

# Leadership skill, professional competence and innovation ability of project managers in construction industries: Basis for project manager's leadership framework

Wang, Guan ✉

Graduate School, Lyceum of the Philippines University - Batangas, Philippines

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## Abstract

The study aimed to examine the leadership skills, professional competence and innovation ability of project managers in construction industries that were made the basis in developing a Project Manager's Leadership framework. Descriptive design was used as it aimed to describe the characteristics of a population or phenomenon, the current state of leadership skills, professional competence, and innovation abilities of project managers in China's construction industry. Survey questionnaire was the data gathering instrument used in the study among 405 project managers and employees of six large state-owned enterprises (SOEs) mostly construction companies in China. Based from the result, the respondents' showed moderate agreement on the importance of communication, coordination, and teambuilding skills for leadership in construction companies and these skills are essential for effective project management and successful construction outcomes. They also agreed on their professional competence as to construction laws, contract management, and safety knowledge in construction companies that are critical for effective project management and successful construction outcomes. The importance of innovative ability in bringing new technologies, management models, and organizational structures were moderately agreed by the respondents. Further, a significant relationship was found among leadership skills, professional competence and innovation ability. Based from the results of the study, a project managers leadership framework for construction companies was developed. This would contribute to developing a professional development framework for construction project managers in China. By analyzing the importance of these three aspects (leadership, competence, and innovation), the study can identify specific skills and knowledge areas that project managers need to succeed. This framework can then be used to design training programs and assess project manager capabilities.

**Keywords:** project management, leadership, professional competence, innovation, construction engineering, safety literacy, risk management, organizational structure

## **Leadership skill, professional competence and innovation ability of project managers in construction industries: Basis for project manager's leadership framework**

### **1. Introduction**

In the current construction industry, project managers assume a critical role. With the increasing size and complexity of engineering projects, as well as the rapidly changing technological and market environments, the importance of a project manager's leadership, professionalism, and creativity for project success continues to rise (Smith, 2021). However, while these competencies are widely recognized as key factors in project success, understanding of how they interact and collectively influence project outcomes remain limited (Johnson, et. al., 2020).

Today, project management has become an integral part of modern business operations. Organizations are increasingly relying on project management to monitor and evaluate projects, and to ensure that they comply with their objectives. Project management involves a range of complex processes, which include planning, organizing, managing, controlling, budgeting, monitoring, testing, and implementing projects. Project leadership refers to the art and science of guiding a team towards successful project completion. Project leadership brings together people to achieve a common goal, the team is able to accomplish more than they could as individuals (Duggal, 2023). Motivating and inspiring teams is an essential leadership skill for project managers. The ability to negotiate, communicate, listen, develop influencing skills, and develop a team are also important leadership skills, particularly since they contribute to the improvement of the performance of a team. All projects-oriented organizations such as construction firms, consultancy firms, and information and communication technology (ICT) firms, need for trained, competent, leader and experienced project managers. Among the most important elements for a successful project manager, there are combination of knowledge, skill, leadership, ability and personal attitude which are necessary for successful project completion (Ghorbani, 2023).

Professional competencies of project managers are the qualifications which include their knowledge, skills, experience and more. Project management competencies are important because they can indicate the skill and experience levels of project managers. Project managers can drive the success of a project, so it's crucial to hire project managers that possess essential project management competencies. Searching for candidates who possess project management competencies can help recruiters ensure they find a qualified candidate who can excel in a project manager position and benefit their company. According to Chen, et al. (2019), due to the increasing complexity and flexibility of business activities, project-based organizations have become common. In such organizations, project management competencies, which refer to a collection of knowledge, personal attitudes, skills, and relevant experience, are core assets that must be taken seriously. Formalized project management career paths have been widely implemented in the construction industry. Throughout history, humans have used technology to make their lives easier and more efficient. The construction industry is no different. In the past, manual labor was the only way to build structures. In modern construction, various tools and equipment can speed up the process. Staying ahead of the competition requires construction firms to improve their methods constantly. It often means investing in new technologies to make their projects more efficient and cost-effective. As construction companies embrace new technologies, the possibilities for innovation are endless.

Construction is an essential industry that helps to create the built environment we live in. From homes and office buildings to roads and bridges, construction plays a vital role in our daily lives. As our needs and desires change, construction must adapt to meet these new challenges. Innovation is therefore essential to the continued success of the construction industry. By developing new methods and materials, construction companies can stay ahead of the curve and deliver projects that meet the ever-changing needs of their clients. Those who fail to innovate in a highly competitive market will quickly be left behind. For this reason, construction companies must always look for new ways to improve their business. Those who can embrace change and innovate will be the ones

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Leadership skill, professional competence and innovation ability of project managers in construction industries that succeed in this ever-changing industry (Paredes, 2023).

The rapid pace of change in the Chinese construction industry, with new technologies and regulations emerging constantly, poses a challenge for proponent. The Chinese construction industry is constantly evolving with new technologies and regulations. Studies struggle to capture these fast-paced changes and their impact on project manager skillsets. The high rate of project manager turnover in China makes it difficult to track long-term skill development and the impact of training programs. There might be an overemphasis on traditional project management skills like budgeting and scheduling while neglecting the importance of fostering innovation in problem-solving and project execution (Li, et al., 2023). The lack of standardized tools for measuring leadership, competence, and innovation in Chinese project managers makes it difficult to compare skills across companies. Studies might not capture the latest skills required by project managers due to outdated research designs. Studies often struggle to access sensitive project data from construction companies, hindering researchers' ability to gather accurate information on project manager performance. It is important to address the relevant leadership styles and how they translate to effective project management in China.

This study aims to fill this knowledge gap by exploring the key competencies that construction project managers must possess to construct a project manager's leadership framework. The importance of the research lies in the fact that by analyzing in-depth the project managers in terms of leadership, professional competence and innovation, this study provides not only a theoretical contribution, but also a practical guide for the construction industry. The results of the study will contribute to the development of project managers with effective leadership skills, promote best professional practices, and stimulate innovative thinking and approaches in project management. In addition, the findings of this study are expected to provide valuable insights to policy makers, educators, and practitioners in the construction industry for the overall progress and sustainability of the industry. Through this study, the proponent as part of construction industry will contribute to effective project management by studying leadership skills, professional competence, and innovation ability of project managers in China's construction industry. The output of the study will provide the potential to significantly improve project success rates, promote innovation, and ensure a competent workforce that can drive growth and efficiency within the industry.

**Objectives of the Study** - The study aimed to examine the leadership skills, professional competence and innovation ability of project managers in construction industries that serve as basis in developing a Project Manager's Leadership framework. Specifically, the study determined the Leadership skill of project manager as to communication, coordination and team building, described the professional competence of project manager in terms of construction laws, contract management, safety knowledge; assessed innovation ability of project manager as to bringing new technologies, management models and organizational structures; tested the significant relationship among the leadership skill, professional competence and innovation ability and developed a project managers leadership framework for construction companies.

## 2. Methods

**Research Design** - The descriptive-quantitative research design was used in the study as it described the leadership skills, professional competency and innovation ability of project managers and the relationship among these variables. The descriptive design aims to explore and describe the relationships among these three variables (leadership skills, competence, and innovation) rather than manipulating them to test a specific cause-and-effect hypothesis (Creswell, et. al., 2018). Descriptive research helps paint a picture of how these qualities are present and potentially connected in real-world project management scenarios. Descriptive research is well-suited for gathering and analyzing this type of quantitative data to understand the characteristics and experiences of project managers (Gall et al., 2015).

**Participants of the Study** - This study made use of 405 construction project managers and staff, engineers, quality officers, contract administrators, and designers from six different large state-owned enterprises, namely

China Railway Major Bridge Engineering Group Co. limited, China Railway 19th Bureau Group Co. limited, GuangXi road and bridge engineering Group Co. limited, China construction second engineering bureau Ltd, GuangXi institute of building research & design, Guangxi construction Group. These participants provided valuable information about the leadership, professionalism and innovation of large state-owned enterprises in construction project management. Since they come from multiple fields and different companies, their feedback added to the diversity and representativeness that helped reveal the prevailing practices and challenges of project management in large state-owned construction companies. By collecting data from this specific group, the proponent was able to provide an in-depth analysis of the current state of construction project management in China and provide a quantitative assessment for improving the managerial competence of project managers in this field.

**Instrument of the Study** - The data collection instrument for this study is a questionnaire and was used to quantitatively measure the leadership, professionalism and innovation of construction project managers. This questionnaire was self-constructed by the proponent based from the literature read and based from his experiences in the project management in construction companies. The first part of the questionnaire is the leadership skill indicators to assess the project manager's leadership skills as to communication skills, coordination skills, and team building. The second part of the questionnaire measures the professional competency of the respondents which includes the indicators about construction laws, contract management and safety knowledge. The third part of the questionnaire focused on the innovation ability of the respondents which assessed the new technology, management model and organization structure. The questionnaire was pilot tested with small group of respondents to test its reliability.

Based on result, the Leadership Skills, Professional Competence, and Innovation Ability Instrument has an Excellent consistency as exhibited by the Cronbach's Alpha value of (.962). This was validated by the Good remarks from Leadership Skills (.891); it was confirmed by the Good results from Communication (.846) and Team Building (.846), and Acceptable result from Coordination (.729). Also, it was validated by the Excellent remarks from Professional Competence (.948); it was confirmed by the Good results from Construction Laws (.832), Contract Management (.832), and safety knowledge (.824). Moreover, it was further validated by the Excellent results from Innovation Ability (.908); it was confirmed by the acceptable results from New Technologies (.728), and Organizational Structures (.728) and Good result from Management Models (.819), which shows that the instrument at hand passed the reliability index test. Thus, the researcher can now proceed to the actual survey using the aforementioned instrument.

**Data Gathering Procedure** - The questionnaire was designed according to the purpose of the study and included sections on leadership skills, professional competence and innovation ability. Pre-testing was conducted first to test the comprehension and validity of the questionnaire with a small sample, and the content of the questionnaire was adjusted according to the results of the pre-test. Stratified sampling was used to select project managers and employees from six large state-owned enterprises to ensure that the sample was representative and to determine the sample size for effective statistical analysis (Peters, et. al., 2023). The questionnaire was then distributed to project managers and employees using We Chat and face to face administration of questionnaire was done for those respondents who cannot be reached online. The proponent set a deadline for questionnaire collection to facilitate time planning for subsequent data analysis. He regularly kept track of the return of questionnaires and reminded participants who have not completed the questionnaire. Direct data export for electronic questionnaires and cleaning the data, checking and dealing with missing values, outliers and duplicate records. Data was organized and imported into statistical analysis software. Descriptive statistics was analyzed to understand the basic distribution of the data.

**Data Analysis** - Weighted mean and rank were used to determine the leadership skill of project manager as to communication, coordination and team building, described the professional competence of project manager in terms of construction laws, contract management, safety knowledge; assessed innovation ability of project manager as to bringing new technologies, management models and organizational structures. The result of Shapiro

Wilk test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. All analyses were performed using SPSS version 28.

**Ethical Consideration** - Ethical considerations are essential when conducting research on leadership, professional competence and innovation of construction project managers. These considerations ensured that the research was designed and conducted in a way that respected the rights and well-being of the participants and complied with legal requirements and ethical standards. Informed Consent and Participant Privacy: First and foremost, research must ensure that all participants participate voluntarily, and that they need to be fully informed about the nature of the research, its purpose, the expected behaviors during the study, and how their data will be collected and used (Turner, et. al., 2020). To this end, researchers need to provide a detailed informed consent form that clearly explains the potential risks and benefits of participating in the study. In addition, researchers need to ensure that all personal information will be kept confidential and that the data collection and storage process will be strictly anonymized to protect the privacy of participants. Any information that may make an individual identifiable, such as name, contact information, etc., will be stripped from the study data and stored properly in a secure environment.

**Date security and confidentiality** - All data collected through the questionnaire will be handled in accordance with data protection regulations. The researchers used the encryption technology and a secured a web platform to transmit and store the data, ensuring that only authorized personnel will have access to this information. At the end of the study, all electronic data were securely stored or destroyed to prevent unauthorized use as affirmed by Wallace, et. al., (2019). For paper questionnaires and records, they were intended for secured storage in locked filing cabinets for access by the research team only. In addition, the research results were released without any personal identifying information to avoid revealing the identity of the participants.

### 3. Results and discussion

**Table 1**

*Summary Table on Leadership Skill of Project Manager*

Key Result Areas	Composite Mean	VI	Rank
Communication	3.09	Agree	3
Coordination	3.20	Agree	1
Team Building	3.15	Agree	2
Grand Composite Mean	3.15	Agree	

*Legend: 3.50-4.00 = Strongly Agree; 2.50-3.49 = Agree; 1.50-2.49 = Disagree; 1.00-1.49 = Strongly Disagree*

Table 1 provides a composite rating of the leadership skills of construction project managers in three key outcome areas, communication, coordination, and team building. Each domain has a composite mean, a value that is based on a weighted average of the individual breakdowns previously analyzed. The grand composite mean 3.15 implies that the leadership skills of program managers are generally recognized in all areas. However, the level of "Strongly Agree" was not reached, indicating that although program managers' leadership skills are effective in these key areas, they have potential for further improvement in each area.

These combined results suggest that although project managers are performing well overall in leadership skills, they still need to make continuous improvements and develop in the areas of communication and team building. Project manager training and development programs should enhance professional training in these areas, for example, through role-playing, communication skills workshops, and team-building activities, to improve the overall leadership skills of project managers. In addition, project managers should be encouraged to share successes in coordination to enhance the coordination skills of the entire team (Garcia, et. al., 2019).

Overall, these data provide construction firms with important insights into the current state of project managers' leadership skills and provide strong guidance on how to improve these skills through targeted training and development initiatives (Huang, et. al., 2021). Through these measures, project managers' abilities in

communication, coordination, and team building can be further improved, thereby contributing to the overall performance of project teams and project success.

**Table 2**  
*Summary Table on Professional Competence of Project Manager*

Key Result Areas	Composite Mean	VI	Rank
Construction Laws	3.22	Agree	3
Contract Management	3.48	Agree	2
Safety Knowledge	3.66	Strongly Agree	1
Grand Composite Mean	3.45	Agree	

*Legend: 3.50-4.00 = Strongly Agree; 2.50-3.49 = Agree; 1.50-2.49 = Disagree; 1.00-1.49 = Strongly Disagree*

Table 2 summarized the professional competence of project managers with a grand composite mean of 3.45. This provides a comprehensive assessment of the project manager's performance in three areas of professional competence: construction regulations, contract management, and safety knowledge. These areas are key factors in project management success and are core components of a project manager's professional competencies.

The grand composite mean 3.45, with an overall rating of "Agree" reflects the overall high level of performance of project managers in the three core professional competency areas listed above. It demonstrates that the project managers have a solid foundation of competencies in ensuring project compliance, contract management, and safety knowledge, all of which are critical to the smooth running and successful completion of the project.

The overall evaluation results show that the project manager's expertise is particularly strong in the areas of contract management and safety knowledge, while it is satisfactory but relatively weak in the area of construction regulations (Smith, et. al., 2019). This may reflect the fact that project managers deal more frequently with contract management and safety-related tasks in their daily work, while in-depth knowledge and application of construction regulations may require more time and experience accumulation. Therefore, when developing training programs for project managers, construction firms should consider strengthening construction regulations-related training content to ensure that project managers maintain a high level of professional competence in all key areas (Tan, et. al., 2021).

These data are also valuable for project managers' career development planning. Project managers can use these ratings to identify their strengths and room for improvement, so they can make more targeted efforts at personal development. At the same time, highly rated areas can be further utilized and developed as personal career strengths (Vargas, et. al., 2020). Overall, the results of this evaluation are an affirmation of the project manager's professional competence, while also pointing out the direction for future improvement and development.

Table 3 summarizes the project manager's overall rating in the three key outcome areas of innovativeness. These areas include innovations that bring about new technologies, management models, and organizational structures. The Composite Mean, Consistency Index (VI), and relative rankings for each area provide an overall assessment of the program manager's ability to innovate. Grand composite mean of 2.92 indicates that the project manager's overall performance in all innovation competency areas was rated "Agree". This rating is in the middle of the "Agree" range, indicating that while the program manager demonstrates some competence in innovation, there are opportunities for improvement in all areas.

**Table 3**  
*Summary Table on Innovation Ability of Project Manager*

Key Result Areas	Composite Mean	VI	Rank
Bringing New Technologies	2.89	Agree	2
Management Models	2.86	Agree	3
Organizational Structures	3.00	Agree	1
Grand Composite Mean	2.92	Agree	

*Legend: 3.50-4.00 = Strongly Agree; 2.50-3.49 = Agree; 1.50-2.49 = Disagree; 1.00-1.49 = Strongly Disagree*

These combined results emphasize the importance of project managers' ability to innovate and reveal their overall performance in this area. The lower scores for project managers in bringing new technologies and management models suggest that, despite the positive aspects, their innovative practices in these areas may be limited by factors such as resources, knowledge, or organizational culture (Howard, et. al., 2022). Higher scores for innovation in organizational structure may reflect project managers' increased focus on optimizing internal processes and team configurations, possibly because they have a direct impact on the day-to-day operations of the project and team effectiveness (Howard, et. al., 2022). To enhance project managers' innovation capabilities in these key areas, the organizations may provide more training and resources, such as specialized workshops, seminars, and hands-on projects, as well as increased collaboration with technology vendors and professional organizations (Iyer, et. al., 2019). In addition, encouraging project managers to share best practices, innovation cases, and successful organizational change experiences can help build an organizational culture that supports innovation (Jensen, et. al., 2021).

Overall, while project managers have shown positive performance in innovation competencies, the overall evaluation results show that there is much room for improvement in promoting and managing innovation, which is critical to the long-term success and competitiveness of the program.

**Table 4**  
*Relationship Between Leadership Skill and Professional Competence*

Variables	rho	p-value	Interpretation
<b>Communication</b>			
Construction Laws	0.438**	0.000	Highly Significant
Contract Management	0.448**	0.000	Highly Significant
Safety Knowledge	0.135**	0.000	Highly Significant
<b>Coordination</b>			
Construction Laws	0.269**	0.000	Highly Significant
Contract Management	0.332**	0.000	Highly Significant
Safety Knowledge	0.066	0.199	Not Significant
<b>Team Building</b>			
Construction Laws	0.036	0.477	Not Significant
Contract Management	0.052	0.309	Not Significant
Safety Knowledge	0.086	0.091	Not Significant

\*\* . Correlation is significant at the 0.01 level

As seen in the table 4, the computed rho-values ranging from 0.135 to 0.448 indicate a very weak to moderate direct relationship between communication and professional competence. It shows a statistically significant relationship between communication and professional competence since the obtained p-values were less than 0.01. Construction projects involve numerous stakeholders with varying technical backgrounds, from architects and engineers to subcontractors and on-site workers. A project manager needs to communicate effectively with each group, ensuring everyone understands their roles and responsibilities. Construction projects are inherently collaborative. The manager must foster open communication to encourage teamwork and problem-solving. They also need strong communication skills to mediate any conflicts that arise between team members or stakeholders.

The success of a project hinges on the clear and timely flow of information. The project manager needs to effectively communicate project goals, plans, changes, and updates to keep everyone aligned. Miscommunication can lead to delays, errors, and wasted resources (Zwikael, et. al., 2019). Construction projects involve a complex web of interconnected tasks. Subcontractors, suppliers, and internal teams all contribute to the project's success. The project manager needs to effectively coordinate these efforts, ensuring everyone works together seamlessly to achieve project goals. Coordination relies on clear communication and proper documentation. The project manager needs to effectively communicate contractual terms, changes, and updates to all relevant parties. This ensures everyone is on the same page and that all changes are documented clearly to avoid future confusion. The computed rho-value of 0.269 indicates a weak direct relationship between coordination and construction laws.

Likewise, the computed rho-value of 0.332 indicates a weak direct relationship between coordination and contract management. However, the computed rho-value of -0.066 indicates a very weak indirect relationship

between coordination and safety knowledge. It only shows that there was a statistically significant relationship between coordination and sub variables of professional competence namely construction laws and contract management since the obtained p-values were less than 0.01. Construction projects involve a complex web of interconnected tasks. Subcontractors, suppliers, and internal teams all contribute to the project's success. The project manager needs to effectively coordinate these efforts, ensuring everyone works together seamlessly to achieve project goals (Arain, et al., 2020). Further, coordination relies on clear communication and proper documentation. The project manager needs to effectively communicate contractual terms, changes, and updates to all relevant parties. This ensures everyone is on the same page and that all changes are documented clearly to avoid future confusion (Liu et al., 2023).

The computed rho-value ranging from -0.036 to -0.086 indicate a very weak indirect relationship between team building and sub variables of professional competence namely construction laws and safety knowledge while the computed rho-value of 0.052 indicate a very weak direct relationship between team building and contract management. It shows that there was no statistically significant relationship between team building and professional competence since the obtained p-values were greater than 0.01. A connection between team building and project manager competence is complex. While a single team building event might not guarantee a more competent project manager. Team building exercises can be seen as one-time events that create temporary positivity but lack a lasting impact on core team skills (Mohammed et al., 2021). Likewise, effective project management hinges on strong communication, collaboration, and problem-solving, which require sustained development beyond a single activity. Some team building exercises prioritize entertainment and engagement over building the core competencies needed for successful project teams (Gibson, et. al., 2018).

As seen in the table 5, the computed rho-values ranging from 0.178 to 0.644 indicate a very weak to strong direct relationship among the sub variables of leadership skill and innovation ability. There was a statistically significant relationship between professional competency and innovation ability because the obtained p-value were less than 0.01. Project managers with a solid foundation in core competencies like planning, scheduling, and risk management can create a stable and predictable project environment and this stability allows them to encourage and explore new ideas without putting into risks the project goals.

**Table 5**  
*Relationship Between Leadership Skill and Innovation Ability*

Variables	rho	p-value	Interpretation
<b>Communication</b>			
Bring New Technologies	0.537**	0.000	Highly Significant
Management Models	0.644**	0.000	Highly Significant
Organizational Structures	0.545**	0.000	Highly Significant
<b>Coordination</b>			
Bring New Technologies	0.486**	0.000	Highly Significant
Management Models	0.410**	0.000	Highly Significant
Organizational Structures	0.307**	0.000	Highly Significant
<b>Team Building</b>			
Bring New Technologies	0.363**	0.000	Highly Significant
Management Models	0.254**	0.000	Highly Significant
Organizational Structures	0.178**	0.000	Highly Significant

\*\**. Correlation is significant at the 0.01 level*

Effective project managers are adept at problem-solving and adapting to unforeseen circumstances. These skills translate well to innovation. They can identify areas for improvement in project processes, materials, or methodologies, and then develop creative solutions to address them (Ahn et al., 2020). Innovation often thrives in collaborative environments. Project managers with strong communication skills can foster teamwork, encourage diverse perspectives, and create a culture where innovation is valued. They can effectively communicate innovative ideas to stakeholders and secure buy-in.



**Table 6**  
*Relationship Between Professional Competency and Innovation Ability*

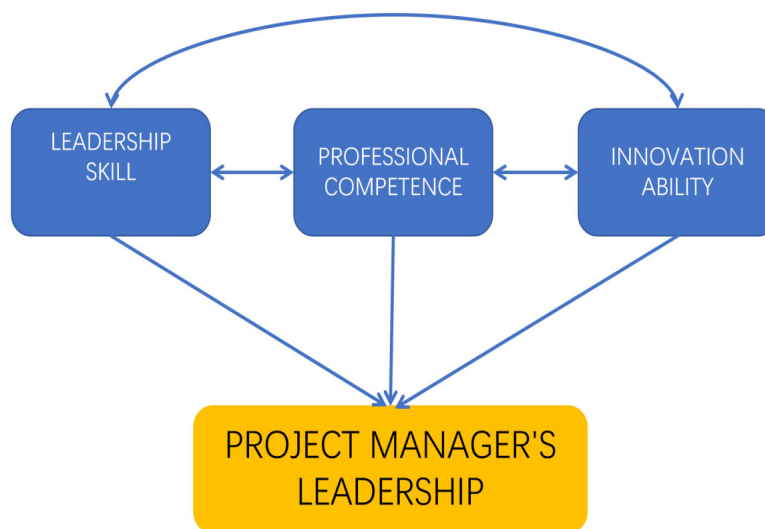
Variables	rho	p-value	Interpretation
<b>Construction Laws</b>			
Bring New Technologies	0.412**	0.000	Highly Significant
Management Models	0.426**	0.000	Highly Significant
Organizational Structures	0.425**	0.000	Highly Significant
<b>Contract Management</b>			
Bring New Technologies	0.332**	0.000	Highly Significant
Management Models	0.490**	0.000	Highly Significant
Organizational Structures	0.321**	0.000	Highly Significant
<b>Safety Knowledge</b>			
Bring New Technologies	0.330**	0.000	Highly Significant
Management Models	0.298**	0.000	Highly Significant
Organizational Structures	0.247**	0.000	Highly Significant

\*\* : Correlation is significant at the 0.01 level

As seen in the table 6, the computed rho-values ranging from 0.247 to 0.490 indicate a weak to moderate direct relationship among the sub variables of professional competency and innovation ability. There was a statistically significant relationship between professional competency and innovation ability because the obtained p-value were less than 0.01. Effective project managers excel in solving problems and adapting to unforeseen situations. These skills can be translated to innovation since they can identify areas for improvement in materials, processes and methods used that can help develop sound solutions to address these problems. Skilled project managers are adept at managing resources. They can strategically allocate resources to support innovative endeavors, such as budgeting for prototyping or feasibility studies for new approaches (Morris, et. al., 2018). Likewise, innovation inherently involves some level of risk. Project managers with strong risk management skills can assess the potential risks associated with innovative ideas and develop strategies to mitigate them. This allows them to take calculated risks and pursue innovation without jeopardizing project success. Additionally, according to Baccarini (2019), they can explore external resources like grants or partnerships that might support innovative projects.

**Project Manager’s Leadership Framework**

Based on the results of the study, a statistically significant relationship among leadership skills, professional competence, and innovation ability in construction project managers are the three core competencies where a project manager’s leadership framework has emerged.



**Figure 1.** Project Manager’s Leadership Framework

Leadership skill has significant relationship with professional competence. Effective leadership is crucial for project managers in construction. They need to guide and motivate diverse teams, manage stakeholders with varying interests, and navigate complex project environments. The leadership skills of project managers which were assessed include the communication skills, coordination and team building.

Strong professional competence fosters confidence in project managers. This confidence allows them to lead with greater authority, delegate tasks effectively, and inspire trust in their team (Ahn et al., 2020). According to Morris, et. al., (2018), team members are more likely to follow the lead of someone they perceive as competent and knowledgeable. Effective leaders utilize their professional competence to make informed decisions, solve problems, and manage projects strategically. A leader who understands project management principles like scheduling and risk assessment can make better choices for the project's success. Likewise, leaders with professional competence share a common language with their teams regarding project goals, challenges, and methodologies (Baccarini, 2019). This shared understanding allows for more effective communication and collaboration, ultimately leading to better project outcomes. Based from the result, leadership skills have high significant relationship with innovation ability. Leaders with strong communication, coordination and team building skills can create an environment that encourages creative thinking and risk-taking which allow team members to feel comfortable sharing ideas, experimenting with new solutions, and challenging the status quo.

According to Ahn, et al. (2020), leaders who encourage diverse perspectives within their teams benefit from a wider range of ideas and approaches to problems. They can leverage their own skills to analyze these diverse perspectives and guide the team towards creative solutions. Innovation often requires adapting to new situations and technologies. Strong leaders have the ability to navigate change effectively and inspire their teams to do the same (Morris, et. al., 2018). This adaptability is crucial for embracing innovation in a dynamic environment. It is interesting to note that professional competency and innovation ability of project managers have high significant relationship. Project managers with a good foundation of professional competencies like planning, scheduling, and risk management create a predictable and controlled project environment which may encourage them to explore more innovative ideas. It is worth noting that effective project managers excel at problem-solving and adapting to unexpected situations. These skills translate directly to innovation (Ahn et al., 2020). They can identify areas for improvement in processes, materials, or methodologies, then develop creative solutions to address them (Morris, et. al., 2018). These three core competencies are not isolated but rather interconnected. Strong leadership skills allow project managers to leverage their professional competence and foster a culture that encourages innovation. Professional competence establishes a solid foundation for making informed decisions and taking calculated risks associated with innovation. Innovation ability, in turn, can lead to new solutions and improved project outcomes, ultimately reinforcing leadership effectiveness. This leadership framework, built on the cornerstones of leadership skills, professional competence, and innovation ability, equips project managers in construction with the tools they need to navigate complex projects, inspire teams, and drive success in a dynamic and ever-evolving industry.

#### **4. Conclusions and recommendations**

The respondents' showed moderate agreement on the leadership skills possessed by the project managers as to communication, coordination, and teambuilding in construction companies. The respondents agreed on their professional competence as to construction laws, contract management, and safety knowledge in construction companies. The innovation ability of the project managers were moderately agreed by the respondents in terms of bringing new technologies, management models, and organizational structures. Significant relationships were found among leadership skills, professional competence and innovation ability. A project managers leadership framework for construction companies was developed.

The HR managers may investigate the effectiveness of different leadership skills in fostering project success and develop training programs to enhance project managers' leadership skills. The construction project managers may prioritize the development and maintenance of their professional competence by means of training programs, professional development opportunities, and continuous improvement initiatives. Construction owners may create

a culture of innovation, provide project managers with time and resources, establish clear innovation goals, and implement a structured innovation process to foster innovation. The project managers leadership framework for construction companies may be recommended for reference and for future use of the construction companies. Future researchers may investigate the impact of emerging technologies on project managers' leadership, professional competence, and innovation ability.

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