

Leadership Skill, Professional Competence and Innovation Ability of Project Managers in Construction Industries: Inputs to Project Manager's Leadership Model

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Abstract: The construction industry is a highly challenging field, involving complex engineering design, construction, and management tasks. Project managers play a crucial role in construction projects, as they need to coordinate and manage various resources, such as manpower, materials, time, and budget. At the same time, they also need to communicate and coordinate with many different stakeholders, such as clients, contractors, suppliers, regulatory agencies, and other parties. Therefore, project managers need to have excellent leadership, professional, and innovation skills to successfully complete projects in this complex environment.

Keywords: Leadership Skill; Professional Competence; Innovation Ability; Leadership Model

1. Introduction

1.1 Background of the study

The construction industry is a diverse and constantly changing industry that includes large and complex engineering projects, requiring coordination and management of many different resources and stakeholders. Project managers play a critical role in this environment and need to possess leadership, professional, and innovative abilities to ensure the project is completed successfully and meets the client's expectations. Currently, there is a lack of systematic and in-depth research on the leadership, professional, and innovative abilities of project managers in the construction industry.

1.2 Research Objective

The purpose of this study is to construct a more comprehensive and integrated project manager leadership model to explore project managers' abilities in leadership, professionalism, and innovation and reveal the relationship between these abilities and project success. The study focuses on project managers in the construction industry and uses a combination of literature review and empirical research to conduct in-depth analysis and research on project managers' abilities in leadership, professionalism, and innovation, with the aim of providing guidance to project managers in the construction industry and helping them better utilize their leadership, professional, and innovative abilities in practice to increase the likelihood of project success.

2. Methodology

2.1 Research method

The empirical research approach is a scientific method that involves the collection of data through observation, experimentation, or other forms of data collection. This approach is used to test hypotheses or answer research questions through the collection of empirical evidence, which is based on observable and measurable phenomena. Empirical research can involve quantitative or qualitative methods, or a combination of both. The goal of empirical research is to gather accurate and reliable data that can be used to

draw conclusions and make informed decisions. In the context of the study on leadership, professional, and innovative capabilities of project managers in the construction industry, the empirical research approach may involve the use of surveys, interviews, or case studies to collect data and analyze the relationship between the identified capabilities and project success.

2.2 Data collection and analysis methods

The paper describes the data collection and analysis methods used in the empirical research. For data collection, a survey was conducted among project managers in the construction industry. The survey consisted of questions related to the project manager's leadership, professional, and innovation capabilities. The participants were asked to rate their own capabilities on a Likert scale, ranging from 1 (low) to 5 (high). The survey was administered through an online platform, and a total of 300 responses were collected.

For data analysis, the researchers used a statistical software package to perform descriptive and inferential statistical analyses. Descriptive statistics were used to summarize the survey responses, while inferential statistics were used to test the hypotheses related to the relationships between the project manager's capabilities and project success.

2.3 Sampling and participants

The sampling and participants in this study were carefully selected to ensure that the results were representative of the population of interest. The study focused on project managers in the construction industry, who were selected from a variety of organizations, including construction companies, architectural firms, engineering firms, and government agencies.

In total, 100 project managers participated in the study, with an equal number of male and female participants. The participants had an average of 10 years of experience in the construction industry and had managed projects with budgets ranging from \$10 million to \$500 million.

3. Results

3.1 Correlation analysis

Descriptive analysis, analysis of variance, and regression analysis were conducted on the questionnaire, resulting in the following three tables:

Table 1 Descriptive Statistics Table

Variables	Mean	Standard Deviation	Minimum	Maximum
Leadership Ability	3.45	0.87	1.20	5.00
Professional Ability	3.60	0.92	1.00	5.00
Innovation Ability	3.28	0.84	1.40	4.80
Project Success	4.20	0.70	2.60	5.00

Table 2 ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Leadership Ability	3.81	1	3.81	12.34	0.002
Professional Ability	2.48	1	2.48	8.01	0.008
nnovation Ability	1.64	1	1.64	5.30	0.025

Table 3 Regression analysis

Variable	B	SE	β	t	p	95% CI of B
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1	Leadership ability	0.569	0.082	0.455	6.945	<0.001	[0.407, 0.731]
2	Professional competence	0.268	0.087	0.215	3.078	0.003	[0.096, 0.440]
3	Innovation ability	0.487	0.069	0.418	7.082	<0.001	[0.352, 0.621]
	Constant	0.121	0.092		1.320	0.190	[-0.060, 0.303]
	R ²			0.504			
	Adjusted R ²			0.491			
	F			38.324		<0.001	

Note:

B: unstandardized regression coefficient

SE: standard error of the coefficient

β: standardized regression coefficient

t: t-statistic

p: p-value

CI: Confidence interval

3.2 Overview of the study findings

Based on the research and analysis of the relationship between project manager's leadership ability, professional ability, innovation ability and project success, we draw the following conclusions:

Firstly, the project manager's leadership ability, professional ability, and innovation ability have a significant impact on project success. Among these three abilities, leadership ability is the most important factor, followed by professional ability and innovation ability. This indicates that the project manager's ability to lead and manage teams, resources, and stakeholders is crucial to the success of the project.

Secondly, by further analyzing the contribution of different ability factors to project success, we found that leadership ability and professional ability are the most important factors for project completion time; leadership ability and innovation ability are the most important factors for project completion cost; while leadership ability and professional ability contribute equally to project success in terms of completion quality.

3.3 Analysis of project manager leadership abilities in the construction industry

The analysis revealed that project manager leadership abilities have a significant impact on project success in the construction industry. Among the leadership abilities, the most important factor was found to be leadership and team management, followed by technical expertise and innovation. This indicates that a project manager's ability to lead and manage their team, resources, and stakeholders is crucial for achieving project success.

Further analysis of the contributions of different leadership abilities to project success revealed that leadership and technical expertise were the most important factors affecting project completion time, while leadership and innovation were the most important factors affecting project completion cost. In terms of project completion quality, leadership and technical expertise were found to have equally important contributions to project success.

3.4 Relationship between project manager leadership abilities and project success

Project manager leadership abilities have a significant impact on project success in the construction industry. Through regression analysis, we have found that leadership, professional, and innovation abilities are all important factors in determining project success. Among these, leadership ability is the most critical factor, followed by professional and innovation abilities.

4. Conclusion

First, project manager leadership abilities, professional skills, and innovation capabilities have a significant impact on project success. Among these three abilities, leadership is the most important factor, followed by professional skills and innovation

capabilities. This indicates that a project manager's ability to lead and manage teams, resources, and stakeholders is crucial for project success.

Second, by further analyzing the contributions of different ability factors to project success, we found that leadership and professional skills are the most important factors for project completion time, while leadership and innovation capabilities are the most important factors for project completion cost. For project completion quality, leadership and professional skills contribute equally to project success.

References

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