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Risk Management Framework: Identifying and Mitigating Business Risks

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Abstract

Despite significant efforts to ensure the success of software projects, the risk of failure remains high. Although these risks cannot be entirely eliminated, they can be effectively managed through proper risk management techniques throughout the software development lifecycle. This study aims to classify and identify the most effective risk management techniques using factor analysis. We surveyed software project managers, presenting them with thirty different risk management techniques, which they frequently used and deemed effective. We categorized these techniques into three main components: Planning and Requirement Techniques, Communication Techniques, and Models and Tools. The study's findings will be applied to a real-world software project to verify their effectiveness in mitigating risks. A novel multi-dimensional weighting approach is proposed to highlight the relationships between risks and actions, selecting best-fit profiles for both business and risk via an `if-the-shoe-fits' process, and determining precise mitigating actions through score tolerance bands. The successful identification and implementation of these techniques are expected to significantly improve the likelihood of mitigating risks in software projects.

Keywords: *Software Projects; Risk Management Techniques; Factor Analysis; Effectiveness Real-World Application.*

1. Introduction

Despite advancements in software project management, delivering systems on time and within budget remains challenging. Many failures can be prevented through proactive risk management, emphasizing early identification and mitigation of risks. Enterprise Risk Management (ERM) is crucial in today's dynamic business environment, leveraging tools and processes for effective risk analysis and opportunity identification [1]. Enterprise Systems (ES), like ERP systems, optimize operations and facilitate decision-making by providing context-rich information. However, there's limited research on transforming ES data into actionable knowledge for risk mitigation [2]. This study addresses this gap by exploring how ES data can be used to mitigate risks, using a case study approach in a mature ES implementation. The findings aim to benefit both academia and industry practitioners, offering insights into ES data transformation and risk management. The paper covers literature review, research methodology, empirical findings, discussion, and future research suggestions. It also explores the concept of risk, emphasizing its omnipresence, uncertainty, and potential for innovation when managed effectively [3-4].

2. Purpose

The purpose of studying risk management is to identify potential risks that could impact individuals, organizations, or society, and to develop strategies to mitigate or manage these risks [5]. By identifying threats well in advance, organizations can plan effectively and potentially diffuse risks before they materialize, thus

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preventing significant financial losses or other setbacks. Risk management is essential for protecting against losses, ensuring business continuity, and reducing the negative effects of threats and disasters [6].

3. Objectives

- To identify and catalog all potential risks that could affect the organisation [7].
- This includes financial risks, operational risks, strategic risks, compliance risks, and reputation risks [8].
- To identify all possible risks, not to eliminate risks from consideration or to develop solutions for mitigating risks [9].
- To identify potential problems before they occur and have a plan for addressing them [10].

4. Methodology

The study is descriptive in research design with a mixed- method approach, incorporating both qualitative and quantitative methodologies with data sourced directly from customers [11]. Simple random sampling techniques used to select a sample size of 100 customers. Statistical tools utilized for data analysis include ANOVA and regression analysis. These tools are instrumental in deriving insights from the collected data, aiding in the understanding of relationships, trends and patterns within the datasets [12]. This approach allows for a comprehensive examination of risk management identifying and mitigating business risks.

5. Hypothesis Testing

H01: Risk Management has no significant influence on financial performance of the organization in Table [1-3] [13].

Table 1 Effect of Organization's Culture

Risk Management	Financial Performance
32	29
23	26
19	22
15	13
11	10

Table 2 Summary Output

Regression Statistics	
Multiple R	0.93979
R Square	0.883205
Adjusted R Square	0.844274
Standard Error	3.181544
Observations	5

Table 3 ANOVA

	df	SS	MS	F	Significance F
Regression	1	229.6333	229.6333	22.68606	0.017574
Residual	3	30.36667	10.12222		
Total	4	260			

Table 4 Intercept

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.555556	4.125557	0.377052	0.731226	-11.5738	14.68496	-11.5738	14.68496
Financial Performance	0.922222	0.193623	4.762988	0.017574	0.306029	1.538416	0.306029	1.538416

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Interpretation: The above summary output illustrates a linear regression between the risk management towards financial performance. The regression pattern proves insignificant p>0.05 which is 0.7>0.05, meaning no significant influence of risk management to financial performance. The R value 0.8832 notes that 8.832% of the variability in risk management relate to financial performance in Table [4].

6. Findings

- I Found That Risk planning are risks prioritized based ontheir relative probability and impact its Represents 36% Perform Qualitative risk analysis 28%Identify Risks 22%Perform Quantitative risk analysis and 14% Plan Risk Responses.
- The Manage Communications process belongs to which of the following process groups its Represents 34% Planning 28% Monitoring & Controlling 20% Closing and 18% Executing.
- Risk planning are risks prioritized based on their relative probability and impact its Represents 36% Perform Qualitative risk analysis 28%Identify Risks 22%Perform Quantitative risk analysis and 14% Plan Risk Responses.
- 35% The risk register documents all the identified risks in detail 26% Risk impact should be considered, but probability of occurrence is not important 19% Risks always have negative impact and not positive and 20% Risk Response Plan is another name for Risk ManagementPlan.
- • project sponsor has asked you to present your project's high- level risk register to him in the next project update meeting. To create your high-level risk register, which of the following processes must be performed its Represents 26% Plan Risk Management 12% Perform Qualitative Risk Analysis 19% Identify Risks 16% Control Risks Work performance information and 13%Work Performance Reports.

Conclusion

Risk retention involves accepting the presence of risk while continuing business operations, often justified by low estimated probabilities or consequences. For example, choosing insurance premiums with higher deductibles is a form of risk retention. Risk reduction aims to decrease the likelihood or severity of risks, often through measures like sharing with other parties or implementing safety protocols. Educational training can increase risk awareness, while physical measures like building safety systems can directly reduce risk. Third-party involvement can provide additional assurance and quality control. Work planning, including timetables and resource allocation, is a common method to reduce risks, particularly in construction settings.

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