw-Away Prototyping Stages [20]

2.2 CodeIgniter Framework

CodeIgniter is an open source web application network that is used to build dynamic PHP applications. CodeIgniter is a PHP framework with an MVC (Model, View, Controller) model to build dynamic websites using PHP which can speed up developers to create web applications. Besides being light and fast, CodeIgniter also has a super complete documentation

accompanied by an example of the code implementation. The MVC architecture is divided into 3 parts:

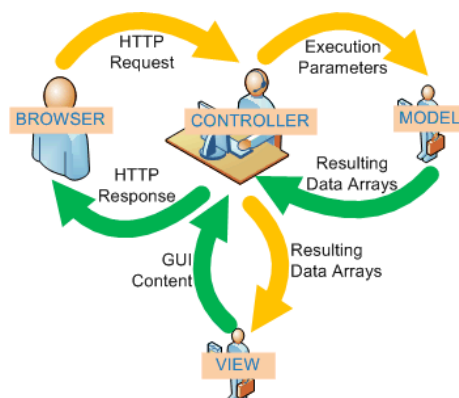


Figure 2. MVC Concept C# Framework [21]

3. Findings

3.1 Use Case Diagram

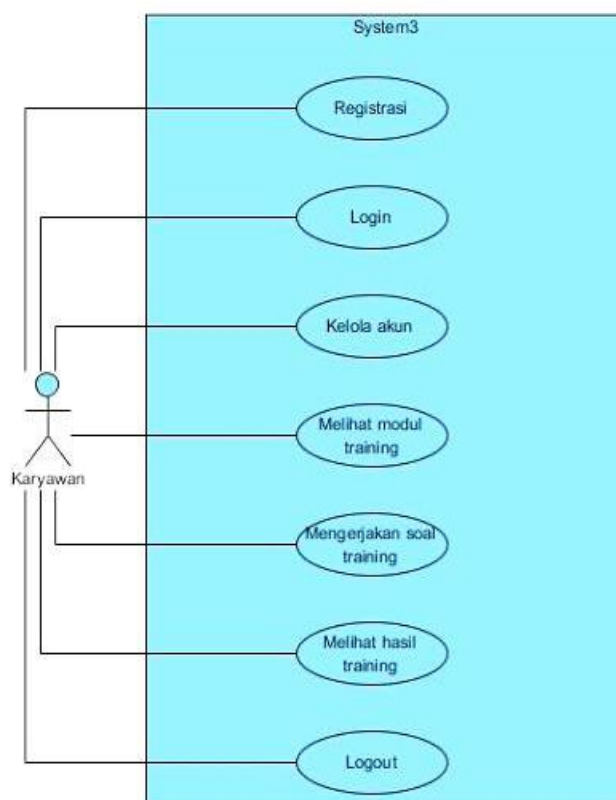


Figure 3. Use Case Diagram Employee

Based on Figure 3. Employee Use Case diagram currently running:

1. There is one system covering the process of employee activities in managing the E-Training system.
2. There is 1 actor in the process of running activities, namely: Employees.
3. And there are 7 use case activities carried out by employees, namely: registration, login, managing accounts, viewing training modules, working on training questions, viewing training results and logging out.

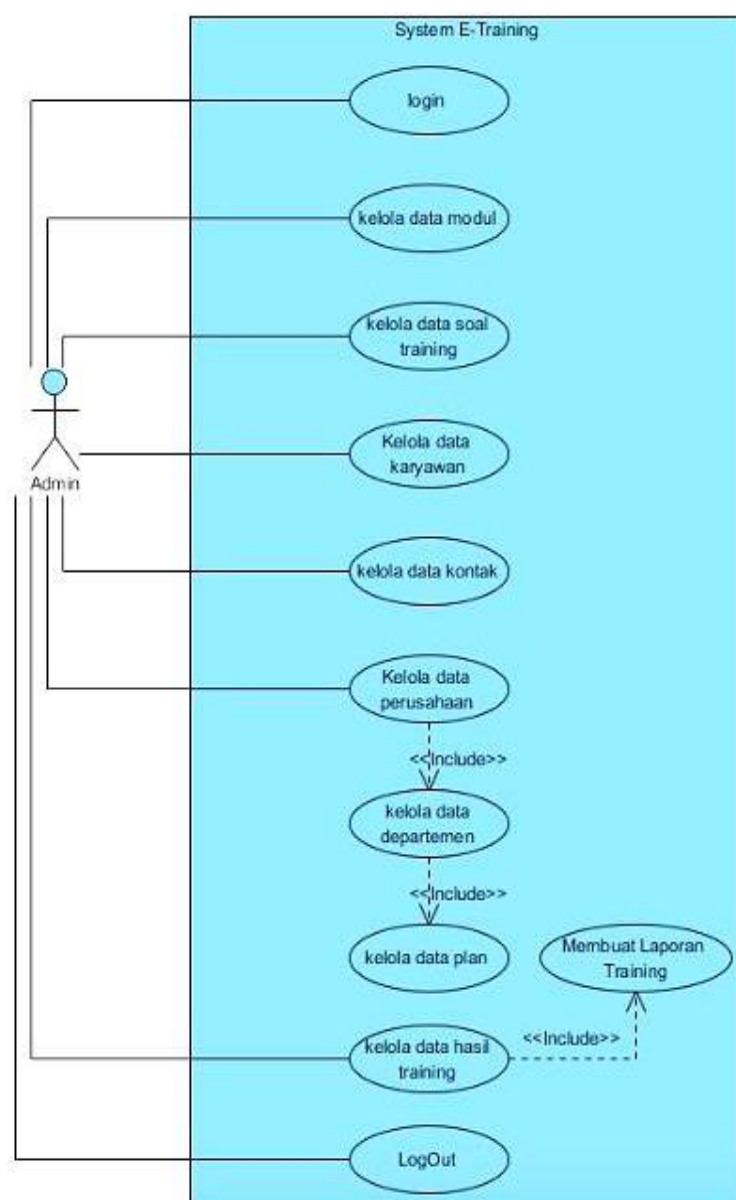


Figure 4. Use Case Diagram Admin

Based on Figure 4. Use Case diagram of the currently running admin:

1. There is one system that covers the process of admin activities in managing the E-Training system.
2. There is 1 actor in the process of running activities, namely: Admin.
3. And there are 11 use case activities carried out by the Admin, namely: logging in, managing module data, managing training data, managing employee data, managing contact data, managing company data such as data plans and departments, managing training results data and making training reports and logging out.

3.2 Research Implementation

1. Login Display



Figure 5. Login Display

2. Admin dashboard display



Figure 6. Admin dashboard display

3. Display company data

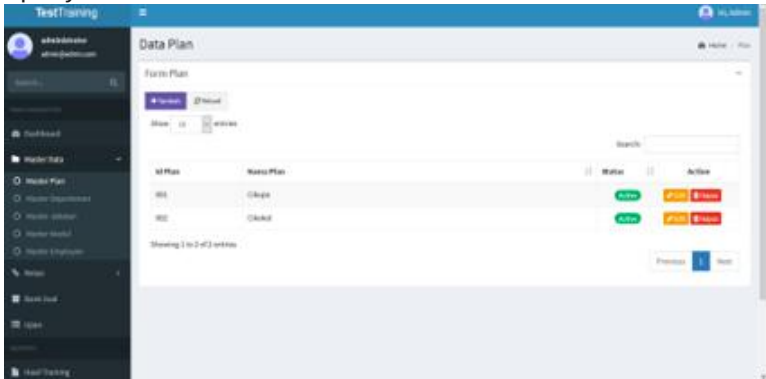


Figure 7. Display of company data

4. Display module data

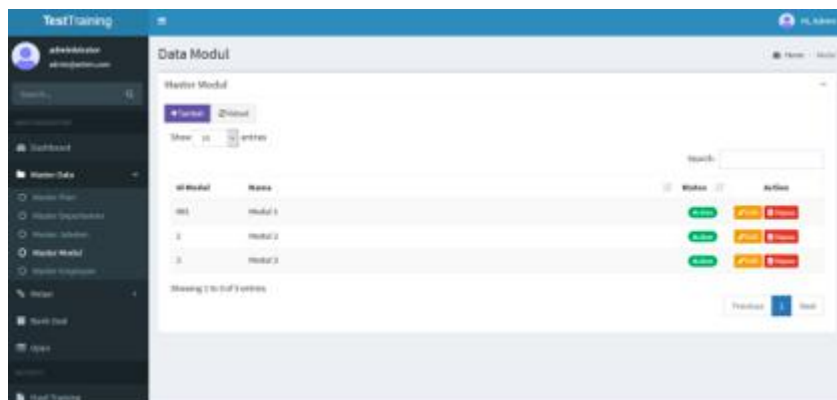


Figure 8. Display of module data

5. Display employee data

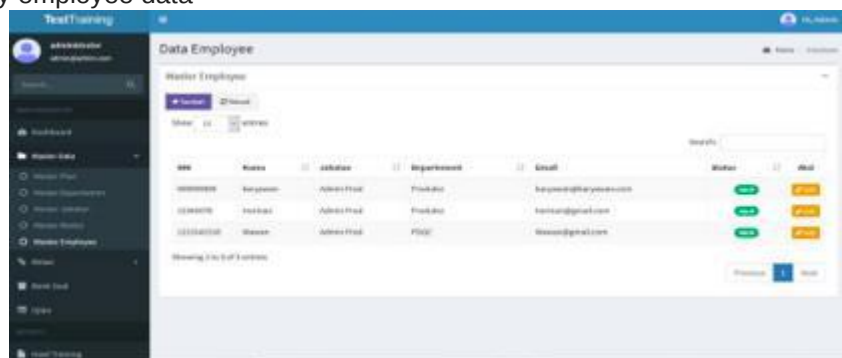


Figure 9. Display employee data

6. Display of question data

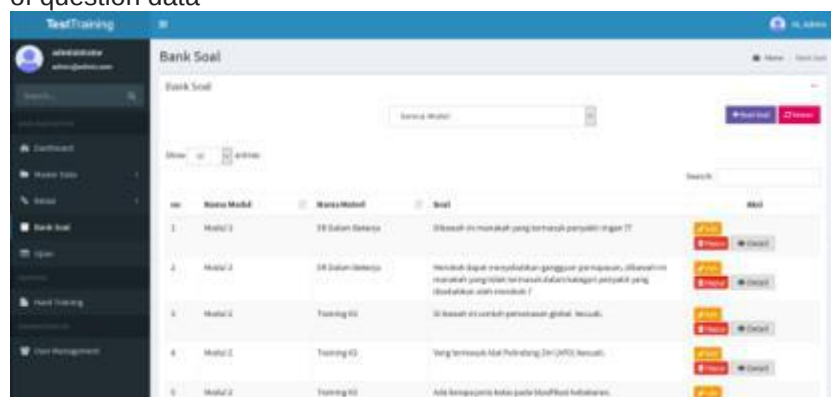


Figure 10. Display of question data

7. Display of result data



The screenshot shows the TestRail application interface. The top navigation bar is blue with the 'TestRail' logo and a user profile icon. The left sidebar is dark grey with icons for Home, Dashboard, Recent Reports, My Learning, and a search bar. The main content area has a white background. On the left, there's a 'Dashboard' section with a 'Control Panel' tab, showing a table of 'Informasi Akun' (Account Information) with columns for Name, Email, Status, and Last Login. On the right, there's a 'Peringkat Kasus' (Case Ranking) section with a paragraph of text and a bulleted list of features.

Informasi Akun								
<table border="1"> <tr> <td>NAME</td> <td>000000000</td> </tr> <tr> <td>EMAIL</td> <td>000000000</td> </tr> <tr> <td>Status</td> <td>000000000</td> </tr> <tr> <td>Last Login</td> <td>000000000</td> </tr> </table>	NAME	000000000	EMAIL	000000000	Status	000000000	Last Login	000000000
NAME	000000000							
EMAIL	000000000							
Status	000000000							
Last Login	000000000							

Figure 12. Employee data display

The screenshot displays the 'List My Training' interface. It features a sidebar with navigation options: Dashboard, Add New User, and My Training. The main area includes filter buttons for Location (Jakarta), Department (Marketing), Tanggal (selected: 20 September 2020), and Status (selected: 100%). Below these is a table titled 'List My Training' with columns: No, Nama User, Nama Materi, Jumlah Jam, Waktu, Tanggal Mulai, and Aksi. The table contains two entries: 'Doko' with '100 Customer Relationship' and 'Test 01' with 'Training KIR'. Each entry has a 'View Detail' button. The page also includes a search bar, a 'Showing 1 to 2 of 2 entries' indicator, and a 'Showing' dropdown set to '1 per 2 entries'.

Figure 13. Display of employee training list

10. Training page display



Figure 14. Training page display

11. Initial view of training

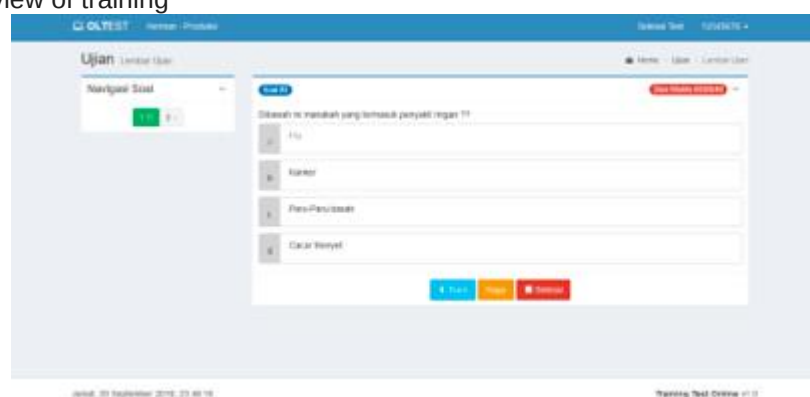


Figure 15. Display of training

4. Conclusion

The current training system is still classified as manual, because in doing training, you still have to prepare the classroom first, and must come to the branch office if there is training there. In delivering the material, they still use the presentation made by trainer, and in the training the questions that are made must be printed according to the employees participating in the training.

Web-based E-Training system applications can help solve problems that occur in the running system, make training easier and streamline the training process.

Proposed system, it is hoped that it will make it easier to carry out control processes for employees to be trained and can help companies provide information about the extent to which employees have the ability after the results of the training.

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