INFLUENCE OF CRITICAL SUCCESS FACTORS OF EFFECTIVE RISK MANAGEMENT PROCEDURES FOR THE EFFECTIVE FUNCTIONING OF THE ORGANIZATION (CASE STUDY: PT PEMBANGKITAN JAWA-BALI PJB)

UNDERGRADUATE THESIS

Submitted to the International Undergraduate Program in Industrial Engineering in Partial Fulfilment of Requirement for Bachelor Degree of Industrial Engineering at the Faculty of Industrial Technology
Universitas Islam Indonesia

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DEDICATION PAGE

This final project is presented to God Almighty Allah SWT as a form of worship of the author as His servant, to both parents of the author who continue to provide moral and material support to the author, as well as all parties who have accompanied the author's learning process during his strata-1 education. Finally, I addressed the supervisor, Winda Nur Cahyo, ST., MT., Ph.D. who has guided the researcher to complete this final project.

MOTIVATION PAGE

"Indeed, with difficulties there is ease [Al-Insyirah/94:6]"

“And look for what has been given to you (happiness) the land of the hereafter, and do not forget your part of worldly pleasures.” (Q.S Al-Qashas: 77)

FOREWORD

Bismillahirrahmanirrahim

Assalamualaikum Warahmatullahi Wabarakatuh

Asyhadu Alla Ilahailallah Wa Asyhadu Anna Muhammadarrasulullah Allahuma Shalli'ala Muhammad Wa'ala Alihi Washobihi Wasalam, Alhamdulillahhirrobbil'alamiin, all praise and gratitude I pray for the presence of Allah SWT for the blessing of his mercy and favor the author was able to complete the final project. Shalawat and greetings also did not forget to pour out on the great prophet Muhammad SAW.

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Abdulmajeed Al-Sabahi,

ABSTRACT

No organization can avoid risk, nor should they insure against every risk. Organizations exist to take on risks in areas where they have developed the capability to cope with risk. PT PLN Nusantara Power, known as PLN NP, is a sub-holding of PT PLN (Persero) which is engaged in the field of electricity generation and other supporting businesses. Based on data from the company's top level, several problems have been mapped in risk factors which include the strategic, financial, operation, project, and obedience categories. So, it is necessary to identify variables that affect the success of risk management in the project. This study aims to test variables that have a negative influence on project performance. The sample in this study was PJB employees. The structural equation modeling (SEM) approach was adopted to analyze these factors because of the lack of evaluation of the causal relationship between internal and external risk. This study examined the relationship between risk factors causes and project success. Data were analyzed through the Smart PLS software package using SEM. There are 2 variables from the six risk factors that affect project success. Project Management (PM) of PJB companies has a significant effect on project success (EF) which is indicated by a T-Statistical value of 2.306 more than 1.96.

Key Words: PJB, Risk Management, RII, Structural equation modeling (SEM)

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INTRODUCTION

1.1 Background

Risk is defined as the potential for complications and problems concerning the completion of a project and the achievement of project objectives (Houston, 2004), the other definition of risk is an uncertain future event or condition with an occurrence rate between 0 and 100%, which can affect at least one of the project components (scope, schedule, cost or quality). No organization can avoid risk, nor should they insure against every risk. Organizations exist to take on risks in areas where they have developed the capability to cope with risk. However, they cannot cope with every risk (Olson & Wu, 2020).

Risk factors, which affect the main components of projects (e.g., cost, time, and quality), are common challenges in the construction industry worldwide. Project risk management is one of the critical aspects of project management because of the uncertainty of construction risks; risk-related failures directly impact the benefits of all project stakeholders (Issa et al., 2015). The risk can be identified in any project as an unknown occurrence or situation that has a negative or positive impact on the project objective (Rose 2013).

PT PLN Nusantara Power, known as PLN NP, is a sub-holding of PT PLN (Persero) which is engaged in the field of electricity generation and other supporting businesses. Established on October 3, 1995. PLN NP continuously strives to take a greater role and contribution in supporting national energy security in terms of electricity supply by managing assets amounting to IDR 174.78 trillion and contributing 28% of the total national generating capacity.

This research was conducted at PT PLN PN or also known as PJB. Based on data from the company's top level, several problems have been mapped in risk factors which include the strategic, financial, operation, project, and obedience categories. At the project level, there are 20 variables that can have a negative effect on the effective functioning of the organization that is mapped using the Relative Importance Index (RII). A questionnaire survey was developed for respondents and designed to identify the risk factors that affect project performance.

The right risk management process can make the company's performance more optimal. This makes PJB want to implement good risk management, especially in the project category. So, it is necessary to identify variables that affect the success of risk management in the project. This study aims to test variables that have a negative influence on project performance. Each of the variables has its indicator. The sample in this study was PJB employees.

Therefore, PJB needs to analyze the factors that negatively affect the running of the project as a form of evaluation using the SEM method. This is useful for minimizing the level of risk that will occur from unpredictable factors or events later. This research is intended to improve the performance of the organization or company on an ongoing basis.

SEM is a multivariate analysis method that can be used to describe the simultaneous linear relationship between observation variables (indicators) and variables that cannot be measured directly (construct variables) (Wold, 2013). This study uses SEM-PLS, an approach from SEM that has no assumptions related to data distribution. Thus, PLS-SEM becomes a good alternative to SEM-based covariance when there are situations including a small sample size, use has few theories that can be used (Kwong &; Wong, 2012). In this research, the SEM model was used to analyze all variables namely indicator variables, and construct variables in one model, to identify which variables with related indicators have the most direct and indirect influence on the project.

The results also demonstrate the value of direct and indirect impact emerges due to the existence of the influence. Meanwhile, if using path analysis only analyzes the construct variables as well as factor analysis only knows which factors have an effect. Therefore, it is linear with the aim of research to find out which variables influence the success of the project, so path and factor analysis is used, both of which are contained in the SEM.

This explanation has a meaning, namely the importance of using the SEM model in research, namely to find out the details of each indicator and construct that can affect the success of the project as a consideration for the evaluation of the PJB company, because each indicator may not necessarily affect the construct variables.

Structural equation modeling (SEM) is a statistical method for the simultaneous testing of dependent relationships between latent variables and their manifest variables (measurable variables), between latent variables and measurement errors directly (Yamin & Kuniawan, 2011). The SEM technique combines factor analysis and multiple regression analysis (Hair, 2019). In SEM, a variable is either exogenous or endogenous. An exogenous variable has path arrows pointing outwards and none leading to it. Meanwhile, an endogenous variable has at least one path leading to it and represents the effects of another variable (s). Based on the SEM theory, there is 1 dependent variable (endogenous) that depends on 6 independent variables (exogenous), namely CN, CL, PM, RM, PO, and CE.

The structural equation modeling (SEM) approach was adopted to analyze these factors because of the lack of evaluation of the causal relationship of internal risk. This study examined the relationship between risk factors causes and project success. This study is to raise awareness of the value of risks for the project category of PJB company. Data were analyzed through the Smart PLS software package using SEM.

1.2 Problem Formulation

The formulation of the problem from the background that has been described is:

1. What are the risk factor variables that affect the success at the project level for effective functioning in PJB?
2. Is there an influence of risk factors on project performance in PJB?

1.3 Research Objectives

Based on the formulation of the problem above, the goals set by the researcher are:

1. To define the risk factor variables that affect the success at the project level for the effective functioning in PJB
2. To define the influence of risk factors on project performance in PJB

1.4 Research Limitations

The limitations of the research based on the formulation of the problem that has been described are as follows:

1. Research conducted in PJB companies
2. Data collection is only addressed to the population of unit department project and risk management
3. Data were obtained through the results of observations on the distribution of questionnaires in PJB company.
4. Research regardless of other factors that influence success project risk.
5. Research focuses only on measuring influence at the project level
6. Research focuses on analyzing the influence between the six variables that have been determined.

1.5 Research Benefits

The benefits that will be achieved based on the research objectives are as follows:

1. For Companies

   As one of the solutions to overcome problems so that it can increase the company's business value after identifying risk management influences the project's success.

2. For Researchers

As a form of application and development of the knowledge that has been obtained and to find out the relationship between variables that can influence the project success at PJB using risk management analysis.

3. For Readers

It is expected that this study will benefit from the scientific knowledge of determining Critical success factors of effective risk management procedures for the effective functioning

1.6 Writing Systematics

The systematics of writing this final project report is compiled systematically and consists of six chapters, each chapter will be described as follows:

CHAPTER I INTRODUCTION

The introductory chapter discusses the research background, problem formulation, problem limitations, objectives, benefits, and systematics of the research. The background contains the reasons for the research to be carried out, the formulation of the problem contains the things that the research will do, the limitations of the problem related to the scope of the research discussion, the purpose of the research carried out, the benefits that can be achieved from the research, and the systematics of writing used for making research reports.

CHAPTER II LITERATURE REVIEW

The theoretical foundation chapter contains theoretical explanations and literature reviews according to the topic of research discussion, namely matters related to the risk factors that influence of success the project as the basis for research.

CHAPTER III RESEARCH METHODS

The research methods chapter contains an explanation of the stages of research carried out from the beginning, namely the methods used in the research, the methods of analysis and design, to the stages that must be carried out until the end of the research.

CHAPTER IV DATA COLLECTION & PROCESSING

The collection & processing chapter contains an explanation of the phases of data collection such as the attributes and methods used when researching to carry out related data processing to solve problems.

CHAPTER V DISCUSSION

The discussion chapter contains an explanation of the analysis of the results of data processing which refers to the theoretical basis as a support for research.

CHAPTER VI CONCLUSIONS &S ADVICE

The conclusion & suggestions chapter explains the conclusions of the research results based on discussion and answering problem formulations and providing suggestions for improvement for further research.

BIBLIOGRAPHY

ATTACHMENT

CHAPTER II
LITERATURE REVIEW

2.1 Inductive Studies

Several previous studies have proven that there is a relationship between variables in measuring the influence of project success, namely internal and external factors. However, reviewing the results of several studies shows differences in relationship patterns between the variables tested.

The strength of the relationships that exist between the variables of a model can be estimated by Structural Equation Modeling (SEM). To find variables that affect user satisfaction, the SEM method is used. SEM is a method for predicting a model that has a weak theoretical foundation, abnormal data, and a sample size that is not too large. Research conducted by Wibisono, Anwar, and Kirono (2015) explains the use of the SEM method to determine the influence of a factor on job satisfaction. Ningsih and Agustina (2018) in their research explained that the SEM method with partial least square (PLS) is used to predict and develop a theory.

Baloi and Price (2003) published a study entitled "Modeling Global Risk Factors Affecting construction cost performance," which reviewed some studies on risk factors and made a collection for that, which include the majority of essential factors, such as risks related to labor skills and availability, material delivery and quality, equipment reliability, and availability and management efficiency.

Ghosh and Jintanapakanont (2004) categorized risks into the following major classes: (1) financial, (2) contractual and legal, (3) subcontractors, (4) operational, (5) safety, (6) design, (7) force majeure, (8) physical and (9) delay. However, Wiguna and Scott (2005) classified the construction risk factors into the following significant categories: (1) external and site conditions, (2) economic and financial risks, (3) technical and contractual risks, and (4) managerial risks.

Table 2. 1 Previous Research

Author Year	**Risk Categories**								**Result**
	Economic	**Political**	**Safety and Environmental**	**Security**	Client	Consultant	Resource and Material	Project Management	
Zuofa and Ochieng (2011)					V	V	V		The results showed that there is a relationship between risk variables to project success
Mahamid et al. (2015)					V	V	V	V	The study concluded that the top delay causes in construction projects in Saudi Arabia from the consultants' perspective

Author Year	**Risk Categories**								**Result**
	Economic	**Political**	**Safety and Environmental**	**Security**	Client	Consultant	Resource and Material	Project Manage ment	
Kassem et al (2022)	V	V	V	V	V	V	V	V	The factors under feasibility study and design and resources and materials; are the categories that affect project success.
Rahman et al. (2013)					V	V	V	V	It was found that three variables causing cost overruns in Malaysia's construction
Van Thuyet et al. (2007)					V			V	The results are client and project management variables

Author Year	Risk Categories								Result
	Economic	**Political**	**Safety and Environmental**	**Security**	Client	Consultant	Resource and Material	Project Management	
									impact the project's success
Rezakhani (2012)	V	V	V	V	V	V	V	V	The results are economic and political variables impact the project's success
Banaitiene (2012)	V	V		V					The results are economic, security, and political variables impact the project's success
Barlish et al. (2013)	V	V	V	V					The results are safety and environmental and security variables impact the project's success

Author Year	Risk Categories								Result
	Economic	**Political**	**Safety and Environmental**	**Security**	Client	Consultant	Resource and Material	Project Management	
Ghahramanzadeh (2013)	V	V	V	V	V	V	V	V	The results are safety and environmental and security variables impact the project's success
Aziz (2013)	V	V	V						The results are economic and political variables impact the project's success
Renuka et al. (2014)	V	V	V	V					The results are economic, political, safety and environmental, and security variables that impact the project's success

Author Year	**Risk Categories**								**Result**
	Economic	**Political**	**Safety and Environmental**	**Security**	Client	Consultant	Resource and Material	Project Manage ment	
Issa et al. (2015)	V	V	V	V	V	V	V	V	The results are economic, safety and environmental, and security variables impact the project's success
Haupt (2015)	V	V	V						The results are economic, safety, and environmental, variables that impact the project's success
Chaher and Soom (2016)			V	V					The results are safety and environmental, and security variables impact the project's success

The previous research conducted by Kassem (2022) related to 13 latent variables of a country's economic, political economy, local peoples, environment and safety, security risk, force majeure, project management, resources and materials, tendering, feasibility study, consultant, contractor, and the client as a measurement of system success in the project using 51 manifest variables. The results showed that there was a significant influence between the relationships of latent variables carried out by the test. This research model is a development of previous research that categorizes risk factors into 2, namely internal risk and external risk.

According to (George & Mallery 2016) the Spearman correlation coefficient is a coefficient that measures the correlation between different phenomena or two or more variables to see if one or a group of them is associated with the other, for example, this research aims to see if there is a correlation between the causes of risk and the effects of risks on the success Construction project in the oil and gas sector in Yemen.

Tah and Carr (2001a, b) used a hierarchical risk classification structure to categorize risks in construction projects and explain the basis for such groupings within the project. The hierarchical risk allocation structure divides the risk affecting the project into internal and external risks. External risks are uncontrollable and unpredictable factors, such as high rates of inflation, material price fluctuation, currency exchange, and force majeure event or disasters.

Issa et al. (2015) developed a construction risk structure in Yemen based on a field survey; the researcher divided the structural risks that the project is subjected to hierarchically into several levels from the first level to the internal and external risks within each of which there are several sub risks. Further, each main risk has secondary risks and the researcher examined many risk factors, which he put in a questionnaire to investigate the importance of these risks in the implementation of construction projects and how to redistribute among the stakeholders in the project.

2.2 Deductive Study

The deductive study in this study contains theoretical explanations according to the topic of research discussion, namely matters related to the influence of project success.

2.2.1 Risk

Risk is a possibility that can occur in something that is unforeseen, detrimental in nature, and may affect the completion of the project as a whole relating to time, cost, and quality (Sandyavitry, 2015). Risk is something that is very broad in interpretation, which can be interpreted by the possibility of a potentially damaging event that occurs in the project (Serpella, et al., 2014). According to Hanafi (2012) in his book states that the risk is upper 2 types, including:

1. Pure Risk

   Pure risks are risks where losses exist but are likely the advantage is non-existent. There are types of pure risk, such as asset risk physical, employee risk, and legal risk.

2. Speculative Risk

   Speculative risk is the risk that there is an expectation of profit and losses. There are 4 types of speculative risk, such as market risk, risk credit, liquidity risk, and operational risk.

According to Junior and Carvalho (2013), There are a lot of risks that occur in something uncertain, but there are several factors that contribute to the occurrence of project risks, for example, time deadlines, costs, limited resources, and inability to meet several factors and competition between one another. According to Serpella, et al., (2014), risk may also represent opportunities and benefits, but the downsides of these risks are more, and usually, people focus more on this adverse bad side.

2.2.2 Relative Important Index (RII)

Using Equation (1), we computed the relative importance index (RII) for each risk. The risk rating is derived by multiplying the likelihood and effect of risk [43]. The Relative Importance Index (RII) method is used to define the relative importance of the various causes and effects factors based on the probability of occurrence and impact on the project by using a five-point Likert scale. This part consisted of questions that solicited the perceived agreement of the risk factors that influence project success and the indicators of project success on a five-point Likert scale (1 = very Low, 2 = Low, 3 = Moderate, 4 = High, and 5= Very High).

$$RII = W/ (A \times N) \quad (1)$$

where RII refers to the Relative Importance Index. W is the respondents' weighted average of each factor, ranging from 1 to 5. The maximum weight (in this case, five) is A, and the total number of answers is N.

2.2.3 Types of Risk

In his writing Hwang, et al. (2017) mentioned that there are 7 categories of risk projects, namely:

1. Technical Risk: Includes risk factors such as cost deviations, and delay in completion of the project.
2. Labor Risk: Uncertainty emanating from construction workers, including their security concerns, shortcomings in skills, and on-site placement is not appropriate.
3. Risk Management: Managerial problems during project implementation, especially communication among stakeholders.
4. Financial Risk: Financial pressure from stakeholders and the possibility of inflation in the local economy, both of which can hinder the sustainability of project implementation.
5. Legal Risk: Disputes between contracting parties, violations of intellectual property, as well as the possibility of delays in achieving legal approval from the authorities' applicable construction.
6. Environmental Risk: Bad weather, unforeseen field conditions, and potential environmental pollution.

7. Political Risk: Instability of government policies, bureaucracy and corruption in authority, and political opposition

2.2.4 Structural Equation Modeling (SEM)

Structural equation modeling (SEM) is a statistical method for the simultaneous testing of dependent relationships between latent variables and their manifest variables (measurable variables), between latent variables and measurement errors directly (Yamin & Kuniawan, 2011). The SEM technique combines factor analysis and multiple regression analysis (Hair, 2019). The hypothesis formulated is the relationship of many variables of a causal nature with the following procedure (Bryne, 2013):

1. The causal relationship that occurs is a structural relationship with the regression equation
2. Causal relationships are arranged with image models (paths) to facilitate the conceptualization of the theory being studied

The research model in regression techniques is built based on one dependent variable and several independent variables. When a research model is built with more than one dependent variable, a method is needed that can solve the problem without regression equations. SEM is an analytical technique for testing and estimating causal relationships which integraintegrates analysis and path analysis (Willy, 2009). The use of SEM in the analysis due to its advantages is as follows (Shiau, Sarstedt, and Hair, 2019):

1. The SEM method can test complex research models with more than one dependent variable.
2. The SEM method can analyze a variable that cannot be measured directly by taking into account its error value. Variables are measured through manifest variables on the questionnaire.

There are two approaches in SEM analysis, namely covariance-based SEM (CB-SEM) and a variant-based partial least squares (PLS-SEM) approach. The software used for covariance-based SEM is LISREL and AMOS (analysis moment structure). This SEM method has better analytical and predictive skills analysis of multiple pathways and regressions because SEM can analyze down to the deepest level of variables or the model under study. Path analysis and regression only span latent variables so the difficulty in parsing or analyzing that occurs at the level of the grain label or indicators- indicators of latent variables (Ulum et al., 2014).

2.2.3 SEM components

In measuring the SEM, there are several components including the type of research variable, and the type of model (Wijayanto, 2008).

1. Types of SEM variables

There are two types of variables in SEM, namely latent variables and manifest variables. According to Shamim and Ghazali (2016), the definitions of latent variables and manifests are as follows.

a. Unobserved variable (unobserved variable or latent variable)

It is a variable that cannot be measured directly. So, it must use manifest variables to represent a construct (Shamim and Ghazali, 2016). Latent variables can be endogenous, exogenous, or intervening constructs. Endogenous and intervening constructs are variables that can be influenced by other variables directly and indirectly. While the exogenous construct is a variable that is not influenced by other variables.

b. Manifest variable (observed variable or measured variable)

It is a variable that can be measured directly or a variable that describes a latent variable in order to be measured (Shamim and Ghazali, 2016). So the manifest variable is the manifest item/variable of a latent variable.

2. Types of SEM models

There are two types of SEM models, namely structural models, and measurement models. The explanation is as follows.

a. Structural model

A model that describes the relationships that occur between latent variables.

b. Measurement model

A model that connects latent variables with manifest variables in the form of factor analysis.

3. Types of errors in SEM

There are two types of errors in the SEM method, namely structural errors and measurements. The explanation is as follows.

a. Structural error

Structural errors occur in structural models and are commonly referred to as noise or error. An error occurs when an exogenous (free) variable cannot perfectly predict an endogenous (bound) variable.

b. Measurement error

Measurement errors occur in measurement models and occur when manifest variables cannot measure a fully related latent variable.

2.2.4 Partial Least Square-Structural Equation Modeling (PLS-SEM)

PLS-SEM is a statistical test that is carried out without a valid theoretical basis and ignores some assumptions by testing whether there are predictive influences that occur between constructs or not. PLS-SEM does not require a large number of hypotheses and samples that are under one hundred and can be used if the basis of the model scheme is temporary or the measurement of each latent variable is new, with the aim of making predictions (Wibisono et al, 2015). The advantages of PLS are described as follows:

1. Can model large numbers of dependent and independent variables
2. Can be used for abnormal and missing value distribution
3. Can be used for small sample sizes

While the disadvantages of PLS are as follows:

1. Limited to testing estimation models on statistics
2. No significance value is obtained except for bootstrapping

Partial Least Square Structural Equation Modeling (PLS-SEM) conducts simultaneous testing of a relationship between latent constructs (linear or non-linear) with many manifest variables, namely mode A (reflective), mode B (formative), or mode M (MIMIC) (Latan and Ghazali, 2016). The PLS-SEM method is an alternative method to SEM with multivariate analysis data processing. Multivariate analysis is a statistical analysis method for research variables simultaneously (synchronously) (Sholihin and 13 Ratmono, 2013).

2.2.5 SmartPLS

SmartPLS is software used in PLS-SEM analysis for path modeling (graphics) with latent variables (Hubona, 2009). SmartPLS software is an SEM component that is used to analyze data made as scientific research. The first software of PLS was Latent Variable Partial Least Squares (LVPLS) developed by Jan-Bernd Lohmoller in Ghozali & Latan (2015:25), in the form of LVPLS. The advantage of SmartPLS is that it is easier to use with a good interface, and a more competitive price, while the drawback is that the test is devoted to data with a small sample size.

2.2.6. Inner Model Measurement

Inner model measurement is also called a structural model that defines the relationship between latent variables (Ghozali, 2014). In the inner model measurement, R-Square testing is carried out to determine the variance in a construct. R-Square values of 0.25, 0.50, and 0.7 indicate weak, moderate, and substantial levels (Hair et al., 2011).

2.2.7 Chi-Square

The Chi-square test is a statistical test, which measures the association between two categorical variables. Working knowledge of tests of this nature is important for the chiropractor and osteopath in order to be able to critically appraise the literature (Pandis, 2016). The chi-square test is a non-parametric test used for two specific purposes: (a) To test the hypothesis of no association between two or more groups, populations, or criteria (i.e., to check independence between two variables); (b) and to test how likely the observed distribution of data fits with the distribution that is expected (i.e., to test the goodness-of-fit). It is used to analyze categorical data (e.g., male or female patients, smokers, and non-smokers, etc.), it is not meant to analyze parametric or continuous data (e.g., height measured in centimeters or weight measured in kg, etc.) (Curtis, K., & Youngquist, S. T.,2013).

Scientists and statisticians use large tables of values to calculate the *P* value for their experiment. These tables are generally set up with the vertical axis on the left corresponding to do and the horizontal axis on the top corresponding to *P* value. Use these tables by first finding our df, then reading that row across from the left to the right until we find the first value bigger than our Chi-square value (Rana, R., & Singhal, R.,2015).

2.2.8 Kolmogorov-Smirnov

The Kolmogorov–Smirnov test is used to test the goodness of fit of a given set of data to a theoretical distribution, while the Smirnov test is used to determine if two samples appear to follow the same distribution. Both tests compare cumulative distribution functions (cdfs) (Berger, 2014). The Kolmogorov–Smirnov test has an exact null distribution for the two directional alternatives but the distribution must be approximated for the nondirectional case.

Regardless of the alternative, the test is less accurate if the parameters of the theoretical distribution have been estimated from the sample. One could manage the conservatism of the Smirnov test by reporting not just its P value but also the entire P value interval, whose upper endpoint is the usual P value but whose lower endpoint is what the P value would have been without any conservatism (Srimani, 2021).

2.2.9 Outer Model Measurement

Outer model measurement is also called the measurement model which defines manifest variables related to their latent variables (Ghozali, 2014). In the outer model measurement, there are 3 types of measurements, namely convergent validity, discriminant validity, and composite reliability. The detailed explanation is as follows.

1. Convergent Validity

   Convergent validity is measured through the results of outer loadings values. The higher the outer loadings value indicates the manifest variables used in variables/constructs have a lot in common. The outer loadings value must be 0.78 or higher (Hair et al., 2011).

2. Discriminant Validity

   The discriminant validity is measured using the Fornell-lacker criterion value on each construct/variable. This value is used to compare the square root of the average variance extracted (AVE) value. The AVE value is the average value of the squared result of the outer loadings value associated with the variable/construct.

3. Composite Reliability

   This value measures the internal consistency of a construct. Composite reliability must be worth more than equal to 0.7 (Hair et al., 2017).

CHAPTER III
RESEARCH METHOD

The research methods chapter is a chapter on the flow of research and how the research is carried out from beginning to completion which can be seen in points 3.1 to 3.9.

3.1 Object of Study

The research that is the main focus is the influence of internal and external variables on the success of risk projects.

3.2 Research Population

The unit analysis of this study is employees who are in the risk department of the PJB company. In this study using population. The criteria of respondents in this study are all members of the risk department, namely with a population of 100 people. Meanwhile, based on the results of the distribution of questionnaires through Google Forms, 32 respondents were obtained. This study was taken for 3 weeks by distributing questionnaires to the risk department population of PJB Company.

In the study, the SEM-PLS method was used because of the limited number of respondents. According to Chin, the minimum sample size used by PLS-SEM is around 30-100 sample sizes (Zuhdi et al., 2016). The respondents used were 32 respondents which were residents from the risk department at PJB Company. Furthermore, the data is processed using smart PLS for influence testing. The RII is also used to analyze the most influential factors or risks in the success of the project.

3.3 Data Type

3.2.1 Primary Data

Primary data is data obtained based on the results of direct research (Marzuki, 1995). In this study, the identification of variables affecting the success of project risk was carried out which became a critical success factor (CSF). The data is taken through the dissemination of questionnaires containing latent variables of questions to get user feedback on users who are active. Then the questionnaire was distributed online through Google Forms to respondents.

3.2.2 Secondary Data

Secondary data is data collected from previous research, namely literature study data, journals, theses, and information obtained from Internet media. Secondary data is useful as a basis for strengthening studies in research risk management projects so that researchers have references and facilitate the research process.

3.4 Data Collection

The data collection method is a way of procuring primary data and data secondary for research purposes. This data collection is carried out to obtain data or information related to the problem to be studied. The techniques used in data collection are:

1. Questionnaire

Is data collection by sharing questionnaires with candidates respondents are employees who are in department projects and risk of the PJB company. The questionnaire is distributed using Google Forms.

2. Likert Scale

The Likert scale questionnaire is used to measure the opinion, perception, or attitude of a group in a social phenomenon. Social phenomena are a predetermined research variable.

Table 3.1 Likert Scale

Level	**Information**
1	Very Low

2	Low
3	Moderate
4	High
5	Very High

3.5 Research Variables

Enshassi and Abu Mosa (2008) elaborated and categorized approximately 44 risk factors and classified them into the following groups: (1) physical, (2) environmental, (3) design, (4) logistics, (5) financial, (6) legal, (7) construction, (8) political and (9) management risks. Ghosh and Jintanapakanont (2004) categorized risks into the following major classes: (1) financial, (2) contractual and legal, (3) subcontractors, (4) operational, (5) safety, (6) design, (7) force majeure, (8) physical and (9) delay. However, Wiguna and Scott (2005) classified the construction risk factors into the following significant categories: (1) external and site conditions, (2) economic and financial risks, (3) technical and contractual risks, and (4) managerial risks. The variables used for this research are:

Table 3.2 Research Variables

No	Variable	Indicator	Definition	Question	Variable Label	Reference
	Exogen Variable					
	External Risk					
1	Country economic risk **(EC)**	Economic and Financial Crisis	Related to the impact of the economy while PJB constructs projects	What is the impact of the country's economic risks on project success?	EC1	(Thuyet et al. 2007; Choudhry & Iqbal 2013; Joukar

		Construction material cost fluctuation	Future investments of PJB companies and the instability of the local currency have a negative impact on the prices of construction. materials.	What is the impact of construction material cost fluctuation risks on project success?	EC2	2016; Hossen et al. 2015; Dakhel 2013)
2	Political Risk **(PO)**	Change regulations and law	Current troubled political instability is associated with severe conditions of uncertainty and challenging conditions.	What is the impact of a country change regulations and law risks on project success?	PO1	(Awodele 2012; Issa et al. 2015; Baloi 2012; Samarghandi et al. 2016; B. Sultan et al. 2017)
		Country conditions during construction	The stability conditions of the country during project construction	What is the impact of country conditions during	PO2	

				construction risks on project success?		
	Internal Risk					
3	Consultant Risk **(CN)**	Insufficient consultant experience	The capabilities of the consultant to handle the project	Insufficient consultant experience influences the project's success	CN1	(Mahamid 2011; Sadi A Assaf & Al-hejji 2006; Famiyeh et al. 2017; Petrovic 2017)
		Delay in Decision Making	Poor communication and management by the consultant and the lack of familiarity with the responsibilities	Delay in Decision Making influence the project's success	CN2	
4	Client Risk **(CL)**	Client Interventions	Changes in decisions from clients during the project	Client Interventions influence the project's success	CL1	(Mahamid et al. 2015; Issa et al. 2015; S. A. Assaf & Al-Hejii 2006; Al-

						Momani 2000; Aziz 2013)
		Delay payment of contractor’s dues	Delays in project payments	Delay payment of contractor’s dues influences the project's success	CL2	
5	Project Management **(PM)**	Wrong project cost and time schedule estimation	Ability in planning and controlling for scheduling and budgeting	Wrong project cost and time schedule estimation impact the project's success	PM1	(Dhimmar and Scholar (2016); Yana et al. (2015); Pidomson (2017); Raykar and Ghadge (2016); Badiru and Osisanya (2013); Barlish et al. (2013); Challal and Tkiouat (2012); Tafazzoli (2017); Salazar-
		Lack of effective communication and coordination	The ability to communicate and coordination	Lack of effective communication and Coordination impacts the project's success	PM2	
		Funding Qualification project	The feasibility of financing business line	Funding Qualification project impact the	PM3	

			business development projects	project success		Aramayo et al. (2013)
6	Resource and Material Supply **(RM)**	Material/service quality	Quality the materials/services used in the project affect	What is the impact of Material/service quality during construction risks on project success?	RM1	(Gebrehiwet & Luo 2017; Mahamid et al. 2015; Issa et al. 2015; Sidawi 2012; Doloi 2012)
		Procurement specification	Requirements and specifications for the procurement of goods/services	What is the impact of Procurement specification during construction risks on project success?	RM2	
	Endogen Variable					
7	Effect of Risk on Project Success **(EF)**	Cost Overruns	Ability to supervise finances in projects according to deadlines	Cost Overruns impact the project's success	EF1	Kassem, M. A., Khoiry, M. A., & Hamzah, N. (2020). Using

		Failure to Achieve the Objective	Ability to achieve project objectives according to targets and contracts	Failure to Achieve the Objective impact the project's success	EF2	relative importance index method for developing risk map in oil and gas construction projects. Jurnal Kejuruteraan, 32(3), 441-453.
		Poor quality	Poor quality in construction risks on project success is the likelihood that a construction project will not be successful due to the use of substandard materials, poor workmanship, or inadequate attention to detail	Poor quality impact the project's success	EF3	
		Time overruns	Ability to supervise times in	Time overruns impact the	EF4	

			projects according to deadlines	project's success		

3.6 Hypothesis Testing

Hypothesis testing is carried out with bootstrapping techniques, namely testing without the need for normally distributed data. The test was performed with a two-tailed T-test. According to Hair et al (2011), a variable is said to have a relationship if the T-statistical values are above 1.65 (significance 10%), 1.96 (significance 5%), and 2.57 (significance 1%). In PLS-SEM software, there is a P-value that has the same probability of obtaining a T value, namely a variable is said to have a relationship if the P-value value is below 0.1 (10% significance), 0.05 (5% significance), and 0.01 (1% significance).

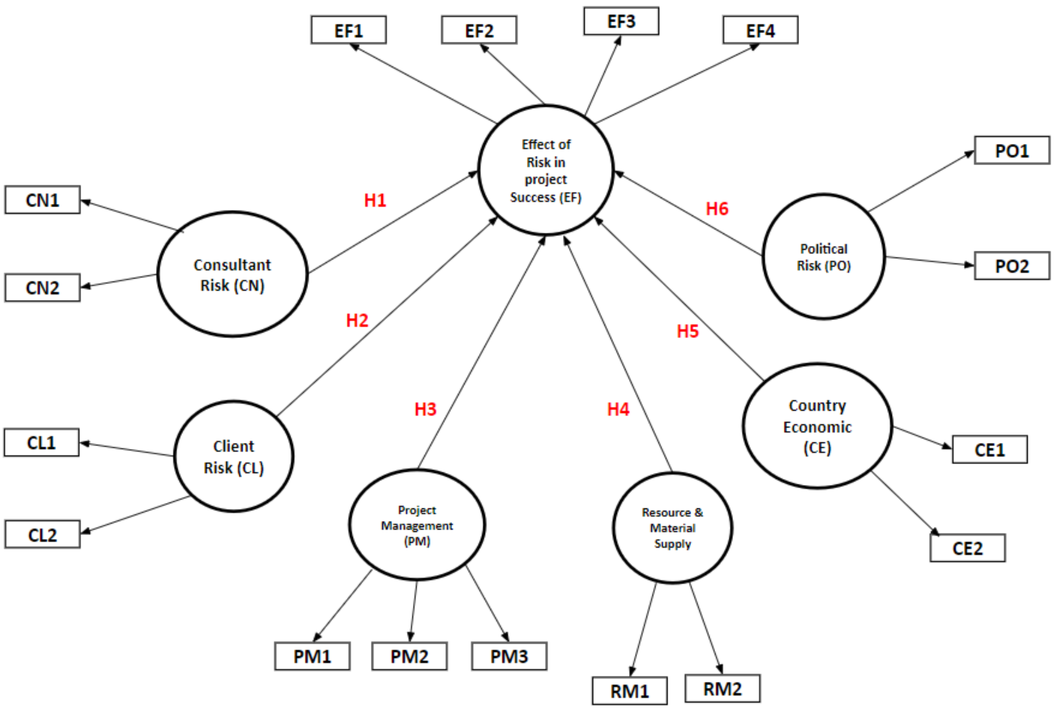


Figure 3.1 Research Model

3.2.3 The relationship between consultant risk with project success

The risk lies in this group due to delayed follow-up and quality control (Famiyeh et al., 2017). The consultant may not have qualified staff in this field. The adoption of foreign companies to carry out this task affects the project logistically in terms of the difficulty of moving to the site in a short time and likely leads to delays in the solution of structural problems. Moreover, the poor management of contracts by the consultant and the lack of familiarity with the nature of the responsibilities of the parties have a significant impact on the identification of deficiencies in project completion Based on this research, a hypothesis was obtained as follows:

H2: Variable consultant risk positively affects the effect risk in project success.

3.2.4 The relationship between client risk with project success

The most important stakeholder is the owner or client of the project, who not only sets out project requirements, conditions, and quality of work but also supervises contracts and designs; client satisfaction is the target of the project (Fallahnejad, 2013). However, the owner or his action toward the project causes many risks to the project. Based on this research, a hypothesis was obtained as follows:

H1: Variable client risk positively affects the effect risk in project success.

3.2.5 The relationship between project management with project success

Rahman and Kumaraswamy (2005) suggested that establishing a team that includes owners, consultants, contractors, subcontractors, and suppliers might improve the management of the schedules of contractors. Ruqaishi and Bashir (2013) offered that clearly defined and documented roles, responsibilities, and communication channels among project stakeholders and sound planning and monitoring are the requirements for effective management Based on this research, a hypothesis was obtained as follows:

H5: Variable project management positively affects the effect of risk on project success.

3.2.6 The relationship between resource material supply with project success

Ruqaishi and Bashir (2013) identified the delay in the supply of materials as another important cause of project delay. This factor can influence the construction project but is compounded in oil and gas projects by transportation problems due to the remote location of construction sites in the desert with little or no transport infrastructure in Yemen and by complications in the project buyout management because the majority of materials required for these types of projects are usually imported from overseas. Based on this research, a hypothesis was obtained as follows:

H6: Variable resource material supply positively affects the effect risk in project success.

3.2.7 The relationship between a Country's economic risk with project success

For instance, economic crises and low oil prices could lead to the disruption of certain projects and the cancellation of plans. Future investments of oil companies and the instability of the local currency have a negative impact on the prices of construction materials. When a country is economically stable, the risks faced by the projects will be less, as mentioned in previous studies; in the following table, the most significant risks are listed. Adeleke et al. (2016) stated that political, economic, and technological factors help the company construction. Based on this research, a hypothesis was obtained as follows:

H3: Variable of country's economic positively affects the effect of risk on project success.

3.2.8 The relationship between political risk with project success

Khodeir and Mohamed (2015) established that political unrest is always associated with economic unrest and a decrease in investments; such a decrease severely affects the currency prices that, in turn, have significant effects on imported materials or the fees of foreign consultants. Basel Sultan and Alaghbari (2018) stated that the Yemeni construction industry during the current troubled political instability is associated with severe conditions of uncertainty and challenging conditions. Based on this research, a hypothesis was obtained as follows:

> **H4: Variable political risk positively affects effect risk in project success.**

Structural equation modeling (SEM) is a statistical method for the simultaneous testing of dependent relationships between latent variables and their manifest variables (measurable variables), between latent variables and measurement errors directly (Yamin & Kuniawan, 2011). The SEM technique combines factor analysis and multiple regression analysis (Hair, 2019). SEM model was used because in this research, analyzed all variables namely indicator variables and construct variables in one model and it will be seen which variables with related indicators have the most direct and indirect influence on the project. For example, there are 6 construct variables namely CN, CL, PM, RM, CE, and PO where each construct has its own indicator. The SEM model will be measured from each indicator and construct, such as CN has indicators CN1 and CN2. In the results of SEM processing, what has an influence on the CN construct is only CN1, namely the capabilities of consultants to handle a project. The CN1 indicator is seen to affect the success of the project (EF).

Based on the SEM theory in Figure 3.1, there is 1 dependent variable (endogenous) that depends on 5 independent variables (exogenous), namely CN, CL, PM, RM, and CE. In SEM, a variable is either exogenous or endogenous. An exogenous variable has path arrows pointing outwards and none leading to it. Meanwhile, an endogenous variable(s) has at least one path leading to it and represents the effects of other variable(s).

The results obtained are also how much the value of the influence directly and indirectly from that influence. Where it can also be seen with the SEM model that CN1 affects CN directly by 1,000 which is more than 0.5, similarly CN could be considered to affect EF directly by 0.024. Meanwhile, if using path analysis only analyzes the construct variables as well as factor analysis only knows which factors have an effect. Therefore, it is linear with the aim of research to find out which variables influence the success of the project, so path and factor analysis is used, both of which are contained in the SEM.

This explanation has a meaning, namely the importance of using the SEM model in research, namely, to find out the details of each indicator and construct that can affect the success of the project as a consideration for the evaluation of the PJB company, because each indicator may not necessarily affect the construct variables. SEM is a multivariate analysis method that can be used to describe the simultaneous linear relationship between observation variables (indicators) and variables that cannot be measured directly (construct variables) (Wold, 2013). This study uses SEM-PLS, an approach from SEM that has no assumptions related to data distribution. Thus, PLS-SEM becomes a good alternative to SEM-based covariance when there are situations including a small sample size, use has few theories that can be used (Kwong &; Wong, 2012).

Several studies have employed structural equation modeling (SEM) to examine project success. For instance, Ng et al. (2010) used a SEM model to study the effect of feasibility study on the success of projects. Tabish and Jha (2012) studied the influence of human and managerial factors on the success of project projects. And some similar studies are outlined in Table 2.1 for previous research.

3.7 Research Tools

The tools that researchers use in data collection are as follows.

1. SmartPLS 4.0

The software is used to perform data analysis with PLS-SEM and data processing by bootstrapping method (random doubling without data normality test).

2. SPSS

This tool is used for the calculations of variances, distributions, and other statistical analyzes.

3. Microsoft Word

This software is used by researchers in the preparation of research reports in writing

4. Google Form

This tool is used for the collection of Likert scale questionnaires.

3.8 Field Data Collection

The process of taking field data is carried out by taking data directly through the distribution of questionnaires to respondents using the help of Google Form then processed using a Likert scale.

3.9 Results and Discussion

The results and discussion are the last stages to monitor and find out how the influence between variables of internal risk and external risk on the success of the project.

3.10 Conclusion

This conclusion will contain answers from the formulation of the problem or research objectives that have been previously determined. In addition to the conclusions, suggestions will be given regarding the results of research that has been carried out as a form of improvement to knowing the risk management contained in PJB, especially at the project level.

3.11 Research Flowchart

The flowchart in Figure 3.1 explains the flow of research and aims to provide an overview of the implementation of research from beginning to end.

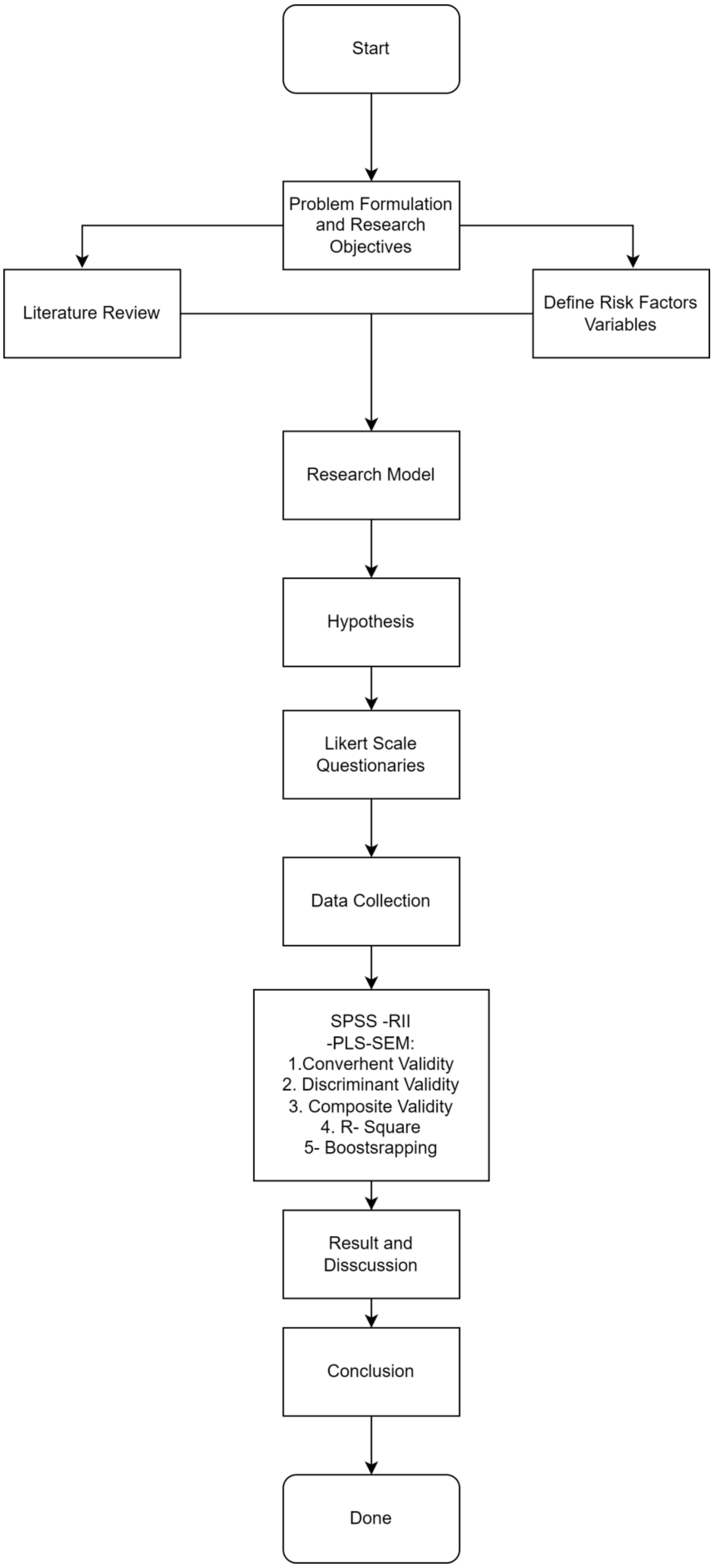


Figure 3.2 Research flowchart

CHAPTER IV
DATA COLLECTION AND PROCESSING

4.1 Data Collection

4.1.1 Company Profile

PT PLN Nusantara Power, known as PLN NP, is a sub-holding of PT PLN (Persero) which is engaged in the field of electricity generation and other supporting businesses. Established on October 3, 1995, PT PLN NP has never stopped offering a variety of power generation solutions to meet the needs of reliable and quality electricity. PLN NP continuously strives to take a greater role and contribution in supporting national energy security in terms of electricity supply by managing assets amounting to IDR 174.78 trillion and contributing 28% of the total national generating capacity. With our vision to become The Trusted Leader Company in Sustainable Energy in South-East Asia, we continually deliver innovations and improvements while at the same time maintaining Good Corporate Governance/GCG. With the support of our shareholders and stakeholders, PT PLN NP grows and thrives in diverse business areas, without forsaking its company's social responsibility to create an independent society and maintain the sustainability of the environment.

4.1.2 Respondent Data

The respondents addressed in this study were the population of employees in the Risk and Project Management departments at PJB. Data collection was carried out for 3 weeks, from 19th January 2023 to 9th February 2023. Data were taken through the distribution of questionnaires containing latent variables of questions to get feedback on PJB risk management Then distributed questionnaires online through Google Forms to the respondent population and obtained as many as **32** respondents collected in this study.

4.1.3 Characteristics of Respondents

The demographic data used in the questionnaire were classified by gender, age, experience in the electricity and energy industries, and job title. In the study, the SEM-PLS method was used because of the limited number of respondents.

According to Chin, the minimum sample size used by PLS-SEM is around 30-100 sample sizes (Zuhdi et al., 2016). The respondents used were 32 respondents which were residents from the risk department at PJB Company. Furthermore, the data is processed using smart PLS for influence testing. The RII is also used to analyze the most influential factors or risks in the success of the project. The characteristics of the respondents can be seen in Table 4.1.

Table 4. 1 Characteristics of Respondents

No	Characteristic	Total Respondent	Percentage
1	**Gender**		
	Woman	6	18%
	Man	26	82%
2	**Age**		
	Under 25 years old	0	0%
	26 – 35 years old	20	63%
	36 – 46 years old	10	31%
	Above 47 years old	2	6%
3	**Experience in the Electrical and Energy Industry**		
	Under 5 years	2	6%
	5 – 10 years	18	57%
	11 – 20 years	9	28%

No	Characteristic	Total Respondent	Percentage
	21 - 30 years	3	9%
	Above 30 years	0	0%
4	**Position**		
	Manager	4	13%
	Project Manager	2	6%
	Project Coordinator	2	6%
	Engineer	14	46%
	Site Supervisor	1	3%
	Staff	7	23%

Source: Questionnaire processing data, 2023.

Based on Table 4.1, it is identified that there are 4 characteristics of respondents distributed through a Google Form questionnaire. The following is an explanation of each characteristic of the respondent.

1. Position

Respondents from the questionnaire consisted of employees in the risk and project departments. Based on the database from the company's client, manifest variables for positions include managers, project managers, project coordinators, engineers, site supervisors, and workers. It is found that as much as 46% is dominated by the engineer position, then as much as 13% is manager, as much as 6% is project coordinator, as much as 6% is project manager, 1 % as site supervisor, and 23% as staff.

2. Age

Based on the results of interviews and databases from corporate clients, manifest variables for age levels were obtained, including under 25 years, 26 – 35 years, 36 –

46 years, and over 47 years. It was found that as many as 63% of respondents were 26 – 35 years, 31% of respondents were 36 – 46 years old, and 6% of respondents were above 47 years old.

3. Experience in the Electrical and Energy Industry

Based on the results of interviews and databases from company clients, experience from respondents in the risk department and projects was obtained. It is found that as many as 57% are experienced as 5 – 10 years, 28% are experienced as 11 – 20 years, 9% % are experienced as 21 - 30 years, and 6% are experienced as under 5 years.

4. Gender

Based on interviews and databases from corporate clients, manifest variables for gender are obtained, including women and men, which is dominated by 82% men and 18% women.

4.2 SPSS Analysis

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
EC1	32	3	5	4.34	.602	.362
EC2	32	3	5	4.38	.609	.371
PO1	32	3	5	4.34	.602	.362
PO2	32	3	5	4.25	.622	.387
CN1	32	3	5	4.09	.734	.539
CN2	32	3	5	4.22	.706	.499
CL1	32	3	5	4.19	.780	.609
CL2	32	2	5	4.16	.808	.652
PM1	32	3	5	4.38	.660	.435
PM2	32	3	5	4.34	.701	.491
PM3	32	3	5	4.22	.659	.434
RM1	32	3	5	4.75	.508	.258
RM2	32	2	5	4.47	.803	.644
EF1	32	2	5	4.06	.878	.770
EF2	32	3	5	4.19	.535	.286
EF3	32	2	5	4.34	.827	.684
EF4	32	2	5	4.00	.880	.774
Valid N (listwise)	32					

Figure 4.4 SPSS Variance

Based on the results of SPPS calculations, it is also proven that there are variances in this study, namely EC1 (0.362), EC2 (0.371), PO1 (0.362), PO2 (0.387), CN1 (0.539), CN2 (0.499), CL1 (0.609), CL2 (0.652), PM1 (0.435), PM2 (0.491), PM3 (0.434), RM1 (0.258), RM2 (0.644), EF1 (0.770), EF2 (0.286), EF3 (0.684), and EF4 (0.774). Some of them are from 3-5, some of them from 2-5, and the distribution are not uniform. In the study, a graph shown in Figure 4.5 also depicted the marginal means of the value of 17 variables in the study with the lowest point of 4.0 (EF4) and the highest point of 4.7 (RM1).

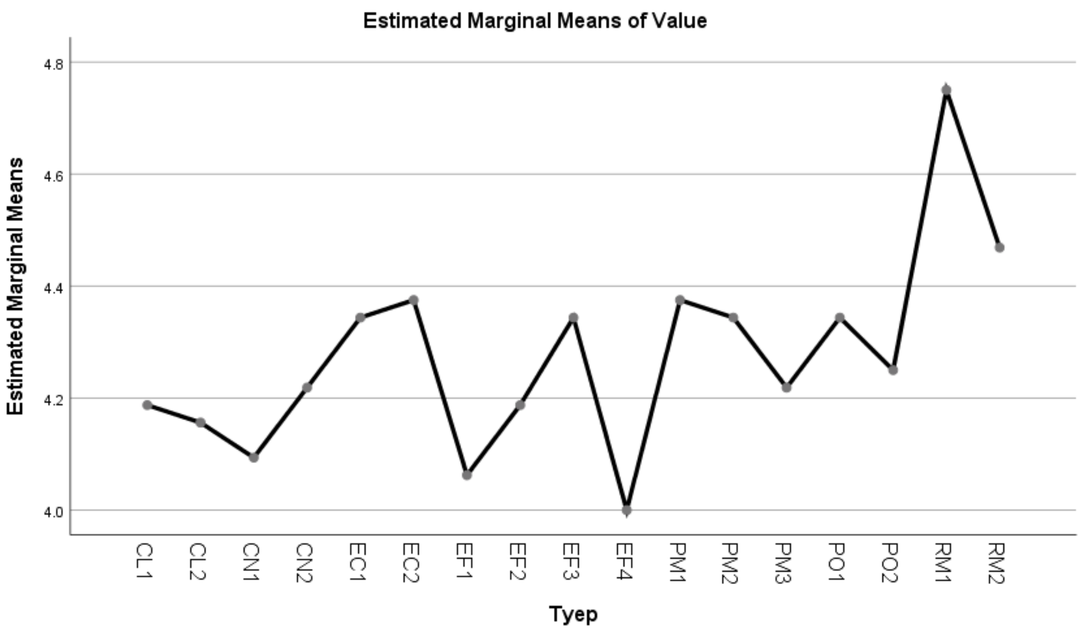


Figure 4.5 Means of Value

The results were illustrated using a simple box plot in the position and experience categories of 32 respondents as follows.

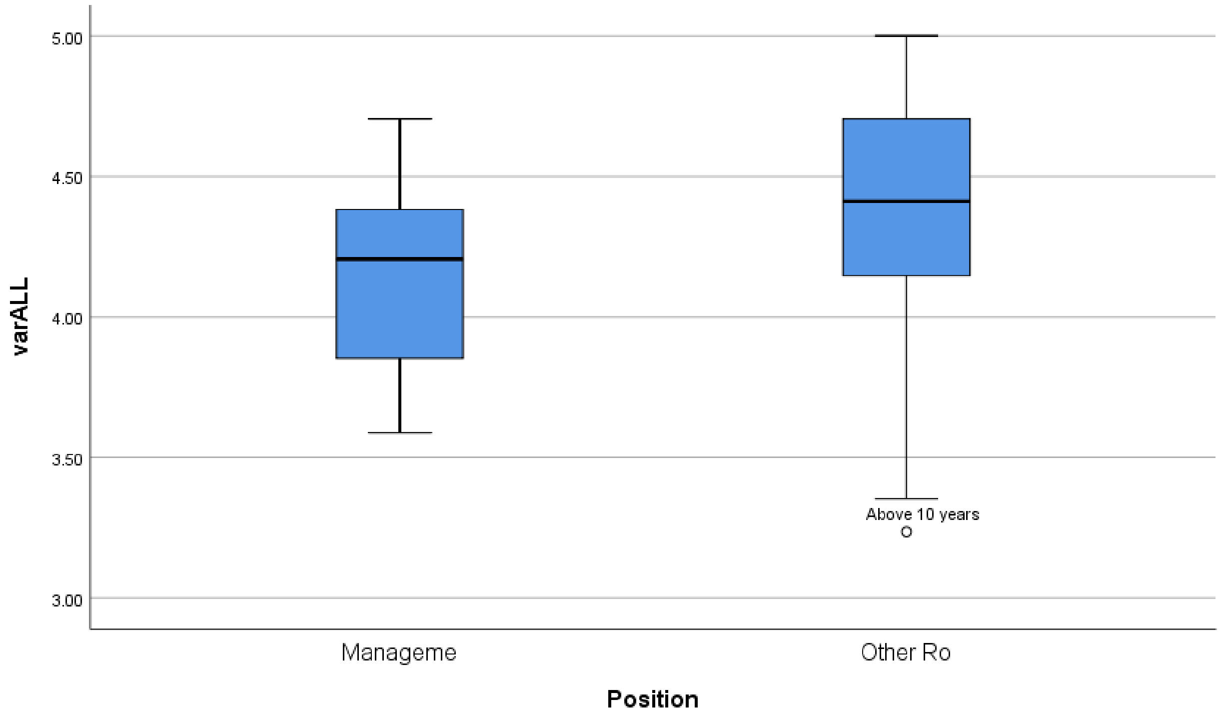


Figure 4.6 Simple Box plot

The box plot is a graphically presented sample distribution summary that can describe the form of data distribution (skewness), the size of the central tendency, and the size of the distribution (diversity) of observational data (Tri, 2020). In simple box plot figure 4.6, it was found that there were variances in 7 research variables when viewed from the point of view of the length of time he worked at PJB. A box plot is a graphical representation of the distribution of data that shows the median, quartile, and outliers. If the data has a high variance, the box plot will have a wide range of values between the first and third quartiles. A simple box plot is for variance in between data (Tri, 2020).

Box plots can help us understand the characteristics of data distribution. In addition to seeing the degree of data distribution (which can be seen from the height/length of the box plot) can also be used to assess the symmetry of data distribution. The length of the box describes the degree of spread or diversity of observational data, while the median location and length of the whisker describe the degree of symmetry (Galloway, 2015).

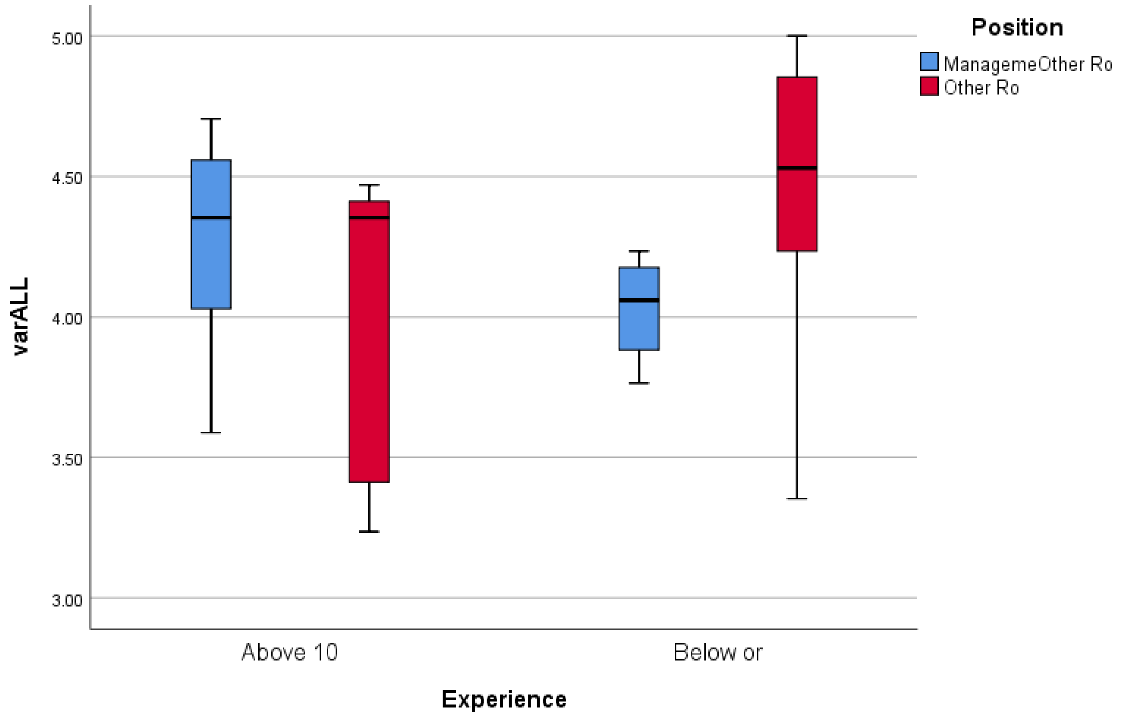
From the results of the simple box plot, it was obtained that for the management category, the Q1 value was 3.75, the median value was 4.25 with the Q3 value was 4.45.

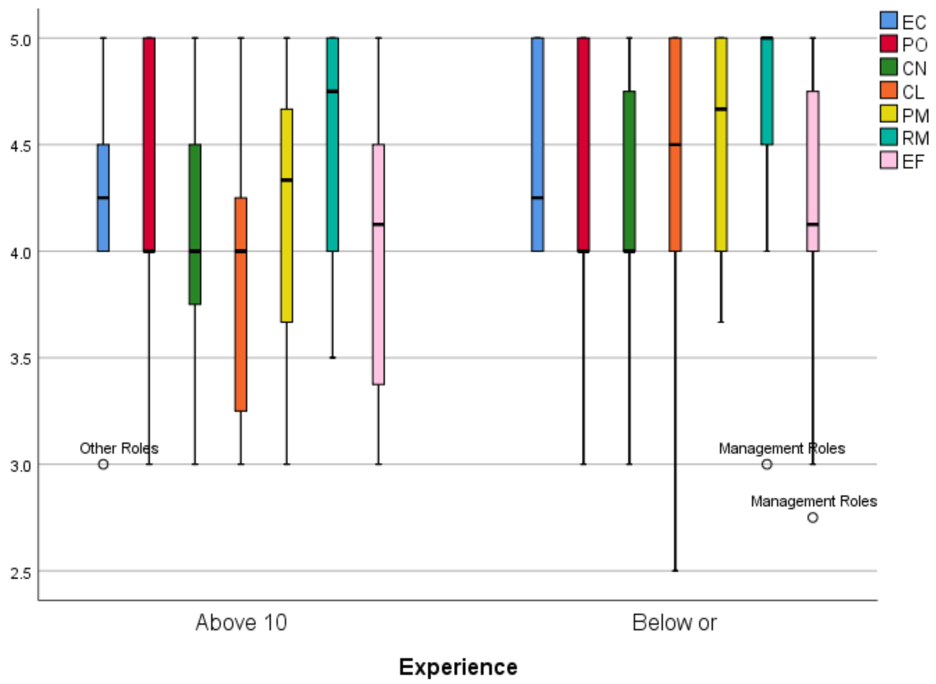
As for the other roles category, the Q1 value is 4.25, the median value is 4.45 with the Q3 value is 4.75. So, it can be seen that there is a distribution of data with a minimum value of 3.25 and a maximum of 5.00.

The cluster box plot is for variance between groups of data to compare the variance between respondents (Tri, 2020). As shown in Figure 4.7, in the box plot, the minimum value is 2.5, the bottom quartile is Q1, the middle quartile is Q2 or median (Me), the upper quartile is Q3, and the maximum value is 5.0. For the above 10 categories, the EC variable obtained a Q1 value of 4.0, the middle quartile (Q2) of 4.25 or median (Me), and the upper quartile (Q3) of 4.5. In the PO variable, the value of Q1 is 3.0, the middle quartile (Q2) is 4.0r the median (Me), and the upper quartile (Q3) is 5.0. In the CN variable, the value of Q1 is 3.75, the middle quartile (Q2) is 4.0, or the median (Me), the upper quartile (Q3) is 4.5. In the CL variable, the value of Q1 is 3.5, the middle quartile (Q2) is 4.0, the median (Me), and the upper quartile (Q3) is 4.75. In the PM variable, the value of Q1 is 3.5, the middle quartile (Q2) is 4.25, or the median (Me), and the upper quartile (Q3) is 4.75. In the RM variable, a Q1 value of 4.0, a middle quartile (Q2) of 4.75, or a median (Me), an upper quartile (Q3) of 5.0. In the EF variable, the value of Q1 is 3.25, the middle quartile (Q2) is 3.875, or the median (Me), the upper quartile (Q3) is 4.5.

For the below 10 categories, the EC variable obtained a Q1 value of 4.0, the middle quartile (Q2) of 4.25 or the median (Me), and the upper quartile (Q3) of 4.5. In the PO variable, the value of Q1 is 3.0, the middle quartile (Q2) is 4.0, the median (Me), and the upper quartile (Q3) is 5.0. In the CN variable, the value of Q1 is 4.0, the middle quartile (Q2) is 4.375, or the median (Me), and the upper quartile (Q3) is 4.75. In the CL variable, the value of Q1 is 4.0, the middle quartile (Q2) is 4.5, or the median (Me), and the upper quartile (Q3) is 5.0. In the PM variable, a Q1 value of 4.0, a middle quartile (Q2) of 4.5, or a median (Me), an upper quartile (Q3) of 5.0.

In the RM variable, the value of Q1 is 4.5, the middle quartile (Q2) is 4.75, or the median (Me), and the upper quartile (Q3) is 5.0. In the EF variable, a Q1 value of 4.0, a middle quartile (Q2) of 4.375, or a median (Me), an upper quartile (Q3) of 4.75.


Position
ManagemeOther Ro
Other Ro
varALL
5.00
4.50
4.00
3.50
3.00
Above 10
Below or
Experience


EC
PO
CN
CL
PM
RM
EF
5.0
4.5
4.0
3.5
3.0
2.5
Other Roles
Management Roles
Management Roles
Above 10
Below or
Experience

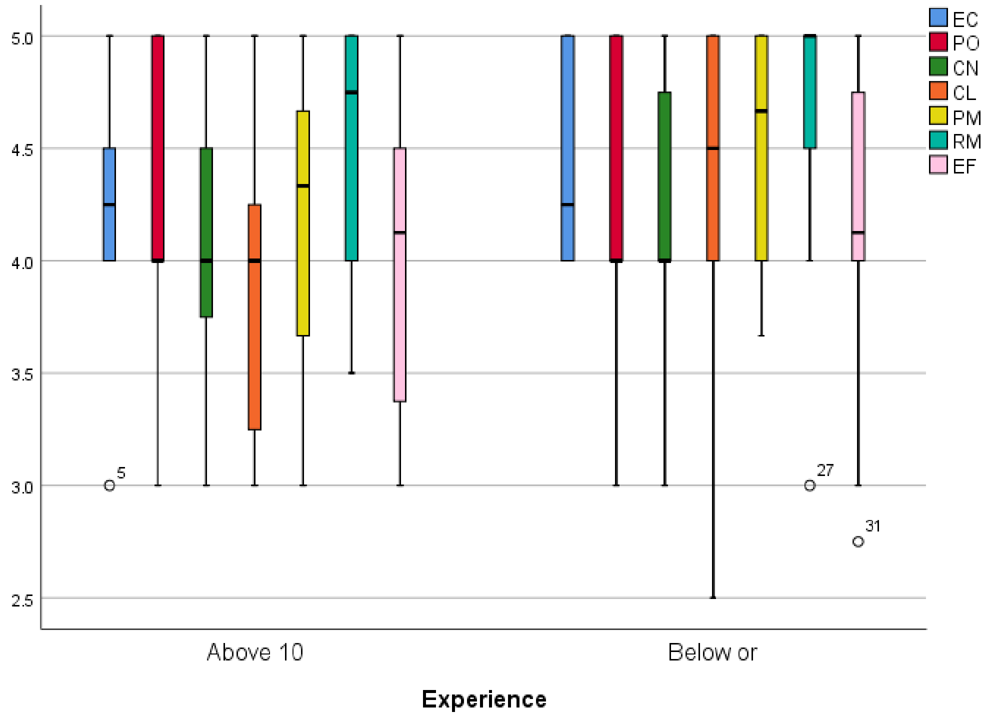


Figure 4.7 Cluster boxplot

The length of the box describes the level of data dissemination, provided that the longer the data means the more spread the data. So, it can be seen that from the results of the cluster box plot, it is found that there are variances in data that spread differently.

As for Figure 4.7, it can be seen that the grouping based on age is as follows. A box plot is a graphical representation of the distribution of data that shows the median, quartile, and outliers. If the data has a high variance, the boxplot will have a wide range of values between the first and third quartiles. And the smallest distribution of data is in the EC variable, while the largest distribution of data is in the EF variable.

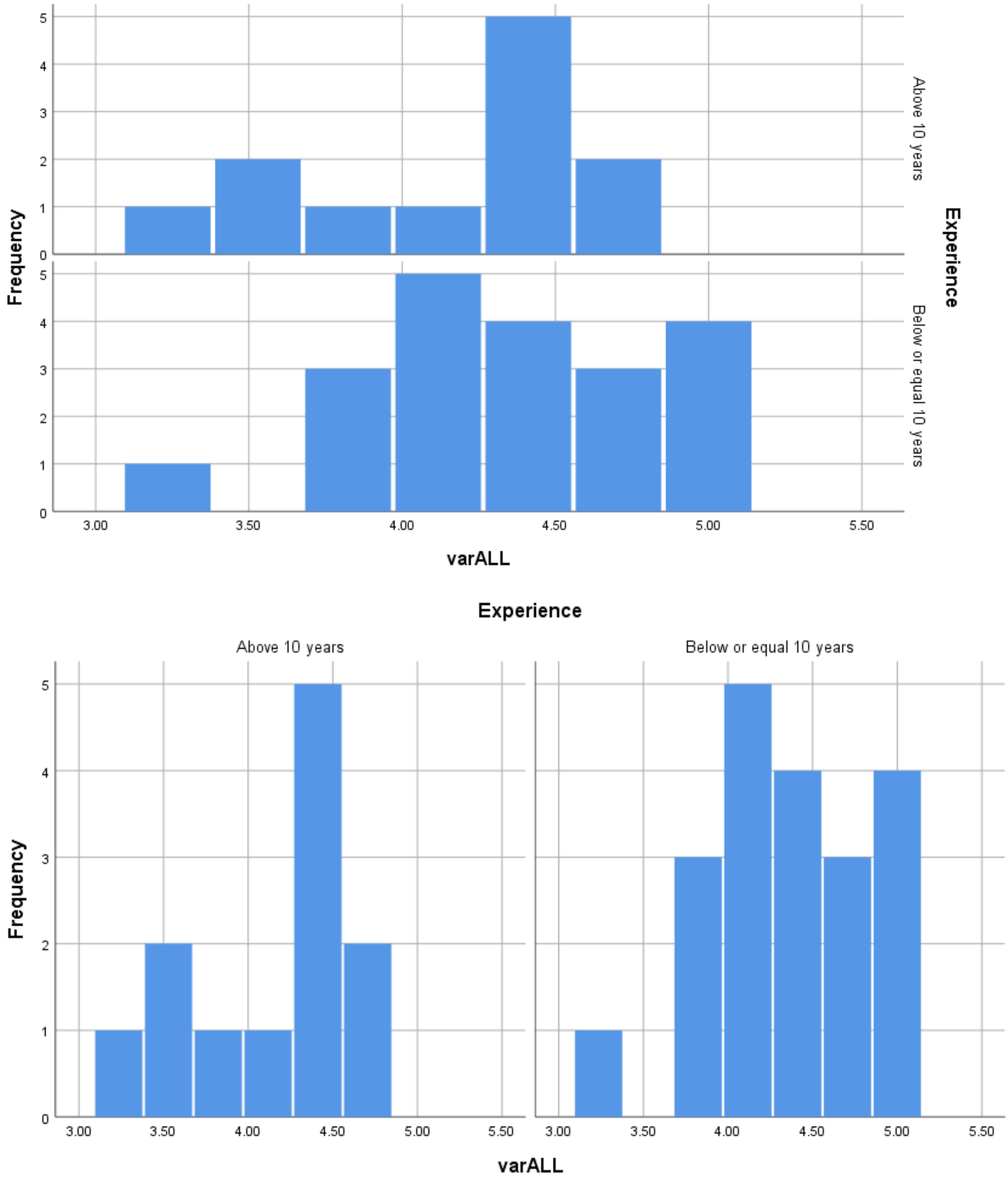


Figure 4.8 Histogram of experience

This study is described in the form of a histogram to describe the variance of respondents' answers. Figures 4.8 illustrate the variance of data for measuring respondents' experience while working in the PJB risk department which is classified in the categories above 10 years and under 10 years. A histogram is a graphical representation of the distribution of data. If the data has a high variance, the histogram will be spread out over a wide range of values (Tri, 2020).

Oneway

Test of Homogeneity of Variances

VAR00001

Levene Statistic	df1	df2	Sig.
4.172	3	124	.007

ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.031	3	1.677	.904	.441
Within Groups	229.937	124	1.854		
Total	234.969	127			

Figure 4.9 SPSS ANOVA

Hypothesis testing in ANOVA by the F-test is based on the assumption that the data are drawn from a population with a normal distribution. ANOVA uses the statistic F, which is the ratio between and within group variances. The main interest of analysis is focused on the differences in group means; however, ANOVA focuses on the difference in variances (Tae Kyun, 2017).

The ANOVA test serves to compare population averages to find out significant differences between two or more data groups. The data is said to be normal and homogeneous if the significance value > 0.05 (Yuwono, 2020). In this study, ANOVA testing was carried out to determine the variance between data groups, where it was seen that there were 5 independent variables and 1 dependent variable. ANOVA testing was carried out and produced a significance for the test of homogeneity of variances value is 0.007, which is sig < 0.05, so it can be said that the data is not homogeneous, and the population has a variance.

4.3 Chi-Square Test

The chi-square test is used to find if there is any correlation among non-numeric variables that are frequently used in statistical studies (Kothari, 2007). The chi-square test is used in discrete data in the form of frequency. It is an independence test and is used to estimate the probability of some non-random factors to take account of the observed correlation. When the literature is examined, similar studies related to the distribution of p-value in small sample sizes were found in the majority of the studies (Mehotra et al., 2003). The chi-square test shall be taken into consideration in this study. The reason is this test is commonly used by researchers compared to other non-parametric tests data is not following a uniform distribution.

In this study, the data were analyzed by using the basic statistical methods which include Inferential data analysis: Chi-square. There are criteria of the probability level of determining the significance of the test: P -value as High significant (P< 0.001), Significant (P< 0.05), Non-significant (P> 0.05), and very highly significant (P< 0.000). The chi-square of the goodness of fit test is also called the single sample goodness of fit test or Pearson's Chi-square of the goodness of fit test.

Frequencies

	EC				PO				CN			
	Category	Observed N	Expected N	Residual	Category	Observed N	Expected N	Residual	Category	Observed N	Expected N	Residual
1		0	6.4	-6.4		0	6.4	-6.4		0	6.4	-6.4
2		0	6.4	-6.4		0	6.4	-6.4		0	6.4	-6.4
3	3.00	1	6.4	-5.4	3.00	3	6.4	-3.4	3.00	6	6.4	-.4
4	4.00	22	6.4	15.6	4.00	18	6.4	11.6	4.00	19	6.4	12.6
5	5.00	9	6.4	2.6	5.00	11	6.4	4.6	5.00	7	6.4	.6
Total		32				32				32		

	CL				PM				RM				EF			
	Category	Observed N	Expected N	Residual	Category	Observed N	Expected N	Residual	Category	Observed N	Expected N	Residual	Category	Observed N	Expected N	Residual
1		0	6.4	-6.4		0	6.4	-6.4		0	6.4	-6.4		0	6.4	-6.4
2	2.00	1	6.4	-5.4		0	6.4	-6.4		0	6.4	-6.4	2.00	1	6.4	-5.4
3	3.00	6	6.4	-.4	3.00	7	6.4	.6	3.00	2	6.4	-4.4	3.00	6	6.4	-.4
4	4.00	15	6.4	8.6	4.00	18	6.4	11.6	4.00	12	6.4	5.6	4.00	20	6.4	13.6
5	5.00	10	6.4	3.6	5.00	7	6.4	.6	5.00	18	6.4	11.6	5.00	5	6.4	-1.4
Total		32				32				32				32		

Figure 4.10 Frequencies

Test Statistics

	EC	PO	CN	CL	PM	RM	EF
Chi-Square	56.438[a]	38.938[a]	37.688[a]	24.563[a]	33.938[a]	41.750[a]	40.188[a]
df	4	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.000	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 6.4.

Figure 4.11 Test Statistics

In the chi-square statistic as shown above, the degrees of freedom are 4, the p-value is less than 0.05. The significance of the Chi-square value is determined by using the suitable degree of freedom and degree of significance and consulting a Chi-square table (Moore, 1994). Since the p-value is less than the significance level, we reject the null hypothesis. We conclude that the data are not uniformly distributed.

The significance of the Chi-square distribution of Pearson is that statisticians can use statistical methods that do not depend on normal distribution in order to interpret findings. The two special purposes of the Chi-square test are to test the hypothesis that there is no correlation among two or more groups, populations, or criteria, and to test to what extent the observed data distribution fits the expected distribution.

4.4 Kolmogorov-Smirnov

The Kolmogorov–Smirnov test is used to test the goodness of fit of a given set of data to a theoretical distribution, while the Smirnov test is used to determine if two samples appear to follow the same distribution (Berger, 2014). The Kolmogorov-Smirnov (KS) test is one of the most popular goodness-of-fit tests for comparing a sample with a hypothesized parametric distribution. The KS general package provides a fast and accurate method for when F(x) is arbitrary, discontinuous, or continuous that uses an alternative fast Fourier transform-based method (Dimitrova et al., 2020). The p-value can be calculated by counting the number of bootstrap KS statistics greater than or equal to the observed KS statistic, and then dividing by the number of bootstrap samples.

Kolmogorov-Smirnov Test

		EC	PO	CN	CL	PM	RM	EF
N		32	32	32	32	32	32	32
Uniform Parameters[a,b]	Minimum	3.00	3.00	3.00	2.50	3.00	3.00	2.75
	Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Most Extreme Differences	Absolute	.469	.406	.313	.381	.333	.563	.337
	Positive	.031	.094	.125	.031	.063	.031	.031
	Negative	-.469	-.406	-.313	-.381	-.333	-.563	-.337
Kolmogorov-Smirnov Z		2.652	2.298	1.768	2.157	1.886	3.182	1.905
Asymp. Sig. (2-tailed)		.000	.000	.004	.000	.002	.000	.001

a. Test distribution is Uniform.

b. Calculated from data.

Figure 4.12 Kolmogorov-Smirnov Test

Based on Figure 4.12, the p-value is less than 0.05. Since the p-value is less than the significance level, we reject the null hypothesis. We conclude that the data are not uniformly distributed. The Kolmogorov–Smirnov test has an exact null distribution for the two directional alternatives but the distribution must be approximated for the nondirectional case.

Regardless of the alternative, the test is less accurate if the parameters of the theoretical distribution have been estimated from the sample. One could manage the conservatism of the Smirnov test by reporting not just its P value but also the entire P value interval, whose upper endpoint is the usual P value but whose lower endpoint is what the P value would have been without any conservatism (Srimani, 2021).

4.5 Structural Model Tes

4.5.1 Model Specifications

This study used a model with seven latent variables measuring project success. Each latent variable that the researcher uses has a development in the sixth testing section of the hypothesis and its manifest variables that the researcher adjusts to the direction and object of study and is taken based on previous research references.

The hypothesis formulated is the relationship of many variables of a causal nature with the following procedure (Bryne, 2013):

1. The causal relationship that occurs is a structural relationship with the regression equation
2. Causal relationships are arranged with image models (paths) to facilitate the conceptualization of the theory being studied

4.5.1.1 Path Diagram Arrangement

The researcher carries out the preparation of a path diagram for the development of hypotheses that have been expressed in the development of a conceptual model of previous drafting.

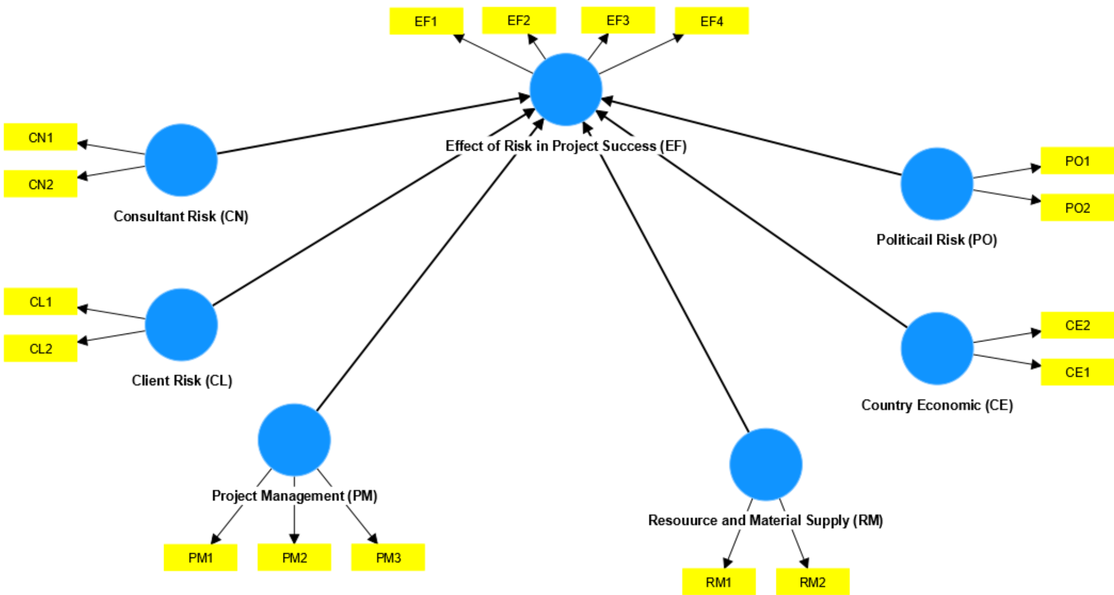


Figure 4.1 Path Diagram

Based on the path diagram model above, there are two types of constructs in the study, namely endogenous and exogenous. An endogenous construct is a variable that can be influenced by other variables directly and indirectly. While the exogenous construct is a variable that is not influenced by other variables (Latan and Ghazali, 2016). Endogenous constructs are indicated by the variables consultant risk, client risk, project management, resource, and material supply, country economy, and political risk. Meanwhile, exogenous constructs are indicated by the effect of risk on project success.

Outer model measurement is also called a measurement model which defines manifest variables related to their latent variables (Ghozali, 2014). Inner model measurement is also called a structural model that defines the relationship between latent variables (Ghozali, 2014). In this study, the outer model was shown by the relationship between consultant risk and its manifest variable, client risk with its manifest variable, project management with its manifest variable, resource, and material supply with its manifest variable, country economy with its manifest variable, the political risk with its manifest variable, and effect of risk in project success. With its manifest variables. While the inner model is indicated by the relationship between latent variable variables in the research framework described in the hypothesis.

4.6 Model Analysis of Structural Equations

4.6.1 Outer Model (Measurement Model)

The outer model analysis is processed using SmartPLS 4.0 software with calculations of validity and reliability. Outer model measurement is also called a measurement model which defines manifest variables related to their latent variables (Ghozali, 2014). In the outer model measurement, there are 3 types of measurements, namely convergent validity, composite reliability, and average variance extracted (AVE).

4.6.1.1 Validity Test

Validity tests are carried out to test the validity of questionnaires that have been distributed. The questionnaire can be said to be valid if the question variables present show measurable results (Sugiyono, 2003). In this study, the amount of data collected was as many as 32 respondents.

Model validation refers to the process of evaluating the performance of a model that has been developed to make predictions or estimate the values of certain parameters (Han, K., Song, K., et al, 2016). The purpose of model validation is to ensure that the model is accurate and reliable and that it can be used to make valid predictions or estimates. Model validation typically involves comparing the predictions or estimates generated by the model with actual data or observations that were not used to develop the model.

Composed of convergence validity and discriminant validity, the validity examination of the PLS model is mainly based on the AVE test. It has been suggested that 0.5 be the critical criterion for AVE (Fornell & Larcker, 1981).

1) Convergent Validity

Convergent validity is measured through the results of outer loadings values. The higher the outer loadings value indicates the manifest variables used in variables/constructs have a lot in common. The outer loadings value must be 0.78 or higher (Hair et al., 2011). If one of the manifest variables is obtained with an outer loading value of < 0.7, the manifest variable is eliminated. This is because the manifest variables are not good enough to be measured by latent variables precisely. The following is the result of the path diagram of the structural model on SmartPLS 4.0.

An outer loading value of 0.5 is still tolerable for inclusion in models that are still under development and below the value of 0.50 can be omitted from the analysis (Sarwono, 2016). An indicator has good validity if the outer loading value is above 0.70. When the obtained outer loading value is in the interval of 0.4-0.7 should be considered for removal from the model (Hair et al, 2012). While validity can be measured using the AVE value provided that the AVE value must be greater than 0.5. That is, when the AVE value is greater than 0.5, the average construct explains more than half (50%) of the variance of each indicator. Conversely, if the AVE value is less than 0.5, then on average there are more errors than the variance described by the construct.

The convergent validity test is carried out by looking at the loading factor value of each indicator against its construct. For confirmatory research, the loading factor limit used is 0.7, while for exploratory research, the loading factor limit used is 0.6

and for development research, the loading factor limit used is 0.5. Because this study is confirmatory research, the loading factor limit used is 0.7 (Asbari., M, 2019).

Table 4. 2 Result Outer Loading

Variable manifest	**Outer Loading Old Model**	**Outer Loading New Model**
Country Economic (CE)		
CE.1	**0,567**	-
CE.2	0,783	1,000
Client Risk (CL)		
CL.1	0,927	0,927
CL.2	**0,927**	0,927
Consultant Risk (CN)		
CN.1	0,789	1,000
CN.2	0,591	-
Effect Of Risk on Project Success (EF)		
EF.1	0,789	0,789
EF.2	0,759	0,759
EF.3	0,821	0,821
EF.4	0,872	0,872
Project Manager (PM)		
PM.1	0,880	0,880
PM.2	0,874	0,874
PM.3	0,858	0,858
Political Risk (PO)		
PO.1	0,966	0,966
PO.2	0,975	0,975
Resource and Material Supply (RM)		
RM.1	**0,622**	-
RM.2	0,934	1,000

Source: SmartPLS 4.0, 2023

Based on the processed outer loading value of 17 manifest variables, three manifest variables were obtained that did not meet the value of the convergent validity amount. The three manifest variables include CE1, CN2, and RM1. This is because the outer loading value of the manifest variable is below 0.7. In convergent validity research, 2 tests were carried out to get an outer loading value above 0.7. As for table 4.2, it can be seen that in the outer loading old model column, 3 variables are obtained that have values below outer loading, while in the outer loading new model column it is found that the overall value is above 0.7.

Therefore, those manifest variables are omitted and retested. The results of the retest showed that all manifest variables in the model had a new outer loading value above 0.7 and it can be said that 14 manifest variables are good enough for precise measurement of latent variables. This occurs when each measurement item correlates strongly with its assumed construct. Indicator loading values should exceed 0.7 on their constructs so that more than 50% of the indicator's variance is caused by the construct (Hair et al, 2012).

As demonstrated in Table 4.2, the research statistics correspond with this criterion, which means that a linear equivalence exists between the observed variables and latent variables so that the observed variables can appropriately account for the latent variables. In this study, the model's discriminant validity test achieved by the cross-loadings analysis of the latent variables is mainly applied to determine the degree of discrepancy between latent variables.

2) Discriminant Validity

The discriminant validity is measured using the Fornell-lacker criterion value on each construct/variable. This value is used to compare the square root of the average variance extracted (AVE) value. The AVE value is the average value of the squared result of the outer loadings value associated with the variable/construct. The model is said to be good if the outer loading of the latent variable and its manifest variable has a greater value compared to other latent variables (cross-loading).

Discriminant validity was assessed using the criterion that required that the AVEs of the constructs should be greater than the square of the correlations among them (Fornell, 1981). Thereby indicating that more variance was shared between the component and its block of indicators than with any other component. Table 4.3 shows the result of the discriminant validity value, while diagonal figures indicate the square root of the average variance extracted between the constructs and their measures. As can be seen, each construct's AVE exceeded the squared correlations of this construct with any other construct.

Table 4. 3 Cross-loading Fornell-Lacker's

Variable	**CL**	**CN**	**CE**	**EF**	**PO**	**PM**	**RM**
CL	**1,000**						
CN	0,404	**1,000**					
CE	0,277	0,103	**0,864**				
EF	0,150	0,333	0,308	**0,902**			
PO	0,187	0,484	0,292	0,510	**0,883**		
PM	0,409	0,415	0,132	0,611	0,497	**1,000**	
RM	0,502	0,343	0,241	0,727	0,261	0,718	**0,883**

The results of cross-loading tests show that each value formed by a latent variable with a manifest variable should be greater than the value with other latent variables. In the test results, the correlation of latent variables of system quality with system quality is smaller than the correlation of system quality variables with other latent variables. As well as the correlation of latent variables of use with use is smaller than the correlation of variables of use with other latent variables.

So, the researcher eliminates the manifest variables contained in the variables of system quality, net benefits, and usage that have the smallest outer loadings value until the validity test model becomes good.

Based on the results of testing the discriminant validity value, it was found that each value of cross-loading formed on each latent variable with its manifest variable is greater when compared to other latent variables. So, it can be said that the model has met the criteria. Based on the results of the validity test, it is found that the model is said to be valid and can be carried out to the next stage of analysis.

4.6.1.2 Reliability and Average Variance Extracted (AVE)

The reliability test is carried out by measuring the value of composite reliability. The latent variable is said to be reliable if the composite reliability and Cronbach's alpha are ≥ 0.7 and the AVE value is ≥ 0.5 then the value of the latent variable-forming manifest variable is said to be consistent. A reliable questionnaire if the respondent's answer to the question is consistent over time (Sugiyono, 2013).

Table 4. 4 Result Composite Reliability, Cronbach’s Alpha, and AVE

	Cronbach’s Alpha	Composite Reliability	AVE
Client Risk (CL)	0,837	0,837	0,860
Consultant Risk (CN)	1,000	1,000	1,000
Country Economic (CE)	0,761	0,855	0,746
Effect of Risk on Project Success (EF)	0,826	0,834	0,685
Political Risk (PO)	0,938	0,953	0,941
Project Management (PM)	0,840	0,841	0,758
Resource and Material Supply (RM)	0,743	0,876	0,780

Source: Data processed, 2022

Based on Table 4.5, the variables consultant risk, client risk, project management, resource and material supply, country economy, political risk, and the effect of risk on project success are obtained.

with a composite reliability value and Cronbach's alpha is ≥ 0.7 and an AVE value ≥ 0.5. So, it can be said that the indicators and latent variables in the study are valid and reliable and can be used for inner model testing.

4.6.2 Inner Model (Structural Model)

Inner model measurement is also called a structural model that defines the relationship between latent variables (Ghozali, 2014). In the inner model measurement, R-Square testing is carried out to determine the variance in a construct. R-Square values of 0.25, 0.50, and 0.7 indicate weak, moderate, and substantial levels (Hair et al., 2011).

Because four manifest variables have outer loading values below 0.7, namely CE2, CN2, and RM1. Researchers retested by removing constructs that had an outer loading value below 0.7. Hair et al. (2014) stated that the value of composite reliability should be> 0.70 even though the value of 0.60 is still acceptable, so one of these indicators must be omitted.

Reliability tests are carried out by looking at the composite reliability value of the indicator block that measures the construct. Absolute raw loading of the outer part with a value of > 0.7. So, if < 0.7 then it is not reliable. Reliability tests are carried out to prove the accuracy, consistency, and accuracy of instruments in measuring constructs. To be able to meet good reliability, the composite reliability value and Cronbach's alpha value must be greater than 0.70 (Chin, 1998).

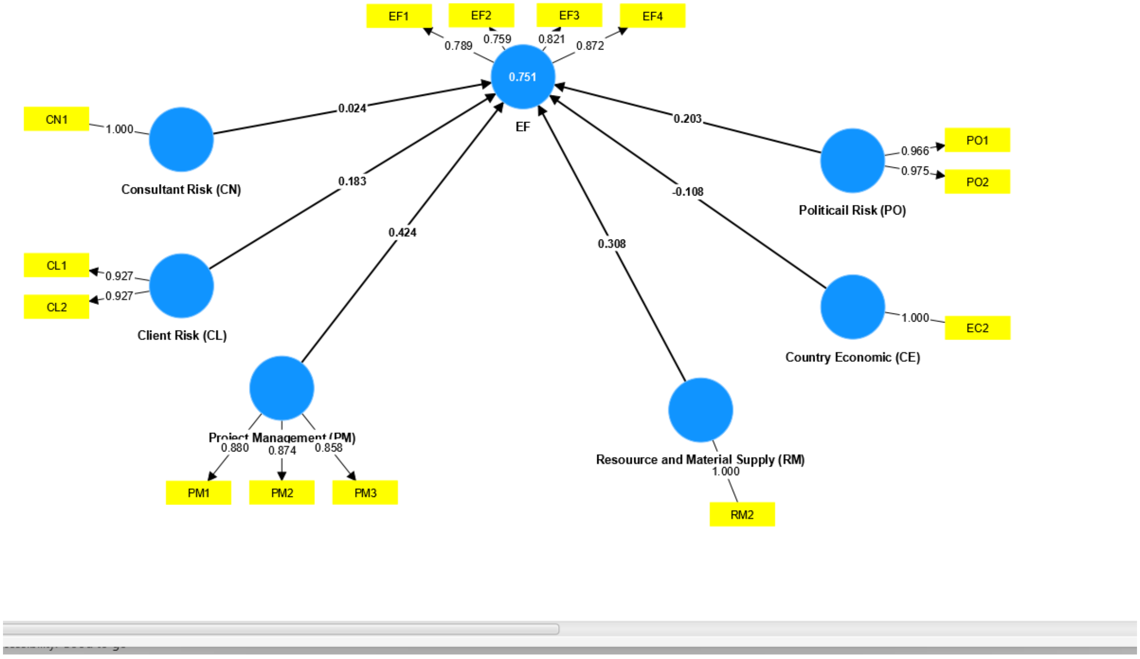


Figure 4.2 Model SEM

(Source: SmartPLS 4)

Figure 4.3 is a new model of the study with constructs – model constructs that have an outer loading value above 0.7. In this case, it is seen that the indicators CE1, CN2, and RM1. should be omitted because they cannot measure their own variables. For example, in CN2, Consultant Risk is not able to explain or measure the variable Effect of Risk in Project Success (EF), namely with outer loading below 0.7 so this indicator is insignificant to be an indicator supporting EF variables and must be eliminated, while EF variables can be explained by EF1, EF2, EF3 and EF4 indicators so that these indicators are used for further calculations, namely bootstrapping measurements. Therefore, the research model can be said to be valid and can be carried out to the next stage of testing.

4.6.2.1 R-Square

The R-Square value indicates a measure of the strength of the model prediction and is a quadratic correlation between the prediction of the endogenous construct and the actual value. The coefficient of R-Square represents the combined effect of exogenous latent variables against the latent variables of the endogenous. R-Square values of 0.25, 0.50, and 0.7 indicate weak, moderate, and substantial levels (Hair et al., 2011). The higher the value of R-Square, the stronger the prediction from the research model.

Table 4. 5 R-Square

Variable	R-Square
Effect of Risk on Project Success (EF)	0,751

Based on the test results, the R-Square value of the Effect of Risk in Project Success (EF) variable was 0.751. Based on the results of the R-Square test, the Effect of Risk in Project Success (EF) variable can be defined as 75,1 % by the variables Client Risk (CL), Consultant Risk (CN), Country Economic (CE), Political Risk (PO), Project Management (PM), Resource and Material Supply (RM).

This shows that simultaneously the six exogenous variables have a significant influence on the Effect of Risk in the Project Success (EF) variable. The remaining 24.9% can be explained by other variables outside of these three variables that were not studied in this study.

4.6.2.2 Fit Model

The fit model test shows how good the research model is. Meanwhile, in the SEM-PLS test, testing the fit model is not a calculation parameter for the initial model evaluation but only enough to see the results of the outer loading value. In the SEM-PLS fit model test, the value of the test results from the standardized root means square residual (SRMR) which has the meaning to assess the match between the correlation or the observed relationship, which is < 0.10 or 0.08, the model will be considered suitable (Bentler, 1999). Furthermore, the normal fit index (NFI) value produces a value between 0 and 1 where the closer to 1, the better the model is considered (Bentler, 1999). The following are the values of the fit model test results on the SmartPLS 4.0 software.

Model fit

	Saturated model	Estimated model
SRMR	0.086	0.086
d_ULS	0.776	0.776
d_G	0.879	0.879
Chi-square	134.608	134.608
NFI	0.654	0.654

Figure 4.3 Model Fit

The researcher conducted a fit model test to see if the research model was said to be suitable and fit as indicated by the NFI value results. Based on the results of the fit model test, it was found that the NFI value in the fit model test showed that the model had a fit value of 65,4%.

4.7 Hypothesis

Hypothesis testing is carried out with bootstrapping techniques, namely testing without the need for normally distributed data. Bootstrapping is the process of doubling data or re-creating samples taken based on existing data without the need for normally distributed data (Shiau, Sarstedt, and Hair, 2019). The test was performed with a two-tailed T-test. According to Hair et al (2011), a variable is said to have a relationship if the T-statistical values are above 1.65 (significance 10%), 1.96 (significance 5%), and 2.57 (significance 1%). In PLS-SEM software, there is a P-value that has the same probability of obtaining a T value, namely a variable is said to have a relationship if the P-value value is below 0.1 (10% significance), 0.05 (5% significance), and 0.01 (1% significance). In addition, the presence or absence of a relationship between the variables of the research model can be seen from the result of the P-Value < 0.005. The following table 4.8 shows the results of the hypothesis test.

Table 4. 4 Hypothesis Model

Hypothesis	Influence	T-Statistic	P-Value
H1	Client Risk (CL) → Effect of Risk in Project Success (EF)	0.856	0.392
H2	Consultant Risk (CN) → Effect of Risk in Project Success (EF)	0.163	0.870
H3	Country Economic (CE) → Effect of Risk in Project Success (EF)	0.552	0.581
H4	Political Risk (PO) → Effect of Risk on Project Success (EF)	0.994	0.320
H5	Project Management (PM) → Effect of Risk in Project Success (EF)	2.306	0.021
H6	Resource and Material Supply (RM) → Effect of Risk in Project Success (EF)	2.282	0.023

Source: Smart-PLS

Based on the results of the hypothesis test above using the bootstrapping technique, it was found that H1, H2, H3, and H4 respectively had a T-Statistical value below 1.96, namely 0.856; 0,163; 0,552; and 0.994 with a P-Value value greater than 0.05 then H1, H2, H3, and H4 are rejected. This shows that the four hypotheses did not have a significant influence on research. H5 and H6 are accepted because they have a T-Statistic value below 1.96 and a P-Value value of less than 0.05. This means that both hypotheses have a significant influence on research with a success rate of 95% and a failure of 5%.

Structural equation modeling (SEM) is a statistical method for the simultaneous testing of dependent relationships between latent variables and their manifest variables (measurable variables), between latent variables and measurement errors directly (Yamin & Kuniawan, 2011). The SEM technique combines factor analysis and multiple regression analysis (Hair, 2019). SEM model was used because in this research, analyzed all variables namely indicator variables and construct variables in one model and it will be seen which variables with related indicators have the most direct and indirect influence on the project. For example, there are 6 construct variables namely CN, CL, PM, RM, CE, and PO where each construct has its own indicator. The SEM model will be measured from each indicator and construct, such as CN has indicators CN1 and CN2. In the results of SEM processing, what has an influence on the CN construct is only CN1, namely the capabilities of consultants to handle a project. The CN1 indicator is seen to not affect the success of the project (EF).

Based on the SEM theory in Figure 4.2, there is 1 dependent variable (endogenous) that depends on 6 independent variables (exogenous), namely CN, CL, PM, RM, PO, and CE. In SEM, a variable is either exogenous or endogenous. An exogenous variable has path arrows pointing outwards and none leading to it. Meanwhile, an endogenous variable has at least one path leading to it and represents the effects of other variable(s).

The results obtained are also how much the value of the influence directly and indirectly from that influence. Where it can also be seen with the SEM model that CN1 affects CN directly by 1,000 which is more than 0.5, similarly CN could be considered to affect EF directly by 0.024. Meanwhile, if using path analysis only analyzes the construct variables as well as factor analysis only knows which factors have an effect. Therefore, it is linear with the aim of research to find out which variables influence the success of the project, so path and factor analysis is used, both of which are contained in the SEM.

This explanation has a meaning, namely the importance of using the SEM model in research, namely, to find out the details of each indicator and construct that can affect the success of the project as a consideration for the evaluation of the PJB company, because each indicator may not necessarily affect the construct variables. SEM is a multivariate analysis method that can be used to describe the simultaneous linear relationship between observation variables (indicators) and variables that cannot be measured directly (construct variables) (Wold, 2013). This study uses SEM-PLS, an approach from SEM that has no assumptions related to data distribution. Thus, PLS-SEM becomes a good alternative to SEM-based covariance when there are situations including a small sample size, use has few theories that can be used (Kwong &; Wong, 2012).

Several studies have employed structural equation modeling (SEM) to examine project success. For instance, Ng et al. (2010) used a SEM model to study the effect of feasibility study on the success of projects. Tabish and Jha (2012) studied the influence of human and managerial factors on the success of projects. And some similar studies are outlined in Table 2.1 for previous research.

The PLS path modeling estimation for the model is shown in Figure 4.2. By considering the diagram:

(i) Explanation of target endogenous variable variance

The coefficient of determination, R square, is 0.751 for the EF endogenous latent variable. This means that the six latent variables (CN, CL, PM, RM, PO, and CE) moderately explain 75.1% of the variance in EF.

(ii) Inner model path coefficient sizes and significance

The inner model suggests that PM has the strongest effect on EF (0.424), followed by CN (0.024), RM (0.308), CE (-0.108), PO (0.203), and CL (0.183).

In contrast, PLS-SEM is primarily used to develop theories in exploratory research maximizing the predictive ability. It focuses on explaining the variance in the dependent variables when examining the model (Hair, Hult, Ringle, Sarstedt, 2017). AVE is the average variance shared between a construct and its measures. It is defined as the grand mean value of the squared loadings of the indicators associated with a particular construct (the sum of the squared loadings divided by the number of indicators) (Hair et al., 2013). The average variance shared between a construct and its measures should be greater than that shared with the other constructs in the same model (Couchman & Fulop, 2006).

The R2 values indicate the amount of variance in the construct that is explained by the model R-square indicates the amount of variance explained by the exogenous variable in its endogenous counterpart (Chin, 1998). In this research, the six latent variables CN, CL, PM, RM, PO, and CE (exogenous) moderately explain 75.1% of the variance in EF (endogenous).

CHAPTER V
DISCUSSION

5.1 Discussion of Respondent Characteristics Results

Based on Table 4.1, it is known that there are 4 characteristics of respondents distributed through a Google Form questionnaire. Furthermore, the investigator conducted a discussion regarding the results.

1. Position

Respondents from the questionnaire consisted of employees in the risk and project departments. Based on the database from the company's client, manifest variables for positions include managers, project managers, project coordinators, engineers, site supervisors, and workers. It is found that as much as 46% is dominated by the engineer position, then as much as 13% is manager, as much as 6% is project coordinator, as much as 6% is project manager, 1 % as site supervisor, and 23% as staff.

2. Age

Based on the results of interviews and databases from corporate clients, manifest variables for age levels were obtained, including under 25 years, 26 – 35 years, 36 – 46 years, and over 47 years. It was found that as many as 63% of respondents were 26 – 35 years, 31% of respondents were 36 – 46 years old, and 6% of respondents were above 47 years old.

3. Experience in the Electrical and Energy Industry

Based on the results of interviews and databases from company clients, experience from respondents in the risk department and projects was obtained. It is found that as many as 57% are experienced as 5 – 10 years, 28% are experienced as 11 – 20 years, 9% % are experienced as 21 - 30 years, and 6% are experienced as under 5 years.

This will have an impact on the performance of projects implemented by PJB. The projects discussed In This Study Include:

1.Add On Muara Tawar Blok 2, 3, 4

2. PLTS Cirata

3. PLTA Batang Toru

4. PLTU Sumbagsel 1

5. PLTS 6 Lokasi Jawa Timur

6. Relokasi Pltdg Jakabaring & Batanghari Ke Haltim (Pt. Antam)

7. PLTU Gorontalo

8. PLTU Bima

9. PLTU Sorong

10. PLTU Sofifi

4. Gender

Based on interviews and databases from corporate clients, manifest variables for gender are obtained, including women and men, which is dominated by 82% men and 18% women.

Based on the respondent characteristics results, it was found that there were workers who had experience under 10 years in total as many as 20 people. It is found that as many 57% are experienced as 5 – 10 years and 6% are experienced as under 5 years. This will affect the quality of the project because the availability of personnel with high experience and qualifications assists them to implement their project with a professional and successful performance. The number of new projects/years affects the degree of experiences and skills learned from executed projects and that will affect the degree of project performance based on previous or current experiences (Nipin, 2015).

It was found that as many as 12 project workers who have experienced more than 10 years are experienced 11 - 20 years, and 9% % are experienced 21 - 30 years. Qualification and experience level of project managers and other management staff and an important and statistically significant factors affecting project success (Alzahrani, 2013)

Respondents from the questionnaire consisted of employees in the risk and project departments. Based on the database from the company's client, manifest variables for positions include managers, project managers, project coordinators, engineers, site supervisors, and workers. It is found that as much as 13% is manager, as much as 6% is project coordinator, and as much as 6% are project manager for higher position category.

For the other positions, it is found that as much as 46% is dominated by the engineer position, 1 % by site supervisor, and 23% by staff. It was concluded that perceptions of success by stakeholders are significant, as are the perceptions of important criteria and actual performance. The final 'so what' would aim to achieve a greater understanding of how project success factors can be measured, to facilitate a shared stakeholder view of project success, as a successful project inspires motivation, improves communication, better team working, and increase in productivity (Kate, 2012). It is not easy to assess how stakeholders will interpret opportunities. It is, therefore, necessary to be aware of how their role, experience, and personality affect assessing opportunities. And, that stakeholder's response often is linked to the reward system and how participants will be held accountable.

5.2 Discussion of Outer Model Test

Validity tests are carried out to test the validity of questionnaires that have been distributed. The questionnaire can be said to be valid if the question variables present show measurable results (Sugiyono, 2003). In this study, the amount of data collected was as many as 32 respondents.

Model validation refers to the process of evaluating the performance of a model that has been developed to make predictions or estimate the values of certain parameters (Han, K., Song, K., et al, 2016). The purpose of model validation is to ensure that the model is accurate and reliable and that it can be used to make valid predictions or estimates. Model validation typically involves comparing the predictions or estimates generated by the model with actual data or observations that were not used to develop the model.

1. Convergent Validity

Convergent validity is measured through the results of outer loadings values. The higher the outer loadings value indicates the manifest variables used in the latent variables have a lot in common. The outer loadings value must be 0.78 or higher (Hair et al., 2011). If one of the manifest variables is obtained with an outer loading value of < 0.7, the manifest variable is eliminated. This is because the manifest variables are not good enough to be measured by latent variables precisely. The loading factor value > 0.7 is said to be ideal, meaning that the indicator is said to be valid to measure the construct. So, a value below 0.7 means that it is not ideal because it is not able to measure its construct/variable itself so it must be deleted/ignored.

An outer loading value of 0.5 is still tolerable for inclusion in models that are still under development and below the value of 0.50 can be omitted from the analysis (Sarwono, 2016). An indicator has good validity if the outer loading value is above 0.70. When the obtained outer loading value is in the interval of 0.4-0.7 should be considered for removal from the model (Hair et al, 2012). While validity can be measured using the AVE value provided that the AVE value must be greater than 0.5. That is, when the AVE value is greater than 0.5, the average construct explains more than half (50%) of the variance of each indicator. Conversely, if the AVE value is less than 0.5, then on average there are more errors than the variance described by the construct.

The convergent validity test is carried out by looking at the loading factor value of each indicator against its construct. For confirmatory research, the loading factor limit used is 0.7, while for exploratory research, the loading factor limit used is 0.6 and for development research, the loading factor limit used is 0.5. Because this study is confirmatory research, the loading factor limit used is 0.7 (Asbari., M, 2019).

Based on the processed outer loading value of 17 manifest variables, three manifest variables were obtained that did not meet the value of the convergent validity amount. The three manifest variables include CE1, CN2, and RM1 with results are 0,567;0,591,0,622. This is because the outer loading value of the manifest variable is below 0.7. Therefore, those manifest variables are omitted and retested. The results of the retest showed that all manifest variables in the model had a new outer loading value above 0.7 and it can be said that 14 manifest variables are good enough for precise measurement of latent variables.

In convergent validity research, 2 tests were carried out to get an outer loading value above 0.7. As for table 4.2, it can be seen that in the outer loading old model column, 3 variables are obtained that have values below outer loading, while in the outer loading new model column it is found that the overall value is above 0.7.

Furthermore, in testing the new model with 14 manifest variables, all manifest variables in the model have a new outer loading value above 0.7. This indicates that all indicators in the new model can define a variable. This occurs when each measurement item correlates strongly with its assumed construct. Indicator loading values should exceed 0.7 on their constructs so that more than 50% of the indicator's variance is caused by the construct (Hair et al, 2012).

2. **Discriminant Validity**

The discriminant validity is measured using Fornell-lacker criterion values on each latent variable. This value is used to compare the square root of the average variance extracted (AVE) value. The AVE value is the average value of the squared result of the outer loadings value associated with the variable/construct. The model is said to be good if the outer loading of the latent variable and its manifest variable has a greater value compared to other latent variables (cross-loading).

Discriminant validity was assessed using the criterion that required that the AVEs of the constructs should be greater than the square of the correlations among them (Fornell, 1981). Thereby indicating that more variance was shared between the component and its block of indicators than with any other component. Table 4.3 shows the result of the discriminant validity value, while diagonal figures indicate the square root of the average variance extracted between the constructs and their measures. As can be seen, each construct's AVE exceeded the squared correlations of this construct with any other construct.

Based on the results of testing the discriminant validity value, it was found that each value of cross-loading formed on each latent variable with its manifest variable is greater when compared to other latent variables. So it can be said that the model has met the criteria.

Furthermore, Fornell-Lacker's cross-loading values were performed on smartPLS 3.0 by comparing the AVE values between the latent variables and other latent variables. AVE values should be higher compared to correlations between other latent variables (Hair et al., 2017). The results of cross-loading tests show that each value formed by a latent variable with its manifest variable is greater than the value with other latent variables. So, it can be said that the model has met the criteria. As for the higher cross-loading value, it shows a lot of similarities.

5.3 Reliability and Average Variance Extracted (AVE)

The reliability test is carried out by measuring the value of composite reliability. The construct is said to be reliable if the composite reliability and Cronbach's alpha are ≥ 0.7 and the AVE value ≥ 0.5 then the construct-forming manifest variable value is said to be consistent.

Based on Table 4.6, variable variables, resource, and material supply with its manifest variable, country economy with its manifest variable, the political risk with its manifest variable, and effect of risk in project success with composite reliability and Cronbach's alpha value of ≥ 0.7 and AVE value of ≥ 0.5. So it can be said that manifest variables and latent variables in research are valid and reliable and can be used for inner model testing. It can also be said that the research model has been consistent.

As demonstrated in Table 4.2, the research statistics correspond with this criterion, which means that a linear equivalence exists between the observed variables and latent variables so that the observed variables can appropriately account for the latent variables. In this study, the model’s discriminant validity test achieved by the cross-loadings analysis of the latent variables is mainly applied to determine the degree of discrepancy between latent variables. In Table 4.4, the square root of AVE’s value appears on one of the diagonal lines while the others are correlation coefficients of each level of variables. If the former is larger than the value of the correlation coefficient in the horizontal or vertical column, it should be characterized by discriminant validity.

5.4 R-Square

The R-Square value indicates a measure of the strength of the model prediction and is a quadratic correlation between the prediction of the endogenous construct and the actual value. The higher the value of R-Square, the stronger the prediction from the research model.

Based on the test results, the R-Square value of the Effect of Risk in Project Success (EF) variable was 0.751. Based on the results of the R-Square test, the Effect of Risk in Project Success (EF) variable can be defined as 75,1% by the variables Client Risk (CL), Consultant Risk (CN), Country Economic (CE), Political Risk (PO), Project Management (PM), Resource and Material Supply (RM).

This shows that simultaneously the six exogenous variables have a significant influence on the Effect of Risk in the Project Success (EF) variable. The remaining 24,9% can be explained by other variables outside of these three variables that were not studied in this study.

5.5 Model Fit

The fit model test shows how good the research model is. Meanwhile, in the SEM-PLS test, testing the fit model is not a calculation parameter for the initial model evaluation but only enough to see the results of the outer loading value. In the SEM-PLS fit model test, the value of the test results from the standardized root Mean square residual (SRMR) which has the meaning to assess the match between the correlation or the observed relationship, which is < 0.10 or 0.08, the model will be considered suitable (Bentler, 1999). Furthermore, the normal fit index (NFI) value produces a value between 0 and 1 where the closer to 1, the better the model is considered (Bentler, 1999). The following are the values of the fit model test results on the SmartPLS 4.0 software.

The researcher conducted a fit model test to see if the research model was said to be suitable and fit as indicated by the NFI value results. Based on the results of the fit model test, it was found that the NFI value in the fit model test showed that the model had a fit value of 65,4%.

Result verification, on the other hand, refers to the process of verifying the accuracy and validity of the results obtained from a research project. This process involves checking the data, methods and analyzes used in the research to ensure that the results are reliable and can be replicated by other researchers. Result verification also involves checking for errors, biases, and other sources of uncertainty that may have affected the results.

In this research, using validity (convergent and discriminant) tests to know that the model is valid. After that, using reliability testing and Average Variance Extracted (AVE). The reliability test is carried out by measuring the value of composite reliability. The construct is said to be reliable if the composite reliability and Cronbach's alpha are ≥ 0.7 and the AVE value ≥ 0.5 then the construct-forming manifest variable value is said to be consistent. Also using R square to indicates a measure of the strength of the model prediction and is a quadratic correlation between the prediction of the endogenous construct and the actual value. The higher the value of R-Square, the stronger the prediction from the research model. The last is using model Fit, the fit model test shows how good the research model is. Meanwhile, in the SEM-PLS test, testing the fit model is not a calculation parameter for the initial model evaluation but only enough to see the results of the outer loading value.

In both cases, it is important to use appropriate statistical methods and techniques to evaluate the accuracy and reliability of the model or results. This may involve using measures such as error rates, confidence intervals, or hypothesis testing to assess the validity of the model or results.

5.6 Hypothesis

Hypothesis testing is carried out with bootstrapping techniques aimed at knowing the significance of the model. Hypothesis testing is carried out with bootstrapping techniques, namely testing without the need for normally distributed data. Bootstrapping is the process of doubling data or recreating samples that are taken based on existing data without the need for normally distributed data. According to Hair et al (2011), a variable is said to have a relationship if the T-statistical values are above 1.65 (significance 10%), 1.96 (significance 5%), and 2.57 (significance 1%). In PLS-SEM software, there is a P-value that has the same probability of obtaining a T value, namely a variable is said to have a relationship if the P-value value is below 0.1 (10% significance), 0.05 (5% significance), and 0.01 (1% significance). In addition, the presence or absence of a relationship between the variables of the research model can be seen from the result of the P-Value < 0.005. The following table 4.8 shows the results of the hypothesis test. The following is a discussion of the nine hypotheses tested.

1. H1: Variable client risk positively affects effect risk in project success

Based on the results of the T-statistical and P-Value tests, it was found that **H1 is rejected** with values sequentially being 0,856 and 0,392. Namely, the client risk variable has not a significant influence on usage. This is because the hypothesis has a T-statistical value below 1.96 and a P-Value value above 0.05.

This means that the variables of Client Interventions and Delay payment of contractor's dues as manifest variables of Client Risk (CL) are not able to influence and have a significant relationship with effect risk in project success (EF). This also means that if the project is successful, according to respondents, the PJB company is not influenced by changes in decisions from clients during the project which is good, and also the company is not able to handle well the delayed payment of contractor's dues influence the project success.

The hypothetical results are also supported by several previous studies by Kaseem (2022) using oil and gas construction objects, stating that there is an influence between client risk and project success. To control and monitor risks throughout the project lifetime, the client should design a risk management plan that includes risk identification and reaction strategy depending on the effect of each element.

1. The customer (government or oil corporations) must speed up decision-making and decrease administrative routine, which slows down project duration.
2. Minimize construction project interference, particularly in aspects under contractor authority.
3. The customer should be aware that frequent changes in project stages affect project costs and timelines. So, the contractor and the customer must agree on the proportion of adjustments and how to deal with them beforehand.
4. Clients should not postpone progress payments based on project length, job progress, and budget.

2. H2: Variable consultant risk positively affects the effect risk in project success

In H2, it is shown that the consultant risk (CN) variable does not have a significant effect on project success (EF) so **H1 is rejected**. Based on the T-statistical results obtained, it is less than 1.96, which is 0.325. This is also evidenced by the result of a P-value value of more than 0.05, which is 0.746. It can be said that the manifest variables Insufficient consultant experience and Delay in Decision Making are incapable of influencing and have no relationship to project success.

It also means that poor communication and management by the consultant and the lack of familiarity with the responsibilities will not significantly affect the success of the project. Likewise, the capabilities of consultants to handle the project do not affect the success of the project but can be influenced by other variables. In this case, the skills needed are to manage the contract properly, actively monitor the job, and identify potential project risks.

3. H3: Variable country economic positively affects the effect risk in project success

Based on the results of the T-statistical and P-Value tests, it was found that **H3 is rejected** with values sequentially being 0.889 and 0.375. Namely, the country's economic (CE) variable does not have a significant influence on project success (EF). This is because the hypothesis has a T-statistical value above 1.96 and a P-Value value below 0.05.

This means that there is no influence if the country's economy deteriorates and can reduce the quality of PJB construction projects. And if the construction material cost fluctuation does not affect the project's success.

4. H4: Variable political risk positively affects the effect risk in project success

H4 shows that the variable political risk (PO) has no significant effect on project success (EF) so **H4 is rejected**. Based on the T-statistical results obtained, it is less than 1.96, which is 1.660. This is also evidenced by the result of the P-value value which is more than 0.05, which is 0.098. It can be said that the variables manifest change in regulations and law and country conditions during construction are incapable of influencing and have no relation to the variables of project success.

This also means that the current troubled political instability does not affect the success of the PJB project and the stability conditions of the country during project construction.

5. H5: Variable project management positively affects the effect of risk in project success

In H5, it shows that the project management (PM) variable has no significant effect on project success (EF) so **H5 is accepted**. Based on the T-statistical results obtained, it is more than 1.96, which is 2.306. This is also evidenced by the result of the P-value value which is less than 0.05, which is 0.021. It can be said that the manifest variables of wrong project cost and time schedule estimation and lack of effective communication and coordination can influence and have a relationship to the variables of project success.

This also means that if the ability in planning and controlling for scheduling and budgeting decreases, according to respondents, it will affect project success. Likewise, the ability to communicate and coordinate will affect project success.

6. H6: Variable resource and material supply positively affect the effect risk in project success

H6 shows that the variable resource and material supply (RM) has a significant effect on project success (EF) so **H6 is accepted**. Based on the T-statistical results obtained is more than 1.96 as 2,719. This is also evidenced by the result of the P-value, which is less than 0.05, as 0.007. It can be said that the quality of the materials/services used in the project gives an effect, also the requirements and specifications for the procurement of goods/services affect the project's success.

Resource and materials and risk factors for management are the most important factors associated with the impact on project success; these factors need to focus more on an effective strategy to respond and mitigate the effects resulting from project cost and schedule as well as quality (Hussain et al, 2018).

There were a total of 7 factors used in the study, namely CN, CL, PM, RM, CE, PO, And EF. The seven factors are modeled by the SEM method so that dependent and independent variables are obtained. Independent variables are CN, CL, PM, RM, CE, and PO which affect the dependent variable, namely EF. The seven factors in SEM are referred to as latent variables. The seven variables have no relationship with each other because this study was modeled by the SEM method, namely, There are two types of variables in SEM, namely latent variables and manifest variables. It is assumed using the hypothesis that 6 independent factors/variables have a positive relationship with the dependent variable, namely EF. Each latent variable has a manifest variable that positively affects its latent variables such as CN1, CL1, CL2, PM1, PM2, PM3, RM2, CE2, PO1, PO2, EF1, EF2, EF3, EF4 which amounts to 14 factors/variables.

The hypothesis test above using the bootstrapping technique, it was found that H1, H2, H3, and H4 respectively had a T-Statistical value below 1.96, namely 0.856; 0,163; 0,552; and 0.994 with a P-Value value greater than 0.05 then H1, H2, H3, and H4 are rejected. This shows that the four hypotheses did not have a significant influence on research. H5 and H6 are accepted because they have a T-Statistic value below 1.96 and a P-Value value of less than 0.05. This means that both hypotheses have a significant influence on research with a success rate of 95% and a failure of 5%.

Based on the results of the six hypotheses, it is known that 2 hypotheses are accepted and 4 are rejected. However, the results of the hypothesis test related to six latent variables can be a focus for PJB companies that 4 variables can affect the risk of the success of the PJB project. It was found that the presence of significant influences on H5 and H6 made the focus for the company on these latent variables. If exogenous variables have a significant influence on endogenous variables then of course the better the exogenous variables will affect the better the endogenous variables.

The results of this study can be used by PJB as a basis for consideration in future projects where factors are found that have an influence and do not. For example, in the study, it was found that hypothesis 5 is accepted which is Project Management (PM) → Effect of Risk in Project Success (EF). When the variables contained in PM, namely PM1, PM2, and PM3, are low will affect the Effect of Risk on Project Success as well as if the PM variable is high, it will affect the quality of the project.

This means that the variable of Lack of effective communication and Coordination dues as manifest variables of Project Management (PM) can influence and have a significant relationship with effect risk in project success (EF). This also means that if the project is successful, according to respondents, the PJB company is influenced by effective communication and Coordination during the project which is good, moreover, the company can appropriately handle the wrong project cost and time schedule estimation that influence the project success.

For hypothesis 6 which is Resource and Material Supply (RM) → Effect of Risk in Project Success (EF). When the variables contained in RM, namely RM1, and RM2, are low will affect the Effect of Risk on Project Success as well as if the PM variable is high, it will affect the quality of the project. H6 shows that the variable resource and material supply (RM) has a significant effect on project success (EF) so H6 is accepted. Based on the T-statistical results obtained is more than 1.96 as 2,719. This is also evidenced by the result of the P-value, which is less than 0.05, as 0.007. It can be said that the quality of the materials/services used in the project given effect, also the requirements and specifications for the procurement of goods/services affect the project's success.

5.7 Relative Important Index (RII)

The Relative Importance Index is computed using the expression below:

RII = W/ (A × N)

where RII refers to the Relative Importance Index.

W is the respondents' weighted average of each factor, ranging from 1 to 5.

The maximum weight (in this case, five) is A,

And the total number of answers is N.

According to (Aibinu & Jagboro 2002) the Relative Importance Index (RII) method is used to define the relative importance of the various causes and effects factors based on the probability of occurring and impact on the project by using a five-point Likert scale. The results were summarized and presented below in Table 5.1 which displays the top 17 risk factors that affect the construction projects in PJB Company, these results give further impetus to the need for an extensive study and more profound and comprehensive sources to learn various risks that affect the operation of PJB projects, is one of the purposes of conducting this pilot study.

A. **Relative Important Index (RII) For all Responded**

Table 5.1 RII All Factors

Relative Important Index (RII) For all Responded			
Code	**Risk Factors**	**RII**	**Rank**
RM1	Material/service quality	0,029688	1
RM2	Procurement specification	0,02793	2
CE2	Construction material cost fluctuation	0,027344	3
PO1	Change regulations and law	0,027148	4
CE1	Economic and Financial Crisis	0,027148	5
PM1	Wrong project cost and time schedule estimation	0,027344	6
EF3	Poor quality	0,027148	7
PM2	Lack of effective communication and coordination	0,027148	8
CN2	Delay in Decision Making	0,026367	9
PM3	Funding Qualification project	0.026367	10
CL1	Client Interventions	0,026172	11
EF2	Failure to Achieve the Objective	0,026172	12
EF1	Cost Overruns	0,025391	13

CL2	Delay payment of contractor's dues	0,025977	14
CN1	Insufficient consultant experience	0,025586	15
PO2	Country conditions during construction	0,026563	16
EF4	Time overruns	0,025	17

The complete RII analysis finds that the largest risk factor in PJB Company is (Material/service quality) with an RII of 0,029688, And the last rank is time overruns with RII of 0,025. As a result, items are prioritized based on their relative importance to the project's success. While it is difficult to grant all risk factors the same amount of attention, time, effort, and money, the table below enables the risk management team to classify and prioritize their influence on project success.

B. **Relative Important Index Based on experience**

1) Below or equal to 10 years of experience in work

Table 5.2 RII Below or equal to 10 years of experience in work

Below or equal to 10 years of experience in work			
Code	**Risk Factors**	**RII**	**Rank**
RM1	Material/service quality	0.029688	1
RM2	Procurement specification	0.028438	2
CE2	Construction material cost fluctuation	0.028125	3
CL1	Client Interventions	0.027813	4
PM1	Wrong project cost and time schedule estimation	0.027813	4
PM2	Lack of effective communication and coordination	0.027813	4
PO1	Change regulations and law	0.0275	7

CE1	Economic and Financial Crisis	0.027188	8
PM3	Funding Qualification project	0.027188	8
PO2	Country conditions during	0.026875	10
CL2	Delay payment of contractor's dues	0.026875	10
EF1	Cost Overruns	0.026563	12
EF2	Failure to Achieve the Objective	0.026563	12
EF3	Poor quality	0.026563	12
CN1	Insufficient consultant experience	0.02625	15
CN2	Delay in Decision Making	0.02625	15
EF4	Time overruns	0.025625	17

2) Above 10 years of experience working

Table 5.3 RII above 10 years of experience in work

2- Above 10 years of experience working			
Code	**Risk Factors**	**RII**	**Rank**
RM1	Material/service quality	0.029688	1
EF3	Poor quality	0.028125	2
CE1	Economic and Financial Crisis	0.027083	3
RM2	Procurement specification	0.027083	3
PO1	Change regulations and law	0.026563	5
CN2	Delay in Decision Making	0.026563	5
PM1	Wrong project cost and time schedule estimation	0.026563	5
CE2	Construction material cost fluctuation	0.026042	8
PO2	Country conditions during construction	0.026042	8

PM2	Lack of effective communication and coordination	0.026042	8
EF2	Failure to Achieve the Objective	0.025521	11
PM3	Funding Qualification project	0.025	12
CN1	Insufficient consultant experience	0.024479	13
CL2	Delay payment of contractor's dues	0.024479	13
EF4	Time overruns	0.023958	15
CL1	Client Interventions	0.023438	16
EF1	Cost Overruns	0.023438	16

C. Relative Important Index Based on Position

1) Related to work in Management

Table 5.4 Related to Work Management

related to work in Management			
Code	**Risk Factors**	**RII**	**Rank**
RM1	Material/service quality	0.028646	1
CE2	Construction material cost fluctuation	0.028125	2
CE1	Economic and Financial Crisis	0.027083	3
PO1	Change regulations and law	0.026563	4
PM1	Wrong project cost and time schedule estimation	0.026563	4
RM2	Procurement specification	0.026563	4
PO2	Country conditions during construction	0.026042	7
CL1	Client Interventions	0.026042	7

CL2	Delay payment of contractor's dues	0.026042	7
EF3	Poor quality	0.026042	7
CN2	Delay in Decision Making	0.025521	11
PM3	Funding Qualification project	0.025521	11
EF2	Failure to Achieve the Objective	0.025521	11
PM2	Lack of effective communication and coordination	0.025	14
CN1	Insufficient consultant experience	0.024479	15
EF4	Time overruns	0.024479	15
EF1	Cost Overruns	0.023958	17

2) Other positions

Table 5.5 Other Positions

other positions			
Code	**Risk Factors**	**RII**	**Rank**
RM1	Material/service quality	0.030729	1
PM2	Lack of effective communication and coordination	0.028646	2
RM2	Procurement specification	0.028125	3
PM1	Wrong project cost and time schedule estimation	0.027604	4
EF3	Poor quality	0.027604	4
CN2	Delay in Decision Making	0.027083	6
CE1	Economic and Financial Crisis	0.026563	7
PO1	Change regulations and law	0.026563	7
CL1	Client Interventions	0.026563	7
EF2	Failure to Achieve the Objective	0.026563	7

CE2	Construction material cost fluctuation	0.026042	11
PO2	Country conditions during construction	0.026042	11
CN1	Insufficient consultant experience	0.026042	11
PM3	Funding Qualification project	0.026042	11
EF1	Cost Overruns	0.026042	11
CL2	Delay payment of contractor's dues	0.025521	16
EF4	Time overruns	0.025521	16

In the below or equal 10 years of experience of work category, RM1 (Material/service quality) was the first order with an RII value of 0.029688 then continued by RM2 (Procurement specifications) as the second order with an RII value of 0.028438 and in 17th place, namely time overruns (EF2) with an RII value of 0.025625.

In the above 10 years of experience in-work category, RM1 (Material/service quality) is the first place with an RII value of 0.029688, followed by EF3 (Poor quality) at second place with an RII value of 0.028438 and 17th place, namely cost overruns (EF1) with an RII value of 0.023438 and client interventions (CL1) with the same RII value.

In the related to work in the management category, RM1 (Material/service quality) is the first place with an RII value of 0.029688, followed by CE2 (Construction material cost fluctuation) at second place with an RII value of 0.028125, and in 17th place, namely cost overruns (EF1) with an RII value of 0.023958.

In the other positions category, RM1 (Material/service quality) is the first place with an RII value of 0.030729, followed by PM2 (Lack of effective communication and coordination) at second place with an RII value of 0.028438 and in 17th place, namely time overruns (EF4) with an RII value of 0.025521.

It can be analyzed from the data that is categorized based on below or equal 10 years of experience of work, above 10 years of experience of work, related to work in management, and other positions that there is a material quality (RM) factor that has the greatest influence on the success of the project with the RII value sequentially being 0.029688;0.029688;0.029688;0.030729. For hypothesis 6 which is Resource and Material Supply (RM) → Effect of Risk in Project Success (EF). When the variables contained in RM, namely RM1, and RM2, are low will affect the Effect of Risk on Project Success as well as if the PM variable is high, it will affect the quality of the project. H6 shows that the variable resource and material supply (RM) has a significant effect on project success (EF) so H6 is accepted. Based on the T-statistical results obtained is more than 1.96 as 2,719. This is also evidenced by the result of the P-value, which is less than 0.05, as 0.007. It can be said that the quality of the materials/services used in the project effect, also the requirements and specifications for the procurement of goods/services affect the project's success.

Resource and materials and risk factors for management are the most important factors associated with the impact on project success; these factors need to focus more on an effective strategy to respond and mitigate the effects resulting from project cost and schedule as well as quality (Hussain et al, 2018). The researcher realized that this research did not escape the shortcomings and limitations of the study. In this study, weaknesses were found including:

1) In this study, the researcher only used 17 indicators, originated from the department of risk and project management. So, the researcher suggested that the next study related to this topic can add other exogenous and endogenous variables.
2) The hypotheses used are only 6 consisting of 5 independent variables and 1 dependent variable, namely EF. So, the results of the study only show the value of the influence formed from 5 independent variables on the dependent variable. Future research may develop other hypotheses from this model.

3) The model used in this research is also expected to apply to other project success. Further research can be done to find the interrelationships between those factors, and more factors can be included in the presented model and examined.
4) This study only used 32 respondents so it used SEM-PLS because of the limitations of respondents for the risk management department. In the future, we can use respondents above 100 so that they can use other SEM models in future studies.

The study involved 32 respondents so processing was carried out using SEM-PLS, namely Smart PLS 4.0 software. Validity and reliability testing are carried out. In the validity testing, 2 timers were carried out, namely convergent and discriminant tests. In the convergent test, 2 tests were carried out on the first and second outer loading, this is because the first outer loading model using theory 0.5 is considered sufficient for SEM-PLS testing. For confirmatory research, the loading factor limit used is 0.7, while for exploratory research, the loading factor limit used is 0.6 and for development research, the loading factor limit used is 0.5. Because this study is confirmatory research, the loading factor limit used is 0.7 (Asbari., M, 2019).

Because the outer loading of the test is carried out 2 times, the validity test obtained large results on outer loading with a minimal sample of 32 respondents. Next, discriminant testing is carried out. This value is used to compare the square root of the average variance extracted (AVE) value. The R square value is also obtained at 0.751. Based on the results of the R-Square test, the Effect of Risk in Project Success (EF) variable can be defined as 75,1 % by the variables Client Risk (CL), Consultant Risk (CN), Country Economic (CE), Political Risk (PO), Project Management (PM), Resource and Material Supply (RM).

CHAPTER VI
CONCLUSIONS AND SUGGESTIONS

1. Conclusion

Based on the results of data processing and discussion in the study, it can be concluded as follows:

1. There are 6 risk factor variables that affect the success at the project level for the effective functioning in PJB, which were processed in SEM testing in this study. Among them include consultant risk, client risk, project management, resource and material supply, country economy, political risk, and the effect of risk on project success are obtained.
2. There are 2 variables from the six risk factors that affect project success. Project Management (PM) of PJB companies has a significant effect on project success (EF) which is indicated by a T-Statistical value of 2.306 more than 1.96. Likewise, resource and material supply (RM) affects project success (EF) which is indicated by a T-Statistical value of 2,282. It can be analyzed from the data that is categorized based on below or equal 10 years of experience of work, above 10 years of experience of work, related to work in management, and other positions that there is a material quality (RM) factor that has the greatest influence on the success of the project with the RII value sequentially being 0.029688;0.029688;0.029688;0.030729.

2. Suggestion

The researcher realized that this research did not escape the shortcomings and limitations of the study. In this study, weaknesses were found including:

a) In this study, the researcher only used 17 indicators with 32 respondents from the Department of Risk and project management. So, the researcher suggested that the next study related to this topic can add other exogenous and endogenous variables.

b) The hypotheses used are only 6 consisting of 5 independent variables and 1 dependent variable, namely EF. So, the results of the study only show the value of the influence formed from 5 independent variables on the dependent variable. Future research may develop other hypotheses from this model.
c) The model used in this research is also expected to apply to other project success. Further research can be done to find the interrelationships between those factors, and more factors can be included in the presented model and examined.
d) This study only used 32 respondents so it used SEM-PLS because of the limitations of respondents for the risk management department. In the future, we can use respondents above 100 so that they can use other SEM models in future studies.

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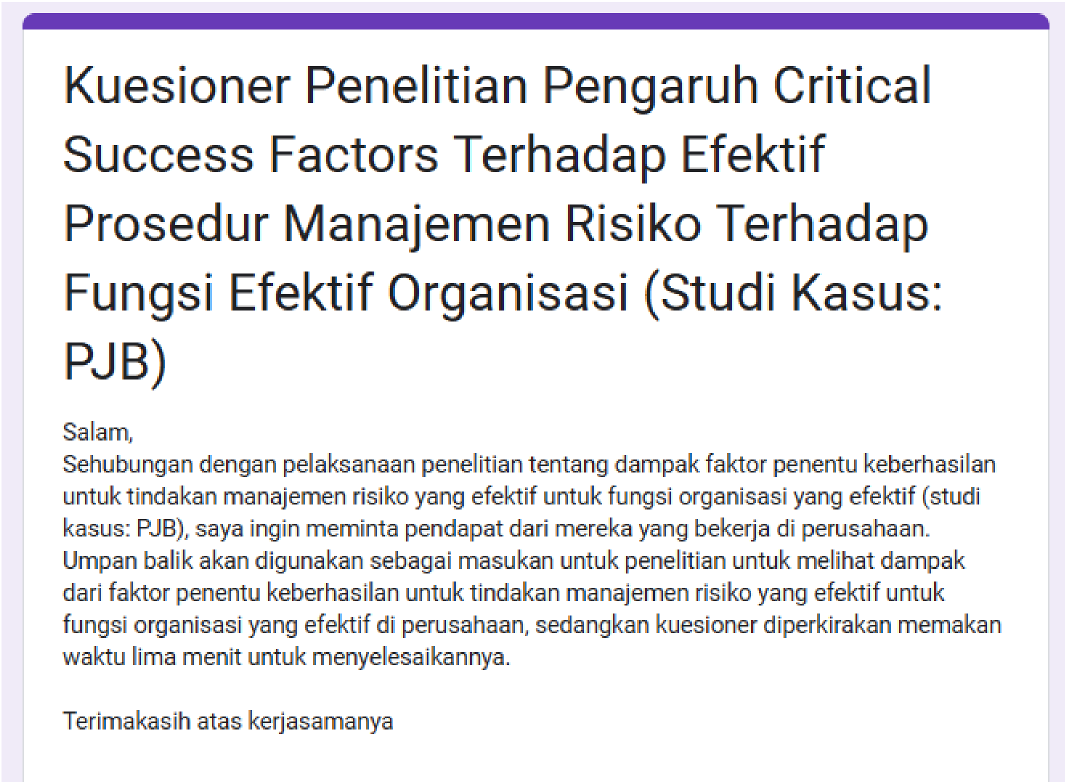
APPENDIX

Questionnaire Likert scale by Google Form



Kuesioner Penelitian Pengaruh Critical Success Factors Terhadap Efektif Prosedur Manajemen Risiko Terhadap Fungsi Efektif Organisasi (Studi Kasus: PJB)

Salam,
Sehubungan dengan pelaksanaan penelitian tentang dampak faktor penentu keberhasilan untuk tindakan manajemen risiko yang efektif untuk fungsi organisasi yang efektif (studi kasus: PJB), saya ingin meminta pendapat dari mereka yang bekerja di perusahaan. Umpan balik akan digunakan sebagai masukan untuk penelitian untuk melihat dampak dari faktor penentu keberhasilan untuk tindakan manajemen risiko yang efektif untuk fungsi organisasi yang efektif di perusahaan, sedangkan kuesioner diperkirakan memakan waktu lima menit untuk menyelesaikannya.

Terimakasih atas kerjasamanya

Peserta harus pernah bekerja di proyek PJB, baik dalam manajemen tender, pengadaan, manajemen proyek dan koordinasi atau pengawasan pekerjaan di tempat dan menyertakan insinyur yang bekerja dan risiko yang dihadapi oleh proyek-proyek tersebutUntitled Title

Q1: Jenis kelamin *

- ◯ Pria
- ◯ Wanita

Q2: Usia? *

- ◯ Di bawah 25 tahun
- ◯ Sekitar 26-35 tahun
- ◯ Sekitar 36-46 tahun
- ◯ Di atas 47 tahun

Q 3: Pengalaman di Industri Listrik dan Energi? * *
Perkiraan tahun pengalaman di Listrik dan Energi

- ◯ Kurang dari 5 tahun
- ◯ 5-10 tahun
- ◯ 10-20 tahun
- ◯ 20-30 tahun
- ◯ Lebih dari 30 tahun

Q4: Jabatan? *

- ○ Manajer
- ○ Manajer proyek
- ○ Koordinator Proyek
- ○ Insinyur lokasi (Sipil -Listrik -Mekanikal-Perminyakan)
- ○ Pengawas lokasi
- ◉ Buruh
- ○ Other: ____________

Next

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Pertanyaan UmumPada

bagian ini, akan diajukan pertanyaan-pertanyaan umum tentang risiko-risiko di proyek-proyek PJB untuk melihat bagaimana peserta diberi pengarahan tentang masalah risiko dan untuk mengetahui faktor-faktor risiko paling signifikan yang dihadapi para peserta di proyek-proyek tersebut.

Country economic risk **(EC)**
Dampak resiko ekonomi terhadap keberhasilan proyek

1. Apa dampak risiko ekonomi negara terhadap keberhasilan proyek? *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

2. Apa dampak risiko fluktuasi biaya bahan konstruksi terhadap keberhasilan proyek? *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

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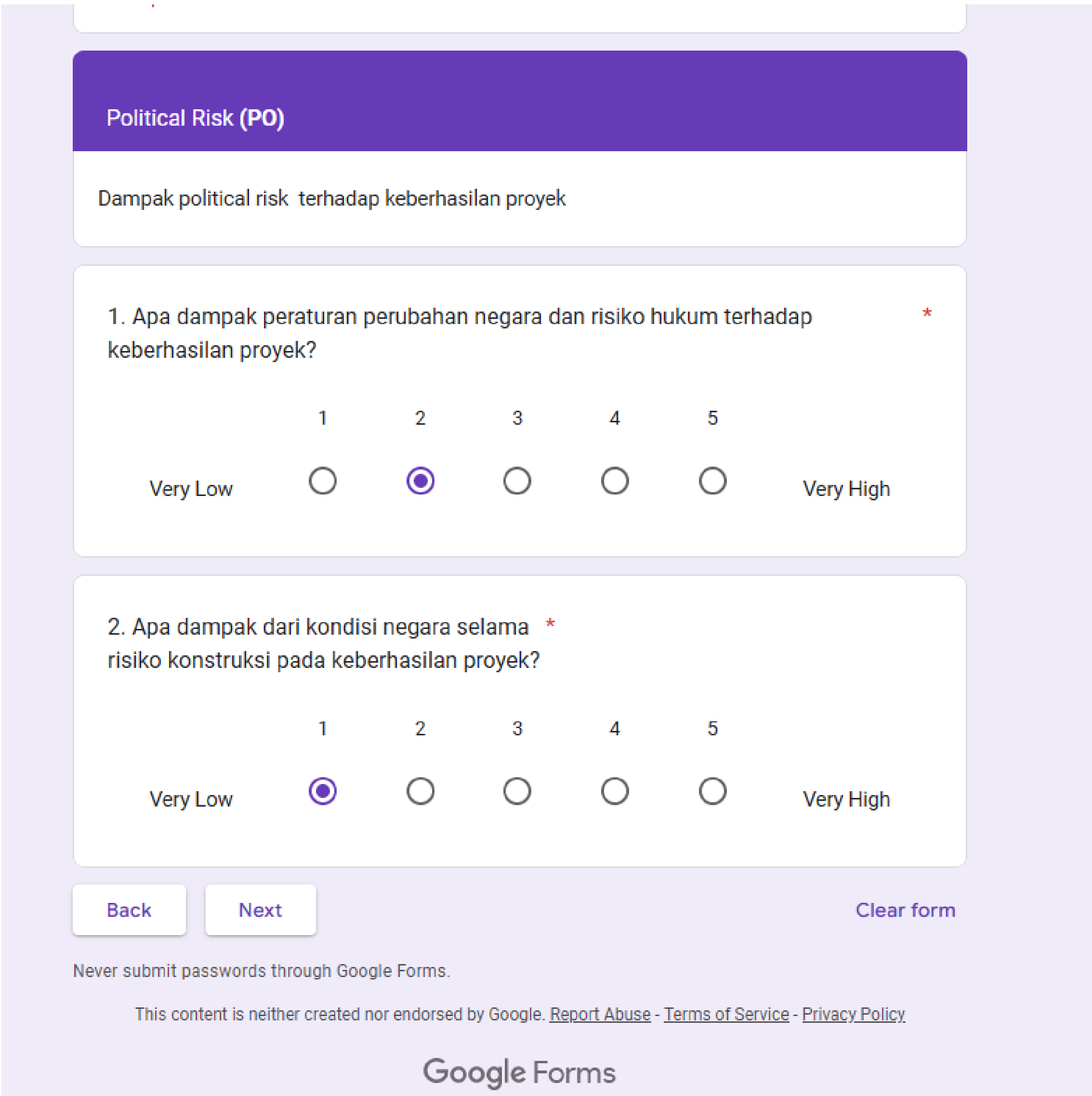

Political Risk **(PO)**

Dampak political risk terhadap keberhasilan proyek

1. Apa dampak peraturan perubahan negara dan risiko hukum terhadap keberhasilan proyek? *

	1	2	3	4	5	
Very Low	○	◉	○	○	○	Very High

2. Apa dampak dari kondisi negara selama risiko konstruksi pada keberhasilan proyek? *

	1	2	3	4	5	
Very Low	◉	○	○	○	○	Very High

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Consultant Risk (CN)

Dampak Risiko Konsultan terhadap keberhasilan proyek

1. Pengalaman konsultan yang tidak memadai mempengaruhi keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

2. Keterlambatan dalam Pengambilan Keputusan mempengaruhi keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

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Client Risk **(CL)**

Dampak Risiko Klien terhadap keberhasilan proyek

1. Intervensi Klien mempengaruhi keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

2. Keterlambatan pembayaran iuran kontraktor mempengaruhi keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

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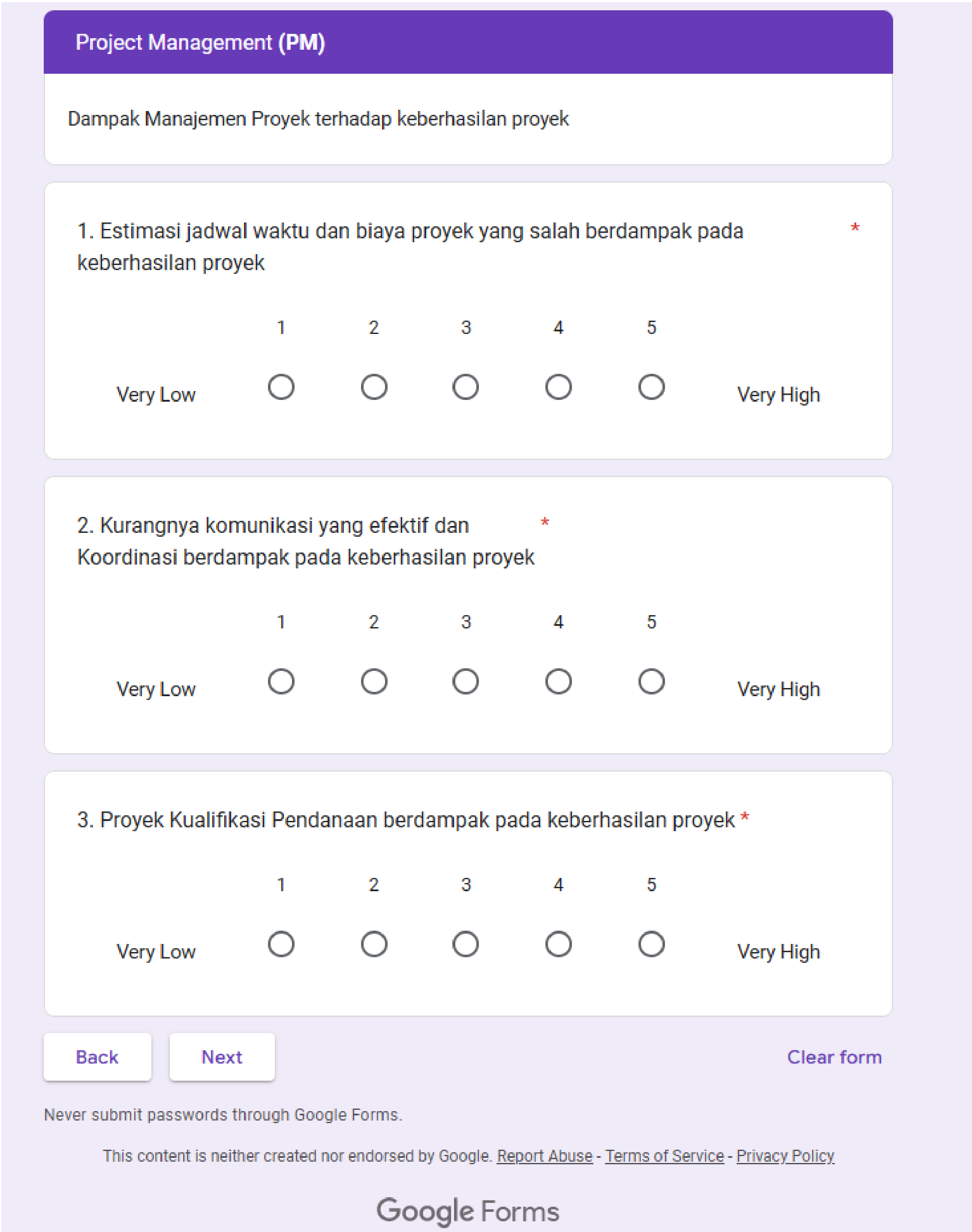

Project Management (PM)

Dampak Manajemen Proyek terhadap keberhasilan proyek

1. Estimasi jadwal waktu dan biaya proyek yang salah berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

2. Kurangnya komunikasi yang efektif dan Koordinasi berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

3. Proyek Kualifikasi Pendanaan berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

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Resource and Material Supply (RM)

Dampak Pasokan Sumber Daya dan Material pada keberhasilan proyek

1. Apa dampak kualitas Material/jasa selama *
risiko konstruksi pada keberhasilan proyek?

	1	2	3	4	5	
Very Low	○	◉	○	○	○	Very High

2. Apa dampak dari spesifikasi Pengadaan *
risiko konstruksi pada keberhasilan proyek?

	1	2	3	4	5	
Very Low	○	○	○	○	◉	Very High

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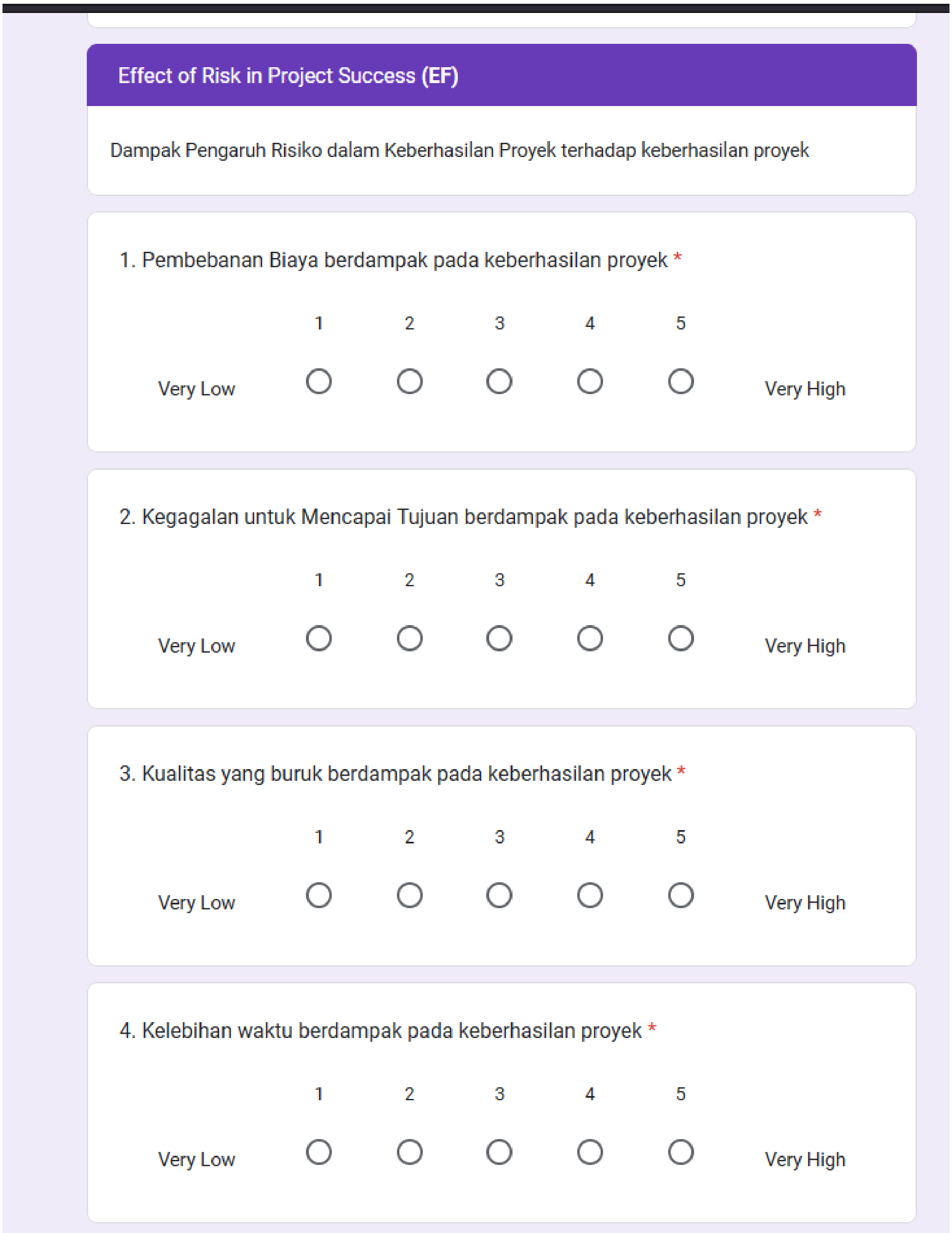

Effect of Risk in Project Success (EF)

Dampak Pengaruh Risiko dalam Keberhasilan Proyek terhadap keberhasilan proyek

1. Pembebanan Biaya berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

2. Kegagalan untuk Mencapai Tujuan berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

3. Kualitas yang buruk berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High

4. Kelebihan waktu berdampak pada keberhasilan proyek *

	1	2	3	4	5	
Very Low	○	○	○	○	○	Very High