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Potential Benefits and Challenges of Integrating Risk Management with Stakeholder Management: Case Study on Gold Processing Plant Construction Project in Central Sulawesi, Indonesia

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ABSTRACT
The purpose of this study is to examine the potential benefits, challenges, and dynamics of implementing the integration of Risk Management (RM) and Stakeholder Management (SM) on a Gold Processing Plant Construction Project in Central Sulawesi, Indonesia. The method used is qualitative approach using the grounded theory method, with primary data from stakeholder interviews and secondary data from literature studies. The results show that Relationship Mode 3, i.e. Management of Stakeholder Differences Concerning Risk, is most applicable, as it improves conflict management and risk response strategies. Recommendations include the integration of this mode into the financial model as a risk management system.

1. Introduction

The dynamic, volatile, and complex nature of the construction industry leads to a high level of uncertainty in construction projects. If uncertainty is not managed correctly, it can adversely impact a company's performance (Okudan et al., 2021).

According to Kermanshachi et al. (2016), the construction industry is dynamic due to the uncertainties associated with technology, budgets, and development processes, as well as the rather complex and uncertain nature of the construction environment. Construction projects have various sources of uncertainty stemming from material and labor shortages, adverse weather conditions, an unstable political environment, inadequate cash reserves, the possible impact of inflation on project costs, and the short-term nature of most construction projects.

The presence of Risk Management (RM) is significant and necessary from the project initiation phase to the project closure phase. The Risk Management (RM) process includes identifying the source of uncertainty (risk identification), estimating the likelihood and impact of uncertain events on a project (risk analysis), generating a response strategy, and the risk monitoring process during the project (Okudan et al., 2021).

Quoted from the Harvard Business School Online website, it is said that, -Risk Management (RM) is a systematic process to identify, assess, and mitigate threats or uncertainties that can affect a company or organization, which involves analyzing the likelihood and impact of risks, developing strategies to minimize adverse impacts and monitoring the effectiveness of actions (Gibson, 2023; Madhav et al., 2017).

Project Risk Management (RM) aims to exploit or increase positive risks (opportunities) while avoiding or mitigating adverse risks (threats). Unmanaged threats can result in problems such as delays, cost overruns, decreased performance, or loss of reputation. Captured opportunities can result in benefits such as reduced time and costs, improved performance, or reputation (Project Management Institute, 2017;Karunakaran et al., 2020)

According to Ward & Chapman (2008), Most projects have various stakeholders who have interests and concerns that can affect the shape and progress of the project. According to Bal et al. (2013), Stakeholder involvement is part of construction project practices to deliver superior project outcomes that require stakeholder identification as an essential component in the scoping phase. The scoping phase is a stage of the process of determining the project scope, which includes goals, results, tasks, schedules, and budgets. This must be done before the plan and consultation begin, considering that each stakeholder has their interests.

Based on the findings from Bal et al., (2013), stakeholders can be prioritized based on the following: (1) Those who have the highest decision-making power; (2) Those who contribute economically, socially and environmentally in terms of impact or dependence on the organization; (3) And those who are not directly related to the project, but are interested in seeing the project and providing sustainable solutions. Stakeholders are the primary source of uncertainty, so it is necessary to manage relationships with stakeholders.

The interests that stakeholders have in the project can lead to differences in priorities and conflicts and dramatically increase the complexity of the situation (Karlsen et al., 2008; Bal et al., 2013). A well-managed stakeholder engagement process helps project stakeholders work together to improve comfort and quality of life while reducing negative impacts on the environment and improving the economic sustainability of the project.

According to Li et al., (2014) and Xia et al., (2018), Fair risk allocation and good relationships with project stakeholders can effectively reduce transaction costs in construction projects. Literature review that has been conducted by Xia et al., (2018) revealed that Construction Risk Management and Stakeholer Management are feasible and can provide benefits to the field of risk management and stakeholders. Some research (Du et al., 2016; T. Wang et al., 2016) shows that the integration of risk management process elements and stakeholders will improve project performance.

The results of the research conducted by Xia et al. (2018) indicate the existence of four linkages or modes of risk relationships with stakeholders, namely: (1) Management of risk based on stakeholder identification; (2) Internal stakeholders' responsibility and ability in the RM process; (3) Management of stakeholder differences concerning risk; (4) Interrelatedness between RM and SM and effect on project performance.

Xia et al. (2018) highlighted that the four identified linkages reveal different potential approaches to connecting risk management with stakeholders. These connection modes were developed through a thematic analysis of 79 relevant construction journals, representing different options. The purpose of these four connection modes or interconnection themes is to inspire future efforts to strengthen the relationship between construction risk management and stakeholder management.

It can be concluded from the beginning that different types of projects have different complexities and risks, and each construction project should carry out an integrated RM and SM process where the integration process can be carried out through the four relationships above.

This research focuses on the construction project of a gold processing plant located on the island of Central Sulawesi, Indonesia, where, of course, the initial conclusion is intended to be applied by the project owner in order to achieve the project objectives quickly and precisely. However, so far, the author has not found studies related to risk management that are integrated with stakeholder management both for practice and theory, especially on the application of the relationship mode between the two in accordance with the studies that have been conducted by Xia et al.(2018).

Therefore, the author plans to contribute to research on the four modes of relationship between Risk Management (RM) and Stakeholder Management (SM), which is the result of the research of Xia et al. (2018). The aim is to find an applicable mode of relationship that can be applied to the construction project of a gold processing plant in Central Sulawesi, Indonesia.

The choice of relationship mode can indeed be associated with the potential benefits, challenges, and dynamics faced in the application of each of these relationship modes.

2. Materials and Methods

Approach Used

This study uses a qualitative research approach, where participants are encouraged to share their ideas and develop common themes from those ideas (Creswell, 2015). The authors opted for interview techniques in this research to gain in-depth insights and understanding from informants, focusing on exploring the potential benefits and challenges of integrating Risk Management (RM) and Stakeholder Management (SM) within a quantitative framework in a gold processing plant construction project in Central Sulawesi, Indonesia.

In qualitative research, questions are designed to capture the experiences of informants. Data is collected through verbal methods, such as interviews, and then analyzed by identifying key descriptions and themes, with text analysis used to reveal the broader significance of the findings (Creswell, 2015).

Data Collection Methods

This study uses primary and secondary data. Primary data are obtained through interviews with respondents or observations, while secondary data is taken from literature studies such as research journals.

1. Interview

Data collection by interview technique was carried out with informants who have the domain of work or the scope of work on the Gold Processing Plant Project at a Gold Mining Company in Central Sulawesi, Indonesia.

Table 1 Informant Data

No	Initial Informant	Informant Code	Specialisation / Position of Informant
1.	DJ	Informant 1	Financial Control
2.	RCM	Informant 2	Construction & Infrastructures
3.	AS	Informant 3	Processing & Mining
4.	AA	Informant 4	Government Relations & Permit

2. Research Using Secondary Data
   The literature study method is used to collect data from books, journals, websites, and other sources relevant to the research.

Data Analysis Techniques

This research uses a qualitative method with a grounded theory approach, which is a systematic method to produce a theory that explains the process, action, or interaction (Creswell, 2015). The method used is systematic design, which involves three phases of coding: open coding, axial coding, and selective coding.

- Open Coding: This first phase forms the initial category of information about the phenomenon studied through information segmentation.
- Axial Coding: The second phase selects one category of open coding as a core phenomenon and relates it to other categories, such as causal conditions, strategies, contextual conditions, interventions, and consequences. This connection is illustrated in the coding paradigm.
- Selective Coding: The third phase involves writing a theory of categorical relationships in axial coding, as well as examining the factors that influence the phenomenon.

Results are validated through triangulation, which is the process of corroborating evidence from various data sources or data collection methods to ensure the accuracy and credibility of the research.

Instrument / Simulation Model Preparation

1) Simulation model of the approach 1: Management of risk based on stakeholder identification,
   - Uncertainty factors: type of stakeholder, level of rejection, period of rejection, period of rejection, licensing to local and central governments,
2) Approach simulation model 2: Internal stakeholders' responsibility and ability in the RM process
   - Uncertainty factors: stakeholder experience in the field, stakeholder experience in managing previous risks in previous projects, scope of stakeholder responsibility, stakeholder contributions
3) Simulation model approach 3: Management of stakeholder differences concerning risk
   - Uncertainty factors: risk perception by stakeholders, types of decisions taken in dealing with risks, risk mitigation plans

4) Simulation model approach 4: Interrelatedness between RM and SM and effect on project performance.
   - Uncertainty factor: the influence of the SM and RM processes that lead to the results of project performance.

3. Result and Discussion

Research Results

After using secondary data relevant to the study, interviews were conducted, and information was obtained from four informants with diverse backgrounds and specialties, namely from the fields of finance (Informant 1), construction and infrastructure (Informant 2), engineering (Informant 3), and government relations and permits (Informant 4).

The information obtained from the interviews' results was used in transcripts, which were then analysed using the grounded theory method with a systematic design type. This method emphasised the use of Open Coding, Axial Coding, and Selective Coding data analysis steps. The triangulation technique, which involves comparing information or data from various data collection methods, is also applied by the triangulation method.

The first phase is Open Coding, the author identifies and segments interview information that has been used as a transcript. The author generated 151 codes from the interviews with four different informants.

The second phase is Axial Coding. In this phase, the coding results are classified into several phenomena categories and associated with other categories. The results of the coding classification won 54 categories.

The third phase is Selective Coding. The results of the previous category classification were then grouped into several themes. The theme contains a theory of the relationship between categories in the Axial Coding model. In this study, the author groups them into five themes, namely Environmentally Friendly and Sustainable Factory Circuit Optimization, Operational Efficiency, Relationship Strategies with the Community, Relations and Compliance with the Government, and Risk and Stakeholder Management Strategies.

Table 2 Selective Coding Result

No	Category	Total of Frequencies	Themes				
			Optimisation of Eco-Friendly and Sustainable Factory Circuits	Operational Efficiency	Community Relations Strategy	Relationship and Compliance with Governments	Risk and Stakeholder Management Strategy
1	Low-Grade Ore Processing	2	2				
2	Capex Cost Efficiency	1		1			
3	Procurement Process	4		4			
4	Promises to the Government	1				1	

5	Unpredictable Weather Conditions	5		5			
6	Misallocation of Funds	1		1			
7	Contractor/Vendor Selection	2		2			
8	External Issues	4			4		
9	Risk Identification	6					6
10	Financial/Cash Flow Disruptions	2		2			
11	Increasing Debt	1		1			
12	Collaboration with Security Forces	1			1		
13	CSR Approach	1			1		
14	Negotiating with Vendors	3		3			
15	Royalties to the Government	3				3	
16	Communication with Protesters	3			3		
17	Operational Shutdown	1			1		
18	Overhead Costs	1			1		
19	Risk Mitigation Plan	2					2
20	Risk Management	2					2
21	Environmentally Friendly & Sustainable Plant Circuit	3	3				
22	Plant Circuit Planning and Construction	5	5				
23	Plant Design Engineering	4	4				
24	Compliance with Government Regulations	11				11	
25	Improving Gold Recovery	1	1				
26	Additional Cash Flow from Operations	2		2			
27	Public Announcement	1			1		
28	Permits Must Be Complete Before Operations	3			3		
29	Waste Processing System Planning	3	3				

30	Environmental Pollution	2	2				
31	Waste Disposal Area	1	1				
32	Risk Failure Potential Measurement	1					1
33	Risk Rating	2					2
34	Water Quality Testing	1	1				
35	Plant Circuit System Evaluation	1	1				
36	Monitoring Manufacturing Vendors	1	1				
37	Risk Matrix	3					3
38	Suitable Equipment (Manufacturing & Installation)	4	4				
39	Stakeholder Synergy	7					7
40	Identifying Stakeholder Demands	2					2
41	Vendor Payments	2		2			
42	Discipline in Following Work SOPs	5	5				
43	QA QC Work Results	1	1				
44	Penalties and Returning Goods to Vendors	1	1				
45	Modifying Incorrect Vendor Equipment	1	1				
46	Using Management Consulting Services	2					
47	Communication with External Stakeholders	12			12		
48	Government Leadership Rotation	3				3	
49	Dynamics Between Local and Central Government	1				1	
50	Community Support	6			6		

51	Project Feasibility and Economics	2	2				
52	Investment to Boost the Local Economy	1				1	
53	Reducing Unemployment	1			1		
54	Project Completion Time Planning	9		9			
	Total	151	36	34	30	24	27

Based on the theme that has been achieved from the results of the category grouping above, it shows that the project's stakeholders are trying to optimize the construction of environmentally friendly and sustainable factory circuits and focus on improving efficiency in the factory construction process to operations. In addition, it shows the efforts of stakeholders in building and maintaining good relations with local communities, establishing relationships, and complying with government regulations. The last theme is Risk Strategy and Stakeholder Management, showing the approach taken by informants in managing risk and relationships with stakeholders.

Relationship Mode 1: Management of Risk Based on Stakeholder Identification

In the linkages (theme of relatedness) or the first mode of relationship, namely Management of risk based on stakeholder identification, it is stated that the need for stakeholder identification in managing risk and the position of stakeholders towards the project can vary, ranging from supporting to opposing the project. This first mode of linkages bridges risk management and stakeholders by explaining how project stakeholder management, especially identifying relevant stakeholders and potential threats, can help formulate a risk response strategy (McElroy & Mills, 2000; Xia et al., 2018).

Based on the results of interviews with the four informants, informant 1 identified the community as an external stakeholder that should be a top priority, given their great potential to hinder or delay the completion of the project. In terms of financial settlement, the second stakeholder identified is the vendor.

The main challenges faced include public skepticisms about the operational goals of mining companies. Community support can be a significant risk in the future; if the community feels that they are not benefiting, demonstrations can occur for days, which can cause company operations to be disrupted, hinder the achievement of project objectives, and incur additional costs due to delayed project completion. Additionally, improper allocation of funds or late payments to vendors can lead to delays in project completion. Risk management to the community includes cooperation with security forces, a Corporate Social Responsibility (CSR) approach, and persuasive socialization regarding the company's goals and benefits to the community. In addition, risk management for vendors is carried out through regular communication regarding the progress of work and obstacles faced.

Informant 2 argued that the factory waste management system ranks highest in terms of consequences and opportunities for risks. This risk is related to the government, considering that companies are required to comply with legal regulations in carrying out factory operations from upstream to downstream. The challenge faced by the company is the risk of environmental pollution, which can result in warning letters from the Ministry of Energy and Mineral Resources (ESDM) and the Ministry of Environment and Forestry (MoEF). To manage this risk, companies need to conduct regular river water quality tests to ensure that the water quality standards used by the community remain unpolluted and safe. Compliance with government regulations must be carried out in accordance with the law, especially in fulfilling the obligation to obtain all necessary permits before starting project operations, such as Feasibility Study (FS) and Environmental Impact Analysis (EIA) permits. From an economic perspective, the company also makes a significant contribution to the government through tax payments and PNBP (Non-Tax State Revenue).

Furthermore, Informant 2 identified that the factory circuit system ranked second in the same category. These risks are directly related to in-house engineers and manufacturing vendors. The challenge faced is that if the factory circuit is not practical in processing ore, this will have a negative impact on the company's cash flow. In addition, delays or errors in the manufacturing of factory equipment can affect the project completion time and the company's cash flow. To manage these risks, it is necessary to check and evaluate the performance of factory circuits regularly, as well as monitor manufacturing vendors through regular meetings, periodic progress reports, and effective control.

According to Informant 3, engineering design risk ranks highest in terms of consequences and opportunities for risks related to internal stakeholders, namely engineers, as well as consulting vendors for engineering drawings as third parties. Informant 3 also identified that the risks associated with manufacturing factory equipment ranked second in the same category.

The challenge related to engineering risks is that if the factory's production output is not suitable, the company's plan to increase cash flow will not be achieved. Likewise, the risk of errors in factory equipment can disrupt the project completion schedule and cause delays, as the company must return the goods to the vendor, impose fines, and make modifications independently if the manufactured factory equipment is not crucial. This risk management includes strict supervision by a third-party engineering team and compliance with the set standard operating procedures (SOP) or manual book. Therefore, strict implementation of quality assurance (QA) and quality control (QC), starting from the engineering design process and manufacturing to equipment installation, is needed to minimize errors and ensure that the implementation goes according to plan.

Informant 4 identified that social risk ranked highest in terms of consequences and the likelihood of risks, which are directly related to society. The main challenge faced is the pragmatic nature of community support, which is determined by the magnitude of the benefits they receive. If the public feels that they do not benefit, they have the potential to hold demonstrations, which can result in the suspension of company operations. For this risk management, companies need to establish regular communication with the community to strengthen relationships and build trust. In addition, companies should carry out social mapping and baseline studies on a regular basis to identify changes occurring in society. In order to meet operational needs, the company also recruits qualified residents so that they can contribute to the improvement of the local economy. This recruitment is expected to help reduce the unemployment rate in accordance with the expectations of the local government. With these measures, companies can obtain potential benefits in the form of social permits, support, and tranquility related to corporate activities from the community.

Based on the results of interviews with four informants, the potential benefit of the implementation of Relationship Mode 1 is the ease of risk management through risk mapping based on stakeholder identification. With a clear risk prioritization assessment, companies can plan for potential threats that may arise, as well as mitigation plans. This allows the project implementation process to be more comprehensive and structured.

However, the challenge faced in implementing Relationship Mode 1 is the difference in informants' perceptions of identifying and prioritizing risks based on stakeholder identification.

The dynamics that occur show that the fundamental risk conceptualization and risk perspective in analyzing various risks by different stakeholders can result in varying risk ratings. This is influenced by social and institutional contexts, which ultimately leads to differences in the prioritization of risk management measures (Goerlandt & Reniers, 2017).

Relationship Mode 2: Internal Stakeholders' Responsibility and Ability in The RM Process

Linkages (theme of relatedness) or the second mode of relationship, namely internal stakeholders' responsibility and ability in the RM process, is how the ability and resources, as well as internal stakeholder responsibilities, are in managing risk. Internal stakeholders are interested in being a source of risk mitigation, especially focusing on the development of pre-conditions and approaches to risk management (Xia et al., 2018).

The stakeholders who became informants in this study have more than 20 years of career experience in their respective fields. Informant 1 works in the financial and non-technical aspects and is responsible for assessing the feasibility and economics of the project by preparing a financial model that is measured using parameters such as NPV, ROI, and Payback Period. If the results of the calculation show feasibility, then the project is considered financially and economically feasible to be implemented. Other responsibilities include project control and evaluation functions, as well as project leaders, such as leaders of the construction process and commissioning. In managing risk, Informant 1 emphasized the importance of communication with stakeholders.

Informant 2 focuses on technical projects in the construction and infrastructure sectors, with the main contribution to the optimization of environmentally friendly and sustainable factory circuits. Informant 2's responsibilities include the preparation of environmentally friendly and sustainable factory circuits. In managing risk, Informant 2 implements a risk profile, sets priorities, and designs mitigation measures. Risks are identified from various sources and assessed through a risk matrix to determine mitigation strategies. This risk matrix is shared with the team so that all members understand and are aware of the risks that exist. With this approach, it is hoped that the project can run more effectively in risk mitigation.

Informant 3's field of work is technical engineering, with a focus on factories as the main component of mining infrastructure. His responsibilities include engineering design planning, design implementation during the construction process, and factory operational supervision. Informant 3 plays a role in ensuring a smooth process from the initial design stage to the implementation and operation of the factory. In an effort to manage internal risks, it is very important to comply with the set Standard Operating Procedures (SOPs) or Manual Books. Risks can arise if the actions taken are not in accordance with the data obtained or do not follow the predetermined stages.

Meanwhile, Informant 4 works in the field of Government Relations and permits, serving as a bridge between the interests of companies and the government, both at the central and regional levels, as well as law enforcement officials, the public, and the media. In an effort to manage internal risks, the first step is to identify risks at the beginning of the project and develop mitigation scenarios for each risk that has been identified. This aims to ensure that all potential risks can be addressed effectively and efficiently.

Based on interviews with four informants, the various types of risks mentioned earlier show that stakeholders tend only to manage risks in their respective fields. Hence, collaboration between fields in managing risks in an integrated manner is very minimal.

The potential benefits of implementing Relationship Mode 2 lie in the career experience of each informant who has more than 20 years in their field, making the informant expert and experienced in carrying out obligations and identifying and managing risks from previously worked projects. However, there are challenges in implementing Relationship Mode 2, based on the results of interviews with four informants, namely in risk management, the application of vertical stakeholder culture in the internal organization of the project is not optimal. Hence, collaboration in implementing the Risk Management (RM) process in the internal organization of the project is not optimal, which is needed to achieve project success.

The dynamics of the implementation of Relationship Mode 2 show that the project capability in Risk Management (RM) depends not only on the project management team on site but also on employees in various positions within the company's internal organization. The risk management attitude of the leaders and the RM culture among team members at various levels are crucial in determining the effectiveness of risk management in the construction sector (Loosemore et al., 2006; Zou et al., 2010; Xia et al., 2018).

Relationship Mode 3: Management of Stakeholder Differences Concerning Risk

Linkages (theme of relatedness) or the third mode of relationship is the Management of stakeholder differences concerning risk, which is the management of differences in perception of risk by each stakeholder and making decisions based on risk (Xia et al., 2018).

Based on the results of the interview with Informant 1, three main risks must be managed in this project, namely external, financial, and natural risks. External risks arise when demonstrations occur. In this situation, the company will identify the protesters, then convey the company's goals and benefits and investigate the demands raised. Mitigation is carried out through cooperation with security forces and the Corporate Social Responsibility (CSR) approach.

Financial risk is associated with late payments to third parties, which can delay commissioning, disrupt cash flow, and increase debt risk. Mitigation includes regular communication on work progress and obstacles faced, negotiations regarding overhead costs and communication about uncontrollable delays. Natural risks are unpredictable, requiring careful project timeline planning.

Informant 2 identified three main risks in this project, namely factory waste management, factory circuit systems, and natural risks. The challenge in waste management is environmental pollution, which can result in warning letters or operational suspension from the Ministry of Energy and Mineral Resources (EMR) and the Ministry of Environment and Forestry (MoEF). Risk mitigation is carried out by monitoring the waste management system and regularly testing river water quality.

The risk of plant circuits is related to the effectiveness of ore processing, which can impact the company's cash flow. Delays or errors in the manufacturing of factory equipment can also affect project completion times. To manage these risks, regular checks and evaluations of factory circuit performance are required, as well as monitoring of manufacturing vendors through regular meetings, progress reports, and adequate controls.

Informant 3 identified three main risks in this project, namely engineering design risk, factory equipment risk during construction, and financial risk. Challenges related to engineering risks arise if the factory's production output does not meet the target, so the company's plan to increase the cash flow is not achieved. Additionally, errors in plant equipment can disrupt project completion schedules, resulting in delays. The company may have to return the equipment to the vendor, pay a fine, or make modifications if the equipment is not crucial.

Risk mitigation includes strict supervision by the engineering team and compliance with Standard Operating Procedures (SOPs). Strict implementation of Quality Assurance (QA) and Quality Control (QC) from manufacturing to equipment installation is necessary to minimize errors and ensure that project implementation goes according to plan.

Informant 4 identified three main risks that must be managed, namely social risks, followed by technical risks during construction and legal/permit risks. The main challenge of social risk is pragmatic community support, depending on the benefits received. If they do not feel benefited, the community can hold demonstrations that have the potential to stop the company's operations. The challenge of technical risk is that if the company considers this project uneconomical, then the project will not continue. The challenge of legal/permit risk is that if a permit has not been obtained, work activities will not be able to start.

Based on interviews with four informants, risk perceptions and risk-based decisions varied widely. Differences in risks were identified, including factory waste management, factory circuit systems, engineering design, factory equipment during construction, and technical risks, as conveyed by Informant 2, Informant 3, and Informant 4.

Potential benefits of implementing Relationship Mode 3 include managing risk perception differences that allow for a more comprehensive understanding among stakeholders regarding various risks in the project. This can lead to a better understanding among stakeholders of the various risks involved in the project, lead to more informed and collaborative decisions regarding risk management strategies, and help resolve conflicts that may arise from differences in risk perception so that the project can run more smoothly.

However, implementing Relationship Mode 3 presents a challenge. Stakeholders may have different perceptions of project risks, which can lead to subjectivity and mismatch in risk management. These differences can influence risk-based decisions among individual stakeholders.

The dynamics of the application of Relationship Mode 3 shows that the diverse backgrounds of stakeholders in construction projects tend to result in different views on the structure and criticality of risk, as well as how to handle it (Xia et al., 2018). Social structures and cultural systems also play a role in influencing individual risk perceptions, actions, and decision-making processes (Friedman and

Miles, 2002; Xia et al., 2018). Therefore, differences in risk perception among stakeholders cannot be ignored. Effective management of differences in risk perceptions and risk-based decisions is needed to equalise effective risk management and response strategies.

Relationship Mode 4: Interrelatedness Between RM and SM and Effect on Project Performance

Linkages (theme of relatedness) or the fourth mode of relationship is Interrelatedness between RM and SM and its effect on project performance. This is a combination of the relationship between Risk Management (RM) and Stakeholder Management (SM), which will impact a project's performance. According to Dadpour et al. (2024), different stakeholders in the project and the various risks they pose can affect project performance and increase project costs. Therefore, Stakeholder Management (SM) is needed.

Based on the results of interviews with four informants, the view of the ideal project completion shows several essential aspects. According to Informant 1, an alternative schedule calculation is needed to anticipate external issues so that the risk of project completion delays can be minimized. Informant 4 added that the ideal completion of the project should include the fulfillment of social, technical, and licensing aspects by stakeholders, which will reduce the number of threats to the project's success.

Informant 2 emphasized that compliance with regulations set by relevant government agencies is very important to ensure the project's smooth operation and avoid penalties or operational termination by the Ministry of Energy and Mineral Resources (EMR) and the Ministry of Environment and Forestry (MoEF). The synergy built between stakeholders also plays a vital role in better risk management and decision-making. Thus, the proper risk management process can improve project performance and stakeholder satisfaction.

Informant 3 stated that efficient resource use and compliance with Standard Operating Procedures (SOPs) are critical to the ideal completion of the project, which will impact stakeholder satisfaction. In addition, using more than one engineering design consultant can minimize the threat of design errors.

The potential benefit of implementing Relationship Mode 4 is the integration between Risk Management (RM) and Stakeholder Management (SM) processes that can have a positive impact on project performance. This integration allows RM process variables to affect SM outcomes and vice versa. However, there are challenges in the implementation of Relationship Mode 4; mistakes in identifying stakeholders can result in unrealized risk management benefits to project performance and vice versa. In addition, the disparity of stakeholder views in formulating a risk response strategy can reduce the positive impact on project performance.

The dynamics of the implementation of Relationship Mode 4 show that, according to Xia et al. (2018), the integration of RM and SM can benefit both areas. However, to achieve these benefits, it is essential to differentiate between process variables and outcome variables, as well as equalize risk response strategies so that project performance is maximized.

4. Conclusion

The results of the study show the benefits and challenges in the integration of Risk Management (RM) and Stakeholder Management (SM): Relationship Mode 1 maps risks based on stakeholders, but challenges arise from differences in risk perception among informants, which are influenced by social and institutional contexts. Relationship Mode 2 utilises the experience of informants in managing risk, but the implementation of a vertical stakeholder culture that is not optimal hinders effective collaboration in the organisation. Relationship Mode 3 improves the understanding of project risks and supports collaborative decisions, but differences in stakeholder risk perceptions can lead to mismatches in risk handling. Relationship Mode 4 integrates RM and SM, which improves project performance, but challenges arise from the differing views of stakeholders in the risk response strategy. In conclusion, Relationship Mode 3 is the most suitable for this gold processing plant construction project because it helps manage conflicts between stakeholders and facilitates the development of customised risk response strategies. Relationship Mode 1 and 2 are less suitable due to the lack of collaboration and different risk perceptions, while Relationship Mode 4 has not shown precise performance.

5. References

Bal, M., Bryde, D., Fearon, D., & Ochieng, E. (2013). Stakeholder Engagement: Achieving Sustainability in the Construction Sector. *Sustainability (Switzerland)*, *5*(2), 695–710. https://doi.org/10.3390/su5020695

Creswell, J. (2015). *LOOSE-LEAF VERSION Planning, Conducting, and Evaluating Quantitative and Qualitative Research I FIFTH EDITION*.

Dadpour, M., Shakeri, E., Nazari, A., & Moghadas Nejad, F. (2024). Optimizing the portfolio of road project stakeholders with cost and risk approach. *International Journal of Construction Management*, *24*(7), 722–733. https://doi.org/10.1080/15623599.2022.2159334

Gibson, J. (2023, October 24). *WHAT IS RISK MANAGEMENT & WHY IS IT IMPORTANT?* https://online.hbs.edu/blog/post/risk-management

Goerlandt, F., & Reniers, G. (2017). An approach for reconciling different perspectives and stakeholder views on risk ranking. *Journal of Cleaner Production*, *149*, 1219–1232. https://doi.org/10.1016/j.jclepro.2017.02.129

Karlsen, J. T., Græe, K., & Massaoud, M. J. (2008). Building Trust in Project-Stakeholder Relationships. *Baltic Journal of Management*, *3*(1), 7–22.

Karunakaran, P., Halid Abdullah, A., Nagapan, S., Sambasivan, M., & Sekar, G. (2020). The Moderating Effect of Project Risk Response-Related Measures on The Relations Between Project-Related Delay Factors and Contruction Project Performance. *Humanities & Social Sciences Reviews*, *8*(2), 405–412. https://doi.org/10.18510/hssr.2020.8246

Kermanshachi, S., Walewski, J., & Cline, D. (2016). *DECISION MAKING AND UNCERTAINTY ANALYSIS IN SUCCESS OF CONSTRUCTION PROJECTS A Dissertation*.

Madhav, N., Oppenheim, B., Gallivan, M., Mulembakani, P., Rubin, E., & Wolfe, N. (2017). Pandemics: Risks, Impacts, and Mitigation. In *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty* (pp. 315–345). The World Bank. https://doi.org/10.1596/978-1-4648-0527-1_ch17

Okudan, O., Budayan, C., & Dikmen, I. (2021). A knowledge-based risk management tool for construction projects using case-based reasoning. *Expert Systems with Applications*, *173*. https://doi.org/10.1016/j.eswa.2021.114776

Project Management Institute. (2017). *A guide to the project management body of knowledge: Vol. Sixth Edition*.

Robinson, S. (2014). *The Practice of Model Development and Use Second edition*.

Ward, S., & Chapman, C. (2008). Stakeholders and uncertainty management in projects. *Construction Management and Economics*, *26*(6), 563–577. https://doi.org/10.1080/01446190801998708

Xia, N., Zou, P. X. W., Griffin, M. A., Wang, X., & Zhong, R. (2018). Towards integrating construction risk management and stakeholder management: A systematic literature review and future research agendas. *International Journal of Project Management*, *36*(5), 701–715. https://doi.org/10.1016/j.ijproman.2018.03.006