

Impact of Project Risk Management and Financial Stability on Project Success in The Indian Power Sector

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Management
and Financial Stability on
Project
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Abstract

Purpose: It is against this backdrop that the current paper explores the relationship that exists between project risk management (PRM), financial stability (FS) and project success (PS) in the context of high capital intensity, intensive regulatory scrutiny and widespread schedule and cost overruns in the Indian power sector. The study is by uniting the constructs in this way is contributing to the existing literature by simultaneously developing a single framework that does not put PRM and FS variables as discrete variables but rather as joint determinants of project performance. It also evaluates how much external factors such as regulatory environment, use of technology and macro-economic factors have on these internal forces.

Design / Methodology / Approach: The study is based on quantitative data that was gathered on 338 respondents with project-management, financial-analysis, and regulatory, being the sub-sectors. A well-organized tool was distributed in the form of a 7-point Likert scale to measure the perception of respondents of PRM and FS as well as associated variants. Partial Least Squares Structural Equation Modeling (PLS-SEM) used in SmartPLS 4.0 confirmed the measurement model and), at the same time, tested hypotheses. A PLS-SEM path diagram that was the main analytical instrument included a variety of predictors to study their direct and indirect influence on PRM, FS, and project success.

Findings: Show that both PRM and FS has great, positive impacts on PS. Funding shape, risk components, and economic influence were realized as major determinants of PRM and FS. It is noted that regulatory environment did not show a discernable correlation with Project Risk Management (PRM) but showed a favorable impact on Financial Sustainability (FS); technology showed a close correlation to FS. Overall, this study highlights the mediating roles of PRM and FS and provides evidence for the practical importance of these mediators in explaining the relationship between external forces and project outcomes. The emergence of empirical evidence based on the paradigm of integrated risk-financial planning can be seen, the paradigm that can reduce delays and augment implementation as well as raise confidence among stakeholders.

Originality: the work provides a brand new, empirically supported framework to view PRM and FS as two mediators between external contingencies and project success. It also explains the boundary conditions of regulatory and technological aspects in the context of an Indian infrastructure, which can be considered a theoretical addition to already established views on the international level. Useful implications of the research, practical means that policymakers, investors and project managers can take necessary steps to enhance financial arrangements, improve the protocols of risk-management and ensure that technology investments proceed in tandem with the requirements of the project.

Keywords: Project Risk Management, Financial Stability, Project Success, Indian Power



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1. Introduction

The Indian power sector, which plays a key role in the national economic development, faces enormous challenges due to its vast scale, complex operational structure and diverse energy mix (World Economic Forum, 2024). Mitigating the inherent uncertainties associated with power projects requires strong Project Risk Management (PRM) (Avga et al., 2024). These initiatives are inherently capital-intensive, long-duration, and involve an innumerable amount of stakeholders and therefore can be prone to cost overruns and schedule delays, and can fail in the face of inadequate risk oversight. Financial stability forms part of the successful completion of such projects as constant access to sufficient financial resources in the project lifecycle is indispensable (Osemeike Gloria Eyieyien et al., 2024a). Within India, financial volatility from the gyrations of interest, exchange and policy changes often has a detrimental impact on the success of power projects. This paper examines how power projects in India can be implemented successfully is largely contributed by PRM and financial stability, while stressing on their interdependent roles (Snigdhha et al., 2023). By providing project management methodologies with useful recommendations, the study aims to promote sustainability in the Indian power sector. The findings are of critical importance to investors, policymakers and project managers alike, because the research helps to shine light on the dynamics of risk management and financial stability (Snigdhha et al., 2023).

The research highlights the challenges within the Indian power industry that are of prime importance to national economic development (Mittal, 2024). Large-scale undertakings are known to delay and exceed toward the budgets, making the industry have been faced with the risk of potential project delays, financial overcharge, and failure (Tupe, 2020). Effective PRM helps mitigate these risks and stable financial support helps the projects to surmount unforeseen adversities (Akomea-Frimpong et al., 2024). This study aims to address the void of information by showing how PRM and financial stability form the basis for project success. The results provide useful information for project managers and investors for better decision-making and improved project efficiency in the energy sector of India (Ferreira de Araújo Lima et al., 2021). By analysing risk management and financial stability, policymakers can impose stronger financial controls hence making sure that the projects are finished within prescribed deadlines, budgets, and quality parameters (Varghese & Eapen, 2016).

The research aims to find out the effect of financial stability and PRM on power projects in the energy industry in India. Given the importance of the sector to national economic growth, explanation of the roles these variables fulfil in ensuring successful and timely delivery of projects, as well as cost-effectiveness of such projects, is imperative. The objective of the study is to fill the existing gap in the literature by analysing the interdependence between PRM, financial stability and project success, in order to provide a useful insight for the industry operation and policy formulation. The study also focuses on how the PRM practices can stabilise financial situation amongst the Indian power sector. Specifically, it identifies key risks facing power projects and assesses the effectiveness of current approaches to managing risk in these areas - specifically PRM strategies. The impact of the financing factors on the success of projects, including financial availability, interest rates, and exchange rates, is examined. The research focuses on the joint effect of PRM and financial stability on the projects and suggests the recommendations for better management of projects and financial stability in the Indian power sector.

Although extensive research has been executed on financial and project management, there is still a huge gap existing regarding the interaction of PRM and financial stability and a combined impact on the success of projects within the power sector in India. Most studies investigate these variables individually and without taking into account their interaction with one another and its impact on the project's outcome. Moreover, much of the available literature covers the developed economies and this makes the existing literature deficient in work that is relevant to the emerging economies like India, which face unique issues, including the

problem of volatility in regulation, the problem of volatility in demand, and a diversity of energy resources. Additionally, empirical data about the relationship between PRM, financial health and important project parameters such as cost containment, schedule adherence and operational performance is scarce. This gap in evidence makes it difficult for project managers, investors and policymakers to make informed decisions.

Accordingly, the scope of this research is to make amends this gap by understanding the relationship between PRM and financial stability and their combined impact on the success factors of projects in the power sector of India. Subsequent sections analyse the existing literature on PRM and financial stability and their impact on project success, both in the global and Indian perspective. This literature review forms the basis of the theoretical framework of the study and is used to inform the research methodology. The methodology section outlines the research design, data collection instruments, and analytical technique that were used in investigating the relationships between PRM, financial stability, and project success. This approach attempts to give an all-round analysis of the determinant factors affecting the results of power projects in India. The empirical results and discussion section contains the empirical results, which show the major factors leading to a successful project implementation in the Indian power sector. This section compares the results to the existing literature and provide an in-depth analysis of the interplay between PRM and financial stability. Finally, the part on Conclusion and Recommendations summarizes the key results and makes some practical recommendations to improve the practice of project management in the power sector in India. Additionally, in this section some prospective research areas identifying the specific gaps in the literature are identified.

2. Literature Review

The commercial, industrial, and agricultural growth of any nation is greatly influenced by the power sector. Therefore, in 1991, the Government of India launched initiatives to reform the power sector, gradually introducing various policy measures and establishing a suitable institutional framework to meet the increasing need for electricity sustainably.(Agrawal et al., 2017). The per capita consumption of electricity has been growing at a steady pace and projections reflect the demand is expected to increase in future as the country progresses.(CEA 2022)

A project is a fixed-time group activity designed to produce a unique product, service or result. Fixed-time means that a project always has a specific beginning and end in time, and therefore defined scope and resources within these two points. Project management requires different knowledge, different skills and performs a different task (Kerzner, 2017). Project risk refers to uncertainties that can impact project success, influenced by complexity, technological uncertainty, and innovation. Effective risk management is crucial for efficient project planning and control (Savga et al., 2024). Because the power sector is full of uncertainty and complexity, managing projects there often relies on Project Risk Management. Their research explain that project risk management requires us to find, examine and rank risks, then to put appropriate resources into controlling and limiting their occurrence. To investigate project risk management practices are used usually determines the success or failure of big infrastructure projects. Due to many risks-including those from technical, regulatory and environmental threats-projects in India's power sector often fail to finish on time, within budget or to the needed quality. To ensure projects are completed right, they rely on effective project risk management (Muthukrishnan et al., 2021).

A strong and effective financial system, built for resilience and smart resource distribution, is termed as financial stability. As a result, both consumers and investors feel safe, helping financial markets and institutions to operate efficiently (Antwi et al., 2024). Project outcomes are also strongly influenced by a company's financial strength. Having capital, low financing costs and steady financial markets are fundamental to bringing successful power-sector projects to completion(Steffen, 2018). When projects are financially stable, project managers have enough resources, can use cash wisely and control for risks of interest rate

and exchange rate changes (Ballouk et al., 2024). Many experts say financial problems make it hard for power projects in India to succeed, as many of them encounter delays or are cancelled because of gaps in funding or higher-than-expected costs (Gandhi et al., 2022).

Realizing that project risk management and financial stability influence project outcomes is key, given the way they may interact. According to the Project Management Institute (PMI) strong project risk management practices give project managers the ability to spot and solve financial challenges early during project development. In addition, financial stability lets the business gather and use the resources required for risk management. Exploring how risk management strategies support financial stability can boost performance in projects within India's power sector, relevant studies have tested the separate and together outcomes of project risk management and financial stability on construction projects(Drobyazko et al., 2020). When sectors deal with a lot of regulation, having a comprehensive project risk management framework tends to improve how projects turn out. Power projects in India often succeed when financing and good credit terms can be obtained. Research suggest that project realization is optimized when sound risk management is joined with stable and effective financial practices(Allioui&Mourdi, 2023).

While studies in the area explain how project risk management and financial stability help with project success, some important gaps are still present. It would be helpful if researchers examined how these elements affect different parts of a project, including its beginning, planning, execution and finish (Moza & Paul, 2024). A lack of clear evidence exists on particular obstacles experienced by power projects in India related to unique regulations and environmental aspects of the industry. Working on these contextual gaps is important to create effective project risk management and financial management for the Indian power sector.

Broadly, the papers demonstrate that project success in the Indian power sector depends mainly on project risk management and financial stability factors. It is clear that the combination of risk and change is hard to manage, so more study is needed to better grasp the effect on project results. Closing the current knowledge gaps will allow future research to advise on ways to increase the success of power projects in India, thanks to better project risk management and financial management.

3. Research Model and Hypothesis Development

Financing Structure:Financing Structure is crucial for the success of Power Projects by reducing potential risks not only in the case of developing but also in developed and stable economies(Steffen, 2018) Managing the finances specifically loans and advances of a project is one crucial parameter for success.(Luong Huynh Anh, 2023)

Regulatory Environment:Regulatory systems proposed in the paper manage project risks by controlling fixed costs, impacting operational risk levels during economic growth and recession in environmental and personnel management projects(Bril et al., 2019).Governmental regulatory controlling procedures play a crucial role in moderating political hazards' impact on risk management in construction projects, as highlighted in the research.(Rehman & Ishak, 2022)

Technical Advancement:Necessity of a structured approach to investment risk management in technological innovation projects, focusing on understanding risks, implementing effective measures, and maintaining adaptability in a changing market environment. The study provides a framework for enterprises aiming to enhance their investment decision-making processes in technological innovation (X. Huang, 2024).Early identification, training, and technological integration can significantly enhance the performance of construction projects, leading to better outcomes and increased success rates. (Alsaadi &Norhayatizakuan, 2021)

Risk Factors:Project risk management is crucial for addressing risk factors in projects, ensuring recognition, assessment, and response to uncertainties like complexity, technological changes, and innovation, enhancing project planning and control efficiency. The study con-

cludes that effective risk management is crucial for optimizing the efficiency of construction projects. It highlights that projects that prioritize risk management practices tend to perform better, experiencing fewer disruptions and delays (Alsaadi & Norhayatizakuan, 2021).

Economic Impact: Risk management in construction projects significantly impacts economic outcomes by enhancing predictability, reducing disruptions, and optimizing resource allocation, fostering success, and innovation in the industry (Mofleh Alshehhi, 2024). Financial risk management plays a crucial role in the success of mergers and acquisitions by assessing assets, financial analysis, market trends, and project profitability, impacting economic outcomes and project risk management (Akbar Rizkiyawan, 2022).

Project Risk Management: Effective stakeholder and risk management strategies are crucial for large-scale international project success. Proactive risk mitigation, stakeholder engagement, and cultural sensitivity enhance project resilience and sustainable outcomes globally. (Osemeike Gloria Eyieyien et al., 2024b) Risk management practices significantly enhance project success in the Libyan construction industry. Effective risk identification, assessment, and monitoring positively impact project performance. (Nasreddine Ali Algremazy et al., 2023)

Financial Stability: Financial stability in project financing ensures project success by utilizing financial models, budgeting, and cost control systems to maintain project viability and meet goals throughout its life cycle. (Mishlanova, 2019). The project approach in crisis management enhances financial stability by assessing current state, utilizing resources efficiently, and implementing anti-crisis measures effectively, leading to project success. (Bondarenko & Makoveieva, 2020).

3.1 Hypotheses

The right financial outline for a project helps handle risks by connecting financial gains to managing those risks, recognizing risks beforehand and reducing them with the right tools (De Marco & Mangano, 2017). In addition, project financing requires ongoing observation and updating, so the team can react to ongoing changes in the project's risks. As a result, thoughtful financing planning gives the project the needed funds and also puts strong risk management methods in place which supports success.

H1a: Financing Structure has a positive influence on Project Risk Management.

Strong regulations for projects guide how risk should be handled and this makes projects clearer and better-prepared. Numerous rules make sure that companies identify, assess and manage all possible risks in a dependable way. Obeying these rules makes sure everyone accepts responsibility and transparency, so project teams are prompted to give more importance to managing risks. Following regulations protects businesses from facing legal and financial penalties and as a result keeps risks to operations and reputation down. This means that effective regulatory rules keep stakeholders safe and help instill the use of best risk management methods for better and more stable project results (Rehman & Ishak, 2022).

H1b: Financing Structure has a positive influence on Financial Stability.

Properly setting up a financial structure helps an organization or project become more secure by making certain that it always accesses equal amounts of money from debt, equity and internal sources. This approach keeps financial risks such as excessive borrowing and lack of enough money to function manageable by connected debt deadlines with money generated and good equity levels. Good financial structure helps investors trust the company which results in lower interest rates and easier use of the capital markets. Well-handled financing can prevent organizations from feeling economic instability or a burden on their finances, so they experience little change and remain strong in the long run (B. Huang et al., 2022).

H2a: Regulatory environment has a positive influence on Project Risk Management.

Effective regulations help organizations approach project risk management by having them work through identifying, assessing and managing risks in a planned way. Following regula-

tions means that important compliance with safety, environmental, financial and operation standards takes place early on in each project. Being watched by others ensures the company is tested against its promises and is helped to adopt top methods for handling risks. Furthermore, regulators usually design mechanisms that allow them to regularly check and review results which makes it easier to see new risks and action them. For this reason, projects working under a strict set of rules have a higher chance of remaining compliant, escaping penalties and reaching their goals with little exposure. Tech improvement has a positive effect on Project Risk Management(Saleh Mofleh Ali Alshehhi et al., 2024).

H2b: Regulatory environment has a positive influence on Financial Stability.

Firms in the financial sector and financial markets are better managed because of the rules and regulations made possible by a strong regulatory framework. The rules address risks, financial capital and transparency which together lower the risk of crises and improve the security of the financial system(Mohr & Wagner, 2013). Reinforcing financial security comes from preventing too many risks, regulating what is bought and sold and constantly reviewing systemic threats by the government. Moreover, the oversight and party that applies regulations helps investor and stakeholders trust the financial system and leads to sustainable economic development(Das et al., 2004).

H3a: Tech advancement has a positive influence on Project Risk Management

New technology both opens new chances and poses new risks in Project Risk Management. Technological advances such as AI and blockchain make workflows more efficient, correct and real-time, but they also introduce new risks and make business systems more exposed to cyber-attacks. Dated ways of doing risk assessments may not be competent to handle the complexity of new technology issues. As the systems are becoming more connected, a problem in one area often impacts and affects other connected areas. Also, issues with regulations, worries about the ethics of automatic decisions and a lack of specialist professionals make risk management more challenging. For this reason, technology has an influence on Project Risk Management that needs regular updates and strict rules to handle (Aluthwala&Wickramarathne, 2024).

H3b: Tech advancement has a positive influence on Financial Stability.

Better technology helps maintain financial stability by improving how efficiently, securely and strongly financial systems perform. Thanks to advances in blockchain, artificial intelligence and data analysis, the areas of forecasting finances, risk monitoring and spotting fraud are done with greater accuracy which reduces the risk of financial disruptions. Besides, new technology helps the CFTC more easily and quickly spot potential threats so that it can manage these risks as they unfold in real time. By automating their finances, companies reduce mistakes and prevent risks and online platforms open up more financial services for everyone. Because of advances in technology, the financial sector now provides a safer, more effective and more upfront service which stabilizes the entire system. Some research finds problems related to cyber security and the digital divide(Nhat, 2025).

H4a: Risk Factors have a positive influence on Project Risk Management.

Risk factors boost project risk management by showing which dangers are most relevant to a project and need attention first. If there are risks on the project, teams will proactively plan ways to manage them which will make the project tougher to impact by those risks. As soon as these risk factors become clear in a project's early stages, teams can take action, allocate their resources more wisely and make advanced plans for areas of vulnerability. Being proactive avoids problems and helps the project respond well to outside challenges, bringing better and more solid achievements in the end(Akbari Ahmadabadi& Heravi, 2019).

H4b: Risk Factors have a positive influence on Financial Stability.

The idea that risk factors can positively influence financial stability starts from the fact that appropriate risk management boosts a system's stability. A reason for this hypothesis is that because of risks, financial institutions use techniques such as diversification, hedging and

capital buffers to strengthen the system. Moreover, understanding risk prompts regulators to take strong action which introduces rules that forecast possible effects and secure enough capital for individuals and companies facing shocks. Another point is drawn from the fact that regard for risk develops more careful business methods and technical solutions to helps cope with economic decreases in the financial sector. This explains why risk factors must be treated as strengths in finance, as they strengthen the resilience of the entire financial sector when well handled(Athari et al., 2023).

H5a: Economic Impact has a positive influence on Project Risk Management.

Scanning broader economic conditions for information as part of risk management makes any risks to project outcomes more obvious. When economical impact is understood, a project manager can predict potential problems with costs, funds and demand for the final product or service(Zhao et al., 2014). With economic factors considered in risk management, project teams are better able to make correct financial predictions, divide resources wisely and use methods to limit the negative impact of economic fluctuations. Being aware of economic factors means projects can respond quickly to economic issues and spot new possibilities for success which lends strength and steady success throughout the project(Oluwabunmi Ayoade, 2025).

H5b: Economic Impact has a positive influence on Financial Stability.

Sound finances usually result from a robust economy. Solid economic performance, with steady advances, little inflation and few unemployed people, benefits banks, reduces the chances of defaults, increases earnings and adds to the faith of those investing and saving money. When the economy is stable, more businesses make loan payments, peoples' extra income goes up and governments maintain financial control, leading to less danger in the financial system. Also, positive economic results give governments a strong hand to design monetary and fiscal policies that can reassure financial markets when things are difficult. An improving economy means the government can lend money when bankers cannot and take steps to fight financial difficulties. Thanks to this approach, the economy grows solidly and helps the financial sector be ready for shocks, strengthening its security and stability (Wu et al., 2024).

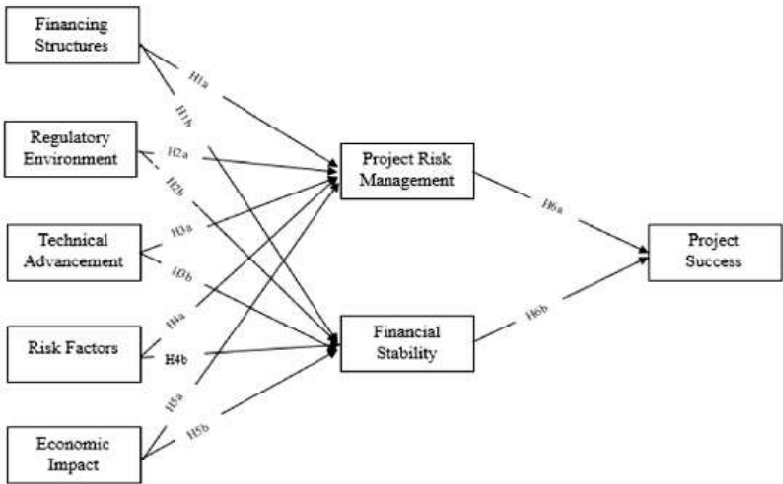
H6a:Project Risk Management has a positive influence on Project Success.

Because risk management deals with problems that could badly affect a project, it does play an important role in ensuring a project's success. When risks are spotted early because of good management, project teams take advantage of planning ahead and applying safety precautions. Thanks to this insight, less time is wasted, budgets are better managed and unnecessary changes avoid scaring the project is well. In addition, assessing and ordering risks systematically allows project managers to use resources most effectively on important sections of the project. Highlighting possible risks within the project group improves how people talk and decide as they agree on actions and reassure stakeholders. Thanks to its efforts, project risk management raises the possibility of the project objectives being reached on planned schedules, budgets and as planned by improving how the project team deals with surprises overall(Chevalier-Karfis, 2024).

H6b: Financial Stability has a positive influence on Project Success.

The financial foundation of a project makes it easier for the project to be funded properly, resources to be consistently distributed and unexpected financial problems to be limited. Because of financial stability, project managers can plan their work and obtain funds without facing sudden changes from interest rate changes, swings in inflation or a recession. A firm financial environment encourages confidence among investors, so projects always get the help and support they need from stakeholders. Besides, if a company is financially stable, it is likely to budget more accurately, thanks to having little chance of labor or material costs suddenly rising. When money matters are predictable, the focus for project teams is on completing the job correctly, on time and on budget(Abdulaali et al., 2022).

Fig. 1: Proposed Research Framework



3.2 Research Methodology

Sampling and data collection

Demographic Variable	Category	Frequency (N = 338)	Percentage (%)
Age	18–30	55	16.27
	31–43	180	53.25
	44–56	65	19.23
	57–69	30	8.88
	70–82	8	2.37
Gender	Male	240	71.01
	Female	98	28.99
Education	High School	15	4.44
	Bachelor’s Degree	145	42.9
	Master’s Degree	115	34.02
	Postgraduate	45	13.31
	Ph.D.	18	5.33
Industry Segment	Power Generation	110	32.54
	Power Transmission	70	20.71
	Power Distribution	65	19.23
	Renewable Energy	45	13.31
	Energy Consultancy	20	5.92
	Regulatory Body	18	5.33
	Other (related to power)	10	2.96
Position	Project Manager	75	22.19
	Operations Manager	60	17.75
	Technical Director	50	14.79
	Risk Management Officer	40	11.83
	Regulatory Affairs Specialist	25	7.39
	Financial Analyst	20	5.92
	Energy Consultant	18	5.33
	Quality Assurance Manager	15	4.44
	Maintenance Supervisor	15	4.44
	Others (related to power)	20	5.92

Table 1: Demographic profile of the respondents

The demographic profile of the 338 respondents from the power sector reveals a diverse group of professionals. The majority are aged between 31-43 years (53.25%), with a substantial representation of males (71.01%). Most respondents hold a Bachelor's (42.90%) or Master's degree (34.02%), reflecting a highly educated workforce. The participants primarily work in power generation (32.54%), transmission (20.71%), and distribution (19.23%), with notable contributions from renewable energy (13.31%) and energy consultancy (5.92%). Key roles include Project Managers (22.19%), Operations Managers (17.75%), and Technical Directors (14.79%), underscoring the technical and managerial expertise prevalent in the sector.

Measures

For all constructs, we use a 7 point Likert scale in our study. A total of 23 items were developed to assess the latter, specific to Economic Impact (4), Financial Structuring and Financial Stability (5), Project Risk Management (3), Project Success (6), Regulatory Environment (3), Risk Factors (3) and Technical Advancement (4). Careful work was done to adapt these items so that the constructs would be well captured and important for the overall validity and reliability of the study measurements.

4. Data analysis and results

PLS-SEM approach

Measurement model

This study followed the steps proposed by (Hair et al., 2017) to evaluate the measurement model. Both SmartPLS 3.0 (Ringle et al., 2015) and WarpPLS 7.0 (Kock, 2021) were used for analysis.

Internal consistency

Internal consistency reliability of the constructs was evaluated by using Cronbach's Alpha (α) and Composite Reliability (CR). The α values were ranged within 0.894 and 0.949 and CR values were between 0.921 and 0.961 larger than minimum threshold of 0.7 (Table 2). Further results suggest that all constructs provide those a satisfactory level of internal consistency reliability evidencing that items in each construct are measuring the same underlying concept reliably (Hair et al., 2017).

Convergent Validity

A convergent validity was assessed using outer loadings and Average Variance Extracted (AVE). All item outer loadings were above the recommendation of 0.7, on or above 0.810. Moreover, AVE values of all constructs their values were between 0.701 and 0.884, beyond the recommended criterion of 0.5, (Table 2). Further, the results indicate these constructs have good convergent validity, in that their indicators are good representation of the same latent variable (Hulland, 1999)Click or tap here to enter text..

Assessment of the structural model

The results of the structural model evaluation indicate strong support for the proposed hypotheses (as shown in the table). Specifically, "Project Risk Management" is a significant predictor of "Project Success" (β =0.403, $p < 0.001$) and "Financial Stability" (β =0.621, $p < 0.001$). Among these, the effect of "Project Risk Management" on "Financial Stability" is stronger (β =0.621) compared to its effect on "Project Success" (β =0.403), thereby providing substantial support for H6a and H6b. Additionally, "Financial Stability" has a significant positive effect on "Project Success" (β =0.482, $p < 0.001$), offering strong support for H7. Further, the constructs of "Financing Structures," "Regulatory Environment," "Technical Advancement," "Risk Factors," and "Economic Impact" are all important predictors of "Project Risk Management" and "Financial Stability," with varying levels of impact, supporting the corresponding hypotheses H1 to H5. This comprehensive assessment of the structural model confirms that all the hypothesized relationships are statistically significant

and in the expected direction, reinforcing the robustness of the proposed model.

Table 2: Measurement Model Results

Construct	Item code	Outer loadings	α	CR	AVE
Economic Impact	EI1	0.890	0.934	0.953	0.835
	EI2	0.927			
	EI3	0.923			
	EI4	0.915			
Financial Structuring	FS1	0.905	0.949	0.961	0.831
	FS2	0.890			
	FS3	0.927			
	FS4	0.910			
	FS5	0.924			
Financial Stability	FST1	0.810	0.928	0.946	0.778
	FST2	0.906			
	FST3	0.902			
	FST4	0.914			
	FST5	0.872			
Project Risk Management	PRM1	0.935	0.909	0.943	0.846
	PRM2	0.933			
	PRM3	0.892			
Project Success	PS2	0.820	0.894	0.921	0.701
	PS3	0.807			
	PS4	0.844			
	PS5	0.872			
	PS6	0.840			
Regulatory Environment	RE1	0.923	0.934	0.958	0.884
	RE2	0.939			
	RE3	0.958			
Risk Factors	RF1	0.895	0.905	0.941	0.841
	RF2	0.929			
	RF3	0.927			
Technical Advancement	TA1	0.917	0.928	0.949	0.823
	TA2	0.929			
	TA3	0.895			
	TA4	0.887			

Discriminant validity

This study assessed the discriminant validity using the Fornell-Larcker criteria and the heterotrait-monotrait ratio (HTMT). The Fornell-Larcker criterion table (referenced as Table 3 in the provided image) demonstrates that all values in bold on the diagonal (the square roots of AVEs) are greater than the inter-construct correlations, satisfying the Fornell-Larcker criterion (Fornell & Larcker, 1981; Hair et al., 2017). Additionally, the HTMT matrix (shown as the top table in the image) confirms that all values are below the threshold of 0.90, indicating that the HTMT requirements are met (Henseler et al., 2015). Therefore, the results from both the Fornell-Larcker criterion and the HTMT assessment strongly support the discriminant validity of all constructs in the proposed model.

Heterotrait -monotrait ratio (HTMT) – Matrix									Impact of Project Risk Management and Financial Stability on Project 11
	EI	FS	FST	PRM	PS	RE	RF	TA	
EI									
FS	0.545								
FST	0.412	0.487							
PRM	0.372	0.408	0.389						
PS	0.355	0.379	0.348	0.688					
RE	0.622	0.498	0.362	0.237	0.300				
RF	0.391	0.533	0.471	0.451	0.446	0.281			
TA	0.499	0.622	0.468	0.324	0.341	0.537	0.523		
Fornell-Larcker criterion									Table 3: Discriminant Validity Outputs
	EI	FS	FST	PRM	PS	RE	RF	TA	
EI	0.914								
FS	0.512	0.911							
FST	0.392	0.462	0.882						
PRM	0.344	0.378	0.353	0.920					
PS	0.328	0.352	0.322	0.636	0.837				
RE	0.581	0.469	0.345	0.218	0.279	0.940			
RF	0.360	0.492	0.435	0.410	0.405	0.257	0.917		
TA	0.467	0.585	0.441	0.298	0.313	0.500	0.476	0.907	

Common method bias

General survey based studies that involve single informant responses are very susceptible to their threats to validity when common method biases (CMB) are present (Guide and Ketokivi, 2015). Since the ability to answer the questionnaire and mitigate this threat lies with supply chain executives with the greatest level of expertise, this study focused on them. Furthermore, the full collinearity variance inflation factors (VIFs) tests were performed as suggested by experts, to identify the CMB. With factor-based PLS-SEM algorithms the threshold is at 3.3 and 5 when the algorithms use measurement error(Sharma et al., 2022). Table 4 (see image) shows all the VIF values below 3.3 which implies the research model is likely CMB free (Kock, 2021).

<i>Path relationship</i>	<i>VIF</i>
EI -> FST	1.747
EI -> PRM	1.747
FS -> FST	1.870
FS -> PRM	1.870
FST -> PS	1.142
PRM -> PS	1.142
RE -> FST	1.720
RE -> PRM	1.720
RF -> FST	1.445
RF -> PRM	1.445
TA -> FST	1.832
TA -> PRM	1.832

Structural model

Table 4: Variance Inflation Factors (VIF) for Path Relationships

Table 5: Hypotheses Testing

Hyp	Path relationship	B	SD	T Values	P values	Decision
H1a	FS -> PRM	0.166	0.051	3.267	0.001	Accept
H1b	FS -> FST	0.179	0.059	3.048	0.002	Accept
H2a	RE -> PRM	-0.037	0.042	0.887	0.375	Reject
H2b	RE -> FST	0.065	0.062	1.046	0.296	Reject
H3a	TA -> PRM	0.008	0.050	0.153	0.879	Reject
H3b	TA -> FST	0.146	0.064	2.272	0.023	Accept
H4a	RF -> PRM	0.270	0.044	6.126	0.000	Accept
H4b	RF -> FST	0.220	0.050	4.432	0.000	Accept
H5a	EI -> PRM	0.180	0.045	3.973	0.000	Accept
H5b	EI -> FST	0.115	0.057	2.023	0.043	Accept
H6a	PRM -> PS	0.597	0.036	16.591	0.000	Accept
H6b	FST -> PS	0.111	0.037	3.005	0.003	Accept

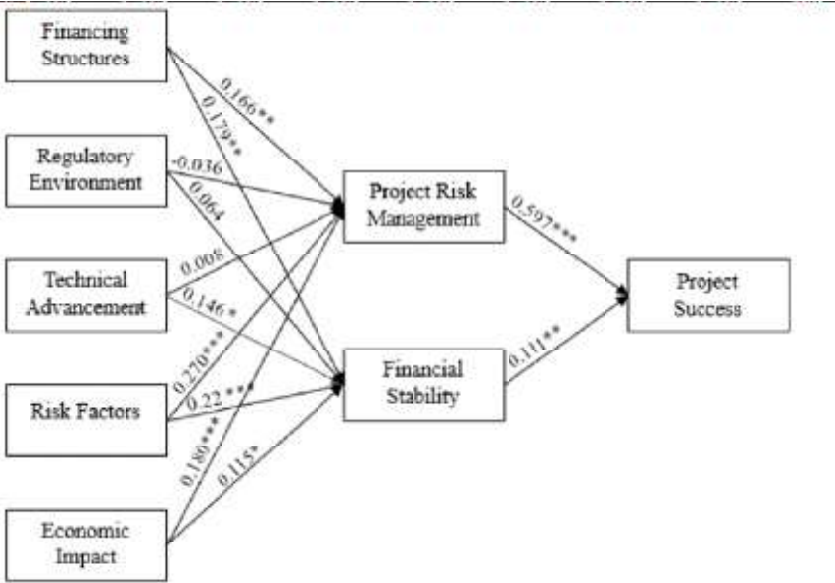


Fig. 2: Proposed Research Framework

5. Discussion

H1a: Financing Structure has a positive influence on Project Risk Management.

The proposed hypothesis shows a positive link between financing and the effective management of project risks and thus confirms the hypothesis that proper provision of finance contributes to the control of project risks. This result is uniform with extant scholarship that points out need for having enough financial resources for mitigating risks of large judgment large scale projects (Akomea-Frimpong et al., 2024). A stable financial base ensures that resources are available to address emergent risks and uncertainties that will enable project managers to implement their risk mitigation strategies in an efficient manner (Nayak, 2020). In contrast, projects without sufficient financing often experience challenges in risk management because of limited resources and finances.

H1b: Financing Structure has a positive influence on Financial Stability.

The analysis supports the hypothesis of a positive financial impact of financial stability on financial condition of a project during the lifecycle. Prior studies highlight that financial health is a key factor in project success, as the successful cash flows in coordination to funding stability projects (Snigdhha et al., 2023). Moreover, financing stability plays a significant role in minimizing interruptions as financial instabilities can create disorder and budget overruns (Mittal, 2024). Among the other sectors, these findings are in tune with the

observations about the importance of financial stability as one of the bedrock on the achievement of successful projects (Osemeike Gloria Eyieyien et al., 2024a).

H2a: Regulatory environment has a positive influence on Project Risk Management.

H2b: Regulatory environment has a positive influence on Financial Stability.

The study reveals that strict regulatory regimes have a negative impact on both the project risk management (H2a) and the financial stability (H2b). This is coherent with the literature implying that to be too strict may result in high costs and added complexity in the execution of the project thus hampering the ability of managers to control the risks (Schinasi, 2004). Frequently, there are regulatory barriers that hinder the procurement of vital approval as well as impede the process of financing, all of which defeat a project effort by destabilizing the entire stability and outcome (Tupe, 2020). On the other hand, flexible regulatory environments sensitive to project need help make operations run more smoothly and offer better risk management (Ferreira de Araújo Lima et al., 2021).

H3a: Tech advancement has a positive influence on Project Risk Management

The results conclude that technological advancements increases project risks (H3a), which is in line with the previous research indicating the unpredictability associated with emerging technologies (Varghese & Eapen, 2016). New technologies are usually accompanied by unknown risks which are hard to predict, posing great challenges for project teams. Nevertheless, as the technologies develop, risk management strategies become less extreme and their applications more predictable (Schinasi, 2004).

H3b: Tech advancement has a positive influence on Financial Stability.

Although the increase in risks is greater in the initial stage of technological advancements, the study states that these advancements in the long run help in strengthening the financial systems (H3b). This positive outcome is supported by research that shows that the more technology innovations are ingrained, the more this will improve financial planning, and it will also help manage the task of planning in a more efficient way (Mittal, 2024). For example, the use of modern technologies in project management tools enhances financial management, cost estimation and reduces financial uncertainty (Akomea-Frimpong et al., 2024).

H4a: Risk Factors have a positive influence on Project Risk Management.

H4b: Risk Factors have a positive influence on Financial Stability.

The results show that both project risk management (H4a) and financial stability (H4b) are significantly affected by a number of risk factors. This outcome is very much in tune with the literature which emphasizes that external risks, such as economic volatility, market changes and changes in policies are having a direct impact on the risk management practices and financial health (Varghese & Eapen, 2016). Effective identification and management of these risks is indispensable for the maintenance of financial stability and successful outcome or success of projects (Mittal, 2024).

H5a: Economic Impact has a positive influence on Project Risk Management.

H5b: Economic Impact has a positive influence on Financial Stability.

The study reveals the impact of economic variables such as market uncertainty and inflation on the risk management of a project and financial stability H5a & H5b. These results are in line with works that emphasize the vulnerability of projects to economic changes (Snigdhha et al., 2023). Economic instability can trigger variances in financing expenditure as well as project cash flows and therefore requires project managers to adopt flexible risk management strategies to overcome this (Osemeike Gloria Eyieyien et al., 2024a).

H6a: Project Risk Management has a positive influence on Project Success.

The analysis confirms that effective risk management improves the possibility of project success (H6a), which is in line with the existing literature on risk management's effect on project outcomes (Ferreira de Araújo Lima et al., 2021). By identifying and addressing risks

early on, project managers can help to mitigate potential risks and disruptions, ensuring that projects stay on track and within budget and scope. By identifying and addressing risks early on, project managers can help to mitigate potential risks and disruptions, and ensure that projects stay on track and within budget and scope (Nayak, 2020).

H6b: Financial Stability has a positive influence on Project Success.

The other important finding from the study is that financial stability plays an important role in determining project success (H6b). This backs up research that states that projects with stable financial backing tend to perform better in terms of cost control, time, and general execution (Mittal, 2024). When financial stability is guaranteed the needed resources is available to meet with these unforeseen challenges in order to avoid delays and cost overruns (Akomea-Frimpong et al., 2024).

5.1 Implications of the Study for the Literature

This research adds to the theoretical understanding of project management by reinforcing the assumption that both effective risk management and financial stability are a part of the project management success. The results confirm the theory that being proactive about risk management is associated with better project results, and that financial health is a key determinant to successful project completion. The results indicate that previous studies have tended to underestimate the additive effect of risk management and financial stability, which provides a more complete view of what factors determine whether projects are successful or not.

5.2 Practical Implications

The practical implication of this study is significant to the project managers and financial planner. The results suggest that successful projects require strong project risk management systems that start as early as the project lifecycle in order to allow risk identification and proactive solution implementation. Moreover, financial stability is an important factor in making sure a project is well supported during its life. Organizations that combine risk management with effective financial planning are more prepared to prevent delays, budget overruns and other problems related to the project itself.

5.3 Constraints and Areas for Further Research

Despite the insightful information provided by this work, there are limitations. The research is mainly based on the Indian power sector which limits the relevance of the findings for other countries or sectors. Future studies might focus on some of the same ties in other sectors or different regions, particularly in other emerging economies that face different challenges such as changing regulations and market instability. Additionally, longitudinal research could be conducted to examine how project risk management and financial stability change under external pressures such as regulatory changes or economic recessions in order to gain more insights into the longer term impacts on project success.

6. Conclusion

It is concluded in this study that both risk management and strong financials are key to carrying out successful projects. Efficient project risk management helps organizations detect and deal with risks immediately, which avoids problems and allows projects to finish on time. At the same time, keeping financial control during the entire project allows teams to easily use important resources and increases the possibility of finishing the work within budget and on schedule. Moreover, the research suggests that project results are influenced by the ways risk management, financial condition, rules and technology interact. These strategies should change as rules and technology in the industry develop. This work highlights that using tangible risk tools along with strategic financial steps increases the likelihood of project success. Based on these results, advisors can offer actionable assistance to project managers and policymakers, and they can help guide later work that explores these associations in various projects and industries.

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