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Risk Assessment to Improve the Performance of Projects

*Muhammad Haris Latif

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Muhammad Haris Latif is currently affiliated with Department of Industrial & Engineering Management, University of Engineering & Technology, Taxila, Pakistan.
Email: Haris.latif@students.uettaxila.edu.pk
Email: m.harislatif123@gmail.com

*Corresponding Author

Abstract

The research, focal point on a wide-ranging investigation of the processes associated with identifying, assessing, and managing threats associated with various projects. The main objective is to enhance the performance by efficiently identifying and mitigating the potential hazards that may arise during the lifecycle of the project. While using a quantitative approach for this, the study includes surveying and interviewing a total of 50 project managers and team members to collect primary data. Data can be analyzed through Statistical Package for Social Sciences (SPSS). The collected data is subjected to statistical analysis and thematic investigation to discover patterns, trends, and correlations between risk assessment practices and project performance indicators. The research results offer valuable insights into the existing utilization of risk assessment methodologies in project management and their effect on project success. It involved risk tolerance, risk treatment, risk transfer, and risk termination which can identify the variables and represent a model to effect on the project performance affecting the success of projects. The analysis evaluates the effectiveness of various risk assessment strategies and techniques in manufacturing, construction-based and Software and IT Industries, encompassing both qualitative and quantitative methods. Additionally, the study explores organizational factors influencing the implementation and outcomes of risk assessment processes.

INTRODUCTION

For a successful risk assessment, to evaluate risks is dependent heavily on project success (Hu et al.,2022). There are various uncertainties and threats that arise from construction, engineering, and information technology projects. It has a greater influence on how things come out (Lyon & Hollcroft, 2021). To reduce the obstructive importance and increase project enhancement, organization and project management performance to proactively identify and manage these risks (De Schutter et al.,2022). As poor risk assessment practices often lead us projects to be postponed, increasing costs or lowering project quality. The conventional project management methodologies, on the other hand, focus on containing risks as they manifest rather than doing a systematic and

thorough assessment of risk. However, it might result in missed chances, increased project volatility, and generally less successful project outcomes (Ostrom & Wilhelmsen, 2019). By thoroughly identifying and mitigating risks from the outset, enterprises may reduce uncertainty, boost the allocation of resources, and improve performance by analyzing hazards in the start (Ostrom & Wilhelmsen, 2019) (Lamine et al., 2020). Various risk assessment techniques can be attributed to factors that can target the construction project which are comprised of cost, time, and performance. Previous research has indicated various risk linked with project resources (S. Husin et al., 2016) external resources (S. Husin Mubarak and Syarafina, 2016), managerial and operational factors (F. Maulina et al.,2016), contracting and design factors (M. Nurisra et al., 2016), and financial and construction methods (Tripoli, A et al., 2016). The research work can explain the following things including the analysis of risk assessment, improving the performance of projects, factors affecting the risk, and its magnitude. The model constructed for it can be used to increase the performance of projects while investigating specific factors. However, the main goal of the study is to find the relationship between project performance in risk assessment. There are certain conditions in which performance can be assessed through the Statistical Package for Social Sciences (SPSS). Also, enhancing the overall objectives of projects can enhance the performance of projects during risk situations. Conclusively, the factors used for improvement in projects during the assessment include risk tolerance, risk treatment, risk transfer, and risk termination along with their variables. These findings, there is a clear understanding of risk assessment which affects the project performance given by project directors, team members, and contractors within the construction-based, manufacturing industries and IT related industries.

LITERATURE REVIEW

To assess the risks while managing projects with use of FMEA, fault tree analysis (FTA), and Bayesian networks in conjunction by He and colleagues (2019). According to the author, while discussing the pros and cons for a hybrid strategy which is suggested for risk assessment. To study project hazards, the use of Monte Carlo simulation as a portion of the probabilistic risk assessment technique can enhance the estimations of risks and include uncertainty and variability in the analysis of risk by Naderpour et al. (2019). In addition to it, there is a need to analyze the risks from the start of planning projects by Porretta & Agnese (2021). They suggested doing thorough assessments of risks to resolve issues and develop contingency plans. According to the author's recommendation, using brainstorming techniques and checklists assists with risk identification and enables a thorough assessment of possible hazards.

A framework for it includes the identification, analysis, and prioritization of risks using qualitative and quantitative methodologies by Siraj and Fayek (2019). The strategy promotes the involvement of stakeholder engagement in decision-making. To complete the project on time and achieve a higher rate of success within limited budgets by Menna et al. (2022). Muthukannan & Senthil (2022) and Cagliano et al. (2015) found that it improves quality parameters of projects, reduces rework, and alleviates customer satisfaction. Further moving on, Zhao et al. (2020) apprise that risk management practices are commonly taken for construction-related projects in which environmental reflections are working as a key indicator. De Araújo Lima et al. (2020); suggested that to maintain the reputation of the corporate sector and promote branding when hazards appear

within organization. Apart from this, He investigates how planning and preparedness for risks comes in its way. For critical risk network, Chen et al. (2021) established to incorporate key risk inter relationship. The role of assessing risk in project management is essential as Shayan et al. (2022) highlight it. He emphasizes the comprehensive need for a risk assessment process that can discover and analyze hazards during this process and minimize volatility. Moving this, as El Khatib et al. (2022) underline the significance of taking both internal and external sources, team members can develop effective risk reduction approaches that deteriorate potential threats and boost success in projects. Hillson and Simon (2020) discuss the proactive nature of risks in the way of projects. According to them, the only way to get enhancements in projects is possible with the efficient role of teams working on a project, while reducing the possible measures of risks. According to (de Nahlik et al. in 2021) which investigated the context of project quality management.

By doing this rigorous risk assessment, project teams are involved in hazards that can influence on project quality outcomes. These teams address the risks and enhance the quality parameters to satisfy the needs of customers and boost overall success. As supported by Nachbagauer (2022), external risks can be controlled by project teams beyond their limits. Further, the project management team undertakes the internal threats within the organization according to Albogami et al. (2022). This investigation contributes to the growth of theoretical foundations, helping in the improvement of project management practices Bukar & Ibrahim, 2021. Stakeholders' participation can affect the assessment of risks and the success of projects according to Shaukat et al. (2022). He stresses working in a team and ensures accountability to identify hazards and enhance success. As Ika & Pinto (2022) stress stakeholder involvement is helpful to motivate, enhance transparency and encourage teamwork to promote visibility and fulfill goals during risk assessment. According to Saad et al. (2022) stresses stakeholders awareness and expectation alignment increase risk assessment findings and project success. Further, discussing more studies, as Lotfi et al. (2022) investigate the domain of schedule risk management which is related to power engineering projects. For the decision-making process in risk assessment to perform better in project management integrate properly by Ullah et al. (2021). The above information explains the significance of risk assessment while enhancing the project performance. In this paper, we have to explain four factors along with their variables which are risk Tolerance, risk treatment, risk transfer, and Risk termination.

The term Risk termination is usually not used in the scenario of risk management. However, depending on the situation, it can act as an action that totally removes or stops the specific hazard affecting on project, company, organization, and any involved process (Yurchenko et al., 2019). Finally, based on the previous studies, the performance of projects in risk assessment can be based on different indicators variables. Following arguments integrate the hypotheses and tested: H1 = Degree of risk tolerance exhibited by an organization is positively correlated with successful tolerating of risks in projects; H2 = Risk treatment strategies in projects have higher likelihood in the project performance success; H3 = There is a significant difference in the effectiveness of risk transfer strategies on the performance of projects; H4 = Organizations that frequently terminate the projects due to high risks are more likely to have lower project success rates than those that employ risk treatment strategies

RESEARCH METHODOLOGY

To better understand and conduct the literature review can investigate the risk assessment in the performance of projects. The survey questionnaire can test the hypotheses proposed for the study. It was designed for the respondents to investigate the risk assessment affecting the performance of projects in manufacturing, construction, and software industries in Pakistan. The questionnaire comprises of Likert based items and statement- based. Data was collected using 50 survey questionnaires to measure the validity. The research methodology follows a quantitative research design to gather numerical data, however; it allows for statistical analysis (Wang et al., 2021). The collection of data includes both primary and secondary methods. As far as, the primary data is concerned it can be obtained through a structured questionnaire survey, focusing on project directors, managers, team members, and contractors who can experience the analysis of risk in project management. While moving towards secondary data, it was collected from academic sources, company reports, journal papers, research articles, book overviews, and conference papers which can reinforce the fundamentals of informing the techniques of risk assessment. The data can be analyzed through Statistical Package for Social Science (SPSS) and find the descriptive and inferential statistics that guarantee validity. It can measure the validity, checking the questionnaire and triangulation of data taken from various resources (Carpitella et al., 2021).

RESULTS, FINDINGS AND DISCUSSIONS

The study gives a comprehensive evaluation of the data collected during the study and shed light on results of risk assessments conducted for the study. It presents the research findings that elucidate the connection between risk assessment and boosting performance of projects. The research used a comprehensive approach to data collection and analysis in order to achieve its objectives. In this portion, the results and findings of our research can be found, it aims to study the behavior, attitudes and involvement of participants within the organization to enhance the performance of projects during risk assessment. The questionnaire survey can be helpful to get samples from 50 respondents, several responses can be observed from different questions that prefer risk assessment and risk management preferences. The outcomes of the study show valuable insights, behavior and attitudes of participants about investment and risk management.

FREQUENCY AND PERCENTAGE RESPONSE

Starting with the tolerance response, the very first is about the response to stock market decline. As 33% of participants feels To Buy more which signals a confidence in market development and provides opportunities, a significant portion (27%) prefer To Reduce exposure of risk to sell some. Moreover, 16% would reduce the hazard by selling everything, which needs to emphasize the approach to take part from strong risk-aversion. To measure equally within a specific group (27%) select Don't sell anything and keep investing, which indicates the commitment for existing investments when the situation of market is not stable. The other response is about the investment time frame

which can be either short-term or long-term. The majority (57%) proceeded for a shorter period of 6 months to 12 months. This probably apprise for recovery of an investment within a short time-span. Furthermore, the confidence of respondents while handling risk tolerance varies significantly. A significant 43% of the participants agree with it and feel confident about investment as the risk tolerance is high, while 27% strongly disagree with this terminology which inculcates the spread of risk attitude and its investment policies output.

Table 1.
Results and Findings

Question	Results
Decline of stock market response	To buy more: 33% To reduce the exposure of risk by selling some: 27% To reduce the hazard by selling everything: 16% Don't sell anything and keep investing: 27%
The frame to recover the investment	0-6 months: 15% 12-36 months: 25% 36 months or above: 3% 6 months to 12 months: 57%
Confidence in Tolerance of risk	To agree with it: 43% To disagree with it: 22.6% Strongly agree with it: 7.4% Strongly disagree with terminology: 27%
Objectives of investment for alignments	The growth is aggressive: 18% Existing revenue to be filled with likely development: 23% The current revenue is unrelated by increasing the worth of funds: 32% To interpret the protection and support present income: 27%
Preference is given to the duration of investment	12 to 60 months: 45% 11 to 20 years: 8.3% 5 to 10 years: 20.4% Above 20 years: 10.2% Less than 1 year: 16.3%
To Utilize the treatment of risk techniques	To employ transfer technique: 28.8% To employ an avoidance technique: 36.9% To employ a mitigation technique: 24.5% To not employ any technique: 10.2%
The strategies become effective through its Perceptiveness	Acceptance of risk: 28.8% Avoidance of risk: 22.2% Reduction of risk: 28.8% Transference of risk: 20.2%
Impact of Risk Transfer	It alters the outcomes of the future: 34.9% It brings clashes in contract: 24.2% It does not make any significant change: 3.9% Send threat to another party: 37%
Stakeholders decision-making in transferring risks	A risk is transferred contractually while controlling the strategies for hazards: 34.7% Effect of risk on project and mitigate it: 24.5% Taking the responsibility to absorb the occurrence of risk: 4.1% Activities, requirements, and needs of contract: 36.7%

To observe the likelihood of Transferring risk	Voluntary agreements between the two parties: 20.2% Dependence of project management scenarios: 30.8% Not any chance of transfer it: 20.6% Taking liabilities between parties: 28.4%.
Affect of Transferring risk	No significant effect: 29.5%
Knowledge, procedures and methods for risk termination	Check the levels dor the basics of termination: 24.6% In-depth understanding and application of the techniques for risk termination: 16.4% To use the approaches and procedures for majority cases correctly: 32.3% Not expert on particular matter: 26.7%
Executive management goals and support for risk termination procedures	Hostile or unsupportive behavior: 8.6% To support and promote ideas: 39.2% Executive management supports the respect actively: 21.5% Provide inertial support: 30.7%
Significance of risk termination within the organization	To boost the performance of company and can be incorporated: 28.9% A work-related distraction: 13.3% Thought to be a beneficial and valuable process: 30.7% The entire organization feels that it is constrained: 27.1%
Organizations follow the techniques for risk termination	Without any planning accepting or avoiding the hazards: 19.4% Hazard to take and decide the best course on it: 21.4% Response to understand the given options: 33.7% Strategy to possess a variety of advanced setup: 25.5%
Methods used for the termination of hazards	Actively accommodate internal and external changes followed by a process: 32.5% To use the method of consistency within the organization: 30.4% Follow the methods in specific places: 24.7% Inefficient procedure: 12.4%
To define a Judgmental Line	It is critical: 41.8% It is moderate: 27.5% It is neutral: 21.5% None of these: 9.2%
Response to Emergency Risk during the Judgmental Line	To avoid emotionally charged language and achieve the objective of neutrality: 39.7% To avoid assumptions from cause and severity in emergency situation: 17.4% Clear and concise information: 13.3% To be calm in an emergency condition: 29.6%

The objectives for investment aligns for the largest group (32%) which aims that The current revenue is unrelated by increasing the worth of funds, emphasizing its aim on capital growth. As observed that, 27% are proceeding To interpret the protection and support present income, enhancing the stability of income. Furthermore, 18% seek The growth is aggressive, while 22% believes that Existing revenue to be filled with likely development, creates the goals for investments among different respondents. It indicates that the preference given to duration of investment, 45% favor 12 to 60 months, which affluence for shorter and mid-term investment goals. Only a small fraction of participants are in favor of long-term durations, such as 11 to 20 years (8.3%) or Above 20 years (10.7%), apprising the horizons of investment varies among participants. However, moving on for other techniques for treatment of risks, the most followed or accepting

strategy is Risk avoidance which accounts for (36.9%), followed by Risk transfer which contains (28.8%) and Risk mitigation which is (24.5%). Consequently, 10.4% of participants have not employed any technique for it, which inculcates the significance of risk management awareness and campaigns. The strategies become effective through its perceptiveness involves that Acceptance of risk (28.8%) and Reduction of risk (28.8%) are considered effective approaches by appropriate number of participants. Avoidance of risk is also perceived as effective by 22.2%, which highlights the multiple strategies while managing risks. Various views of respondents about the transfer of risk and its impacts are diverse, with 37% believing that sending threat to another party and 35.7% response that there is an altercation of the outcomes of future. Though, 24.7% believe that there is a clash within a contract, while 4.3% observe that there isn't any significant change, which includes the strategies, consequences, and perceptions of risk transfer strategies. Although, the involvement of Stakeholders in decision-making can also play a significant role in transferring risk. Moreover, a portion of participants(36.7%) identifies the activities, requirements, and needs of contract as crucial, while 34.7% emphasize the importance of A risk is transferred contractually while controlling the strategies for hazards. Finally, while taking the likelihood of risk transfer, which accounts for 30.8% indicate that Dependence of project management scenarios, while 20.2% believe Voluntary agreements between the two parties. It reflects the transfer of risk in various backgrounds.

To summarize this, one can highlight different aspects of it. It reflects the attitude and behavior of investors towards risk assessment strategies in risk management. Further, the need for tailored investment approaches can reduce the hazards and accommodate the diversity effectively.

REGRESSION ANALYSIS

Relationship between dependent and independent variable

To find out the correlation between dependent (Risk tolerance) and independent variable as given:

Table 2.
Model for risk tolerance and its variables Model Summary of Hypothesis 1

Summary	R	Square of r	Adjusted Square	r Std. error	R Square Change	Change in F	Df1	Df2	Sig. Change in value of F
1	0.813	.680	.601	.548	.69	.362	5	44	.041

Predictors. (Constant), money invested, decline scenario, funds mode, regain value mode, investment time period
Risk Tolerate (Dependent Variable).

Findings

To find out from the data, both are variables are expected to be in correlation. It can be act as statistical measure. This coefficient shows how well the data was fit by the multiple regression model. Whereas a number near one indicates a good match, one near 0

indicates a poor fit. The five found predictor factors explain 69% of the variance in risk tolerance, according to the r2 value of 0.69 in Table 2.

Linking variables between dependent and independent one

To find out the correlation between both the variables can play a significant role in better understanding of the model. We must take Risk treatment as dependent variable along with Independent one.

Table 3.
Model for risk treat and its variables Model Summary of Hypothesis 2

					Change Statistics				
Summary	R	Square of r	Adjusted r Square	Std. error	R Square Change	Change in F	Df1	Df2	Sig. Change in value of F
2	0.826	.738	.704	.748	.720	0.289	5	44	.048

Predictors. (Constant), opinion manner, category of project, applicability of strategy, Mode of technique, conduct mode

Risk Treatment: (Dependent Variable)

Findings

Calculated by taking the independent variable (risk treatment determinants) and estimating the percentage change in the dependent variable (r2). An indication of how well the multiple regression model reflects the data is this coefficient. Good fit is indicated by a number near to one, while a value close to 0 indicates a poor fit. With a r2 value of 0.748 in Table 3 , the five discovered predictor factors account for 74.8% of the variance in risk treatment.

LINKAGE OF DEPENDENT AND INDEPENDENT VARIABLE

To find out the correlation between both the variables can play a significant role in better understanding of the model. We must take Risk transfer as dependent variable along with Independent one.

Table 4.
Model for risk transfer and its variables *Model Summary of Hypothesis 3*

					Change Statistics				
Summary	R	Squar e of r	Adjusted r Square	Std. error	R Square Change	Change in F	Df1	Df2	Sig. Change in value of F
3	0.877	.766	.580	.548	.548	.348	5	44	.077

Predictors. (Constant), transfer of effect, participation in different projects, Affect conditions, chances of transfer, accomplish goals standards

Findings

For transferring of a risk, the variables of it act as independent one. There is a variation in dependent variable as estimates taken from coefficient of determination (r2). This coefficient shows how well the data was fit by the multiple regression model. Whereas a number near one indicates a good match, one near 0 indicates a poor fit. Table 4 shows that the five discovered predictor factors account for 58% of the variance in risk transfer, with a r2 value of 0.58.

LINKING VARIABLES BETWEEN DEPENDENT AND INDEPENDENT VARIABLE

To find out the correlation between both the variables can play a significant role in better understanding of the model. We must take Risk termination as dependent variable along with Independent one.

Table 5.
Model for risk termination and its variables Model Summary of Hypothesis 4

Summary	R	Squar e of r	Adjusted r Square	Std. error	R Square Change	Change Statistics			
						Change in F	Df1	Df2	Sig. Change in value of F
4	0.904	.797	.685	.609	.456	.328	5	44	1.345

Predictors(Constant), efficient method, response output, the importance of conviction, the existence of techniques, methods used.

Findings

Calculated by taking the independent variable (risk termination determinants) and estimating the percentage change in the dependent variable (r2). An indication of how well the multiple regression model reflects the data is this coefficient. Good fit is indicated by a number near to one, while a value close to 0 indicates a poor fit. With a r2 value of 0.609 in Table 5 , the five discovered predictor factors account for 60.9% of the variance in risk termination.

DISCUSSIONS

There are different variables associated with every factor. Firstly, we have seen the risk tolerance. It either shows to fulfill the condition of acceptance or rejection. For the tolerance condition, both the impact and likelihood are low. For this impact is less and an increase in the performance of projects for different variables can be observed. The results show the frequency and percentages for it which shows the relationship between tolerance of risk and its variables. Secondly, we have seen the risk treatment. It either shows to fulfill the condition or not. For the treatment condition, the impact is low, and the likelihood is high. For this impact is less and an increase in the performance of projects for different variables can be observed. The results show the relationship between risk treatment and its variables. Thirdly, the next one is risk transfer. It either shows to fulfill the condition of acceptance or rejection depending upon different scenarios. For the transferring condition, the impact is high, and the likelihood is low. For this impact is high and an increase in the performance of projects for different variables can be observed

only when there is transfer of hazard to another party. The results show the frequency and percentages for it which shows the relationship between risk transfer and its variables. Finally, it seems like the impact is high and the likelihood is high, therefore only those risks are acceptable for having a high impact and high likelihood. The above variable shows the same condition in a partial way because either the impact is low, or the likelihood is low which affects overall performance. The response of the frequency shows the improvement for different variables and for some variables, it does not show a positive relationship.

CONCLUSION

To summarize this, the performance of projects can be investigated through risk assessment in this study. To observe different variables, a strong causal relationship was found. The questionnaire survey was pretested at different levels such as managers, contractors, team members, and project directors. Also, the data can be analyzed through the Statistical Package for Social Sciences (SPSS) and find out inferential and descriptive statistics through a questionnaire survey. The factors that affect the risk assessment to improve performance include Risk tolerance, Risk treatment, Risk transfer, and Risk termination. In these factors, different variables show different outputs which can be discussed. As a whole, these outcomes highlight the significance of investment strategies during risk situations and also the role of investors towards it for various preferences and attitudes.

FUTURE RESEARCH GAP

For the current research work, it is followed to improve the performance of projects during risk assessment. For that purpose, statistical analysis has been done using Statistical Package for Social Sciences (SPSS). However, in the future, other tools can also be preferable such as decision-making techniques and Monte Carlo Simulations. Moreover, enhances the number of respondents and sample size for better performance overall. Apart from this, using Artificial Intelligence concepts using machine learning can better define these variables and their output. Overall, the performance can be better enhanced by these factors in an efficient and effective way.

CONFLICT OF INTEREST

As far as the current research is concerned, there is no conflict of interest and no unethical practices followed during the study.

DECLARATIONS

Conflicts of Interests: The authors declare no conflict of interest.

Consent to Participate: Yes

Consent for publication and Ethical approval: Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

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