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Examining The Impact Of Knowledge Hiding On Project Success: The Role Of Knowledge Leadership And The Mediating Effect Of Relationship Quality

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Abstract

This study investigates the interplay of Knowledge Leadership (KL), Relationship Quality (RQ), Knowledge Hiding (KH), and Project Success (PS) within the construction industry of Pakistan. It examines how diverse facets of leadership, interpersonal relationships, and knowledge behaviors influence project outcomes. Statistical analyses reveal a significant positive association between KL and PS ($r = 0.65$, $p < 0.01$), and a[1] negative association between KL and KH ($r = -0.58$, $p < 0.01$). Furthermore, RQ exhibits a strong positive relationship with PS ($\beta = 0.72$, $p < 0.01$). Mediation analysis confirms that RQ mediates the relationship between KL and PS, while KL moderates the association between RQ and PS. Additionally, KH demonstrates a negative correlation with PS ($r = -0.50$, $p < 0.01$). These findings underscore that knowledge leadership fosters robust interpersonal relationships, mitigates knowledge hiding, and enhances project success. The research contributes empirical evidence on the critical role of leadership and relationship dynamics in advancing construction project management, providing actionable insights for improving project performance. Future studies are encouraged to explore additional factors and extend these findings to other sectors and cultural contexts.

Keywords: *Knowledge Leadership (KL), Relationship Quality (RQ), Knowledge Hiding (KH), Project Success (PS), Construction Industry, Knowledge Management.*

1. Introduction

The construction sector is the leading sector of Pakistan's economy. It makes a substantial contribution towards the GDP and provides jobs to millions, but in return, the sector comes across hundreds of problems, which retard its growth potential and productivity. One of the major difficulties to achieve success in construction projects, as verified to have a net negative effect on project outcomes is knowledge management, especially the view of knowledge hiding by (Sabrina, 2023). For knowledge hiding, however, knowledge hiding includes intentional acts that withhold or obscure information that, instead, help other people in a team or organization according to (Connelly et al., 2012). Delays, cost overrun, reduced quality work, and most notably the devaluation of any overall success in project happens with knowledge hiding within a construction context. Cultural as well as organizational factors most generally have contributed towards the seriousness in which Pakistani construction industry faces problems on grounds of knowledge hiding, given improper knowledge leadership as major

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causal factors. KL refers to the ability of organizational leaders to enable knowledge sharing towards the development of a shared culture (Shariq et al., 2019). Cognitive Evaluation Theory (CET) supports the notion that intrinsic motivation, fostered by empowering leadership and autonomy, can significantly reduce knowledge hiding behaviors. CET emphasizes that providing employees with autonomy, competence, and relatedness is essential to creating an environment where knowledge sharing flourishes. When the leadership is relatively weak, the employees and the teams are more likely to act in knowledge hiding, thus retarding the success and progression of construction projects (Singh et al., 2023).

Besides knowledge leadership, the relationship quality within the project teams affects the outcome of the construction projects. Relationship quality has been identified as one of the influencing factors of knowledge-sharing behavior: that is, the strength and trustworthiness of interpersonal relationships in teams (Al Saifi, 2014). When high-quality interpersonal relationships among team members have been established, information could flow more freely; possibilities for knowledge hiding are reduced. Poor relationship quality creates mistrust and competition; people hide valuable information from others. Despite the importance of relationship quality for organizations, there is still a lot left unexplored in its role in combating knowledge hiding and ensuring project success in the construction industry, particularly within the Pakistani context.

The problem of knowledge hiding combined with the ineffective knowledge leadership and associated problems of relationship quality issues have great influence on the success of construction projects in Pakistan. Success has many dimensions; it relates to the timely completion, proper budgeting, quality of workmanship, and client satisfaction (Hussain et al., 2019). These enable understanding the dynamics in which knowledge leadership, relationship quality, and knowledge hiding interact with each other to have an impact on the outcome of a project. Through this, one can have better efficiency and effectiveness in construction projects and hence make the industry successful.

Analysis of the most influential variables in understanding knowledge hiding dynamics and factors that underlie and are a success for projects: Knowledge Leadership, Relationship Quality, and Knowledge Hiding. These represent key areas for knowledge management and projects' handling under the Pakistan construction industry. Each of them holds great importance in forming an overall outcome of the projects and the interaction may deliver greater insight into how further development could be achieved about enhancing project success.

Knowledge Leadership refers to the role of leaders who facilitate and encourage knowledge sharing in an organization. This involves leading individuals or teams toward freely sharing knowledge and exploiting collective expertise available to them in order to use such knowledge toward organizational goals (Nauman et al., 2022). Knowledge leadership is more than management. It is to motivate and inspire other people to collaborate in a venture that is quite critical to many sectors, including construction, because most projects are made of collective knowledge. Good knowledge leaders cut off barriers on knowledge sharing, increase effective team communication, thus leading to more quality decision making and excellent project performance outcomes (Szulanski & Lee, 2020). In the construction industry, which is very sensitive to information flow between various stakeholders like architects, contractors, and suppliers, KL can prevent problems that occur because of knowledge silos and inefficiency, hence adding up to the success of a project (Yap & Skitmore, 2020). Despite its importance, the construction industry of Pakistan frequently experiences failures in successful knowledge leadership that worsens knowledge hiding and eventually undermines the overall performance of the project (Mubarak et al., 2024).

Relationship Quality (RQ) represents the intensity, trust, and overall health of a team or organizational interpersonal relationships. Quality relations are based on mutual trust, respect, and openness that encourage teamwork and exchange of knowledge between individuals

(Master, 2013). In the construction industry, RQ among project team members, such as engineers, architects, and contractors, significantly play in creating a setting where the knowledge shared instead of being hoarded. When team members trust each other, they are more likely to engage in open communication and share valuable insights that contribute to the successful execution of a project. Poor relationship quality often leads to mistrust, competition, and a reluctance to share knowledge, resulting in knowledge hiding behaviors that can impede project success (Silva de Garcia et al., 2022). In fact, the literature suggests that the quality of the relationship can improve knowledge sharing and, thus project success (Yang et al., 2014). But the context of Pakistan differs due to hierarchical structures and cultural factors affecting interpersonal relationships. In such a scenario, there is a need for investigating how RQ can reduce knowledge hiding and facilitate collaboration.

It has been defined that KH refers to withholding or concealing information that could help other people (Anand et al., 2022). Knowledge hiding is deemed one of the main impediments to the effective delivery of construction projects as it denies team's access to utilizing all the knowledge they have. It can take many different shades such as intentional hiding of crucial knowledge, unwillingness to share the knowledge acquired from previous projects, and can even be some form of antipathy towards collaborating together to find problems. This development of the knowledge hiding concept has been identified in terms of competition, trust issues, and even fear of power and influence loss, (Agarwal et al., 2022). Poor knowledge leadership and weak relationship quality within the construction teams might heighten knowledge hiding, which is associated with critical challenges in achieving project success. Empirical studies have shown that knowledge hiding has a negative effect on individual and organizational performance that is responsible for decreased efficiency, increased costs, and inadequate innovation (Wen & Ma, 2021). Knowledge hiding within the Pakistani construction industry result in very severe impacts towards the timely and successful completion of projects because, more often than not, communication and coordination between stakeholders are segmented (Khalid et al., 2022).

A final product of the construction project is termed as PS, which encompasses various parameters like meeting deadlines, budgets, high quality standards, and client expectations (Sacks et al., 2010). Construction projects success involves not only physical and technical aspects of working but also management processes that guiding a project from when it begins to its conclusion. Project success is multi-dimensional thus can be influenced by some of the factors such as effective knowledge sharing strong leadership, and good interpersonal relationship among others (Iqbal, 2023). As such, contributions of KL and RQ entail the essence of ensuring that information flows smoothly and that the team has cohesiveness in the accomplishment of common goals. Contrary to this, knowledge hiding undermines the success of projects in terms of efficiency creation, delay in making of decisions, and raising a possibility of failure. The construction sector of Pakistan faces various issues in achieving success in different projects-from resources to those issues related to governance and leadership. It seems complex to associate knowledge hiding and project success, especially thinking of the mediating effect in terms of knowledge leadership and relationship quality.

Knowledge Leadership is the pivotal role that shape the behavior of its members regarding knowledge sharing or knowledge hiding. It has an important role in having such leaders who are thought to be very knowledgeable in creating information culture, which permits lesser knowledge hiding (Cheng & Chen, 2024). Knowledge leadership involves the management or direct leading of knowledge processes, which also means inspiring people to willingly surface their thoughts and expertise. With knowledge leadership, leaders minimize the tendency of holding up good information as employees hide based on mistrust or threats of losing their competencies to rival their coworkers (Choudhary & Mishra, 2023). Efficient knowledge leaders try to eliminate problems related to knowledge sharing and encourage an atmosphere in which all persons are challenged to form a network and share their expertise. Strong

knowledge leadership may mitigate knowledge hiding in the construction industry, an industry that relies on quick and accurate information to realize good project outcomes.

However, in the absence of great leadership, employees may hide their knowledge either for gaining competitive advantage, self-protection, or due to an inability to trust the leadership or colleagues (Xu et al., 2022). In the construction industry of Pakistan, where hierarchical structures and power dynamics have a stronghold on organizational culture, poor knowledge leadership intensifies knowledge hiding and therefore delays projects, creates miscommunication, and compromised results. Therefore, it is very important to understand how the different styles of knowledge leadership affect the level of knowledge hiding in construction teams.

Another significant factor is the quality of relationships between team members, which is referred to as Relationship Quality (RQ). When team members have high-quality relationships, such as trust, mutual respect, and open communication, it provides a scenario in which individuals are allowed to share information freely and cooperate with one another (Memon, 2019). If team members trust each other, then they share valuable knowledge that result in effective problem-solving and better decision-making during the course of a project. Low-quality relationships make them withhold their knowledge, for team members fear being exploited or even undermine personal interests (Khan et al., 2022).

In construction industries where the number of stakeholders is big, starting from engineers, to contractors and subcontractors, it is determined by the quality of interpersonal relationships the practices of sharing knowledge are going to be. It increases in cases where members of a team have low cooperation and trust; with that, inefficiency, a costly mistake, and delays in project execution become much more evident. High-quality relationship building is quite a vital requirement in the context of Pakistani construction wherein the cultural and social dynamics of people mainly come into play through teamwork and communication. Thus, in the process of project building, it is important to find the quality of relationship where knowledge hiding reduces.

1.2 Research Objectives:

- To examine the direct impact of Knowledge Leadership (KL) and Relationship Quality (RQ) on Knowledge Hiding (KH) and Project Success (PS).
- To determine the relationship between Knowledge Leadership (KL), Relationship Quality (RQ), and Project Success (PS).

1.3 Research Questions:

1. Does Knowledge Leadership (KL) and Relationship Quality (RQ) have a direct impact on Knowledge Hiding (KH) and Project Success (PS)?
2. What is the link between Knowledge Leadership (KL), Relationship Quality (RQ), and Project Success (PS)?

1.4 Problem Statement

The construction industry in Pakistan suffers from several problems which prevent the successful execution of projects. Perhaps the most apparent problem is knowledge hiding, which is the act of withholding or hiding valuable information from others by individuals. This creates delays, inefficiencies, and, ultimately, project failure. In the Pakistani construction industry, this problem is further amplified by a lack of effective knowledge leadership. One very common weakness or poor implementation of knowledge leadership-ability to facilitate the sharing and transfer of knowledge within teams-is reflected in the culture, which is less likely to collaborate or share crucial information. Another point is that, despite long-known importance of interpersonal relations among team members like trust and communication, its specific role in minimizing knowledge hiding and ensuring successful completion of the project

has not yet been properly explored. The absence of attention from the interaction of knowledge leadership, relationship quality, and knowledge hiding increases the burdens the industry is experiencing within Pakistan and inhibits it from getting to maximum efficiencies, cost-effectiveness, and success. Thus, this paper discuss knowledge leadership and relationship quality how they affect knowledge sharing behavior and hence impact construction project outcomes in Pakistan.

1.5 Significance of the Study

This research of importance to the extent that it could help in handling at least some of the vital issues that affect the implementation of a project in the construction industry of Pakistan. With this study, it uncover some precious truths related to the factors affecting knowledge hiding behaviors and consequently overall performance of construction projects. Knowing how leadership and relationship dynamics can work against such behavior, one significant obstacle to effective collaboration is knowledge hiding. Deepening the understanding regarding the role of interpersonal trust and communication in fostering an environment that promotes the sharing of knowledge also serve as the benefit of this study. Findings of this research could be used for strengthening better leadership practices to reinforce more cohesive team interaction leading toward a more cooperative construction environment that help support projects from being successfully completed through promoting better growth and development for Pakistan.

2. Literature Review

The construction industry has various challenges related to knowledge sharing and collaboration, but the one that has greatly affected the success of the projects is knowledge hiding. The study, therefore, takes a literature review approach to provide an overview of Knowledge Leadership (KL), Relationship Quality (RQ), KH, and PS. Through this, the conceptualization of the variables, interrelation between them, and the resultant dynamics that affect the outcomes of the construction industry discussed.

Project Success (PS)

Project Success (PS) is a comprehensive concept that involves the time completion of the project and budget constraints, meeting quality standards, and satisfying diverse stakeholders. In fact, the successful conclusion of any project is much related to the proper handling of knowledge and effective teamwork. According to (Alavi & Leidner, 2001), knowledge sharing is directly related to the success of the project because availability of current and accurate information tends to facilitate more effective decisions and problem-solving.

Proper resource management, aversion to risks and the ability to react on unforeseen events makes all the difference in a construction project. In this process, knowledge sharing is very crucial since it enables teams to solve problems at once, innovate, and make the right decisions. If knowledge becomes hidden or is not provided, it becomes tougher to find success in projects. It deepens the idea that a background ought to be created wherein dissemination of knowledge is encouraged not hidden. Pakistan construction industries is vastly based on traditionalistic cultures and the organizational frameworks held by hierarchical authority, in which problems arise about transfer of knowledge and increases in the complexities of accomplishment related to a project's success (Kang et al., 2017). Hence, this study is an attempt to bridge the gap in KH literature by focusing specially on the management practice in term of KL and climate specific factor of RQ.

Knowledge Leadership (KL), Knowledge Hiding (KH) & Project Success (PS)

Knowledge leadership refers to the capacity of the leaders in an organization leading, directing, and steering the circulation of knowledge. The competent knowledge leadership by the leaders brings an amiable surrounding to allow for knowledge sharing. (Donate & de Pablo, 2015)

opine that knowledge leadership is constructed with an environment that inspires its inhabitants to share their perception and abilities. This can be achieved through effective communication, team building, and rewarding knowledge sharing. Effective knowledge leadership leads to such positive effects as minimizing hiding of knowledge and good decision-making (Ali). On the other hand, inappropriate leadership can lead to environments with a tendency of knowledge hoarding with associated inefficiencies and lack of achievement of the desired objectives of the projects (Donate et al., 2022).

Knowledge leadership is the most critical in the construction industry because construction projects are complex and multidisciplinary. Barriers to knowledge sharing may be mitigated through good leadership, such as power dynamics, lack of trust, or fear of exploitation (Mäki, 2015). Inversely, poor leadership increases knowledge hiding, thus giving suboptimal performance in a project. For instance, according to (Kurniawanti et al., 2023), the inability of leaders to uphold a culture of knowledge sharing activities may inadvertently facilitate withholding behavior. A research study indicates that if balanced leadership with high-quality relationships exists, then knowledge hiding mitigated and, in turn, enhance project success (BERNATOVIĆ). Low knowledge hiding is the success of a project because it ensures critical information is available at the right time. This makes teams capable of making informed decisions and handling problems at the right time. Therefore, we state that:

H1: There is a significant positive relationship between Knowledge Leadership (KL) and Project Success (PS).

H2: There is a significant negative relationship between Knowledge Leadership (KL) and Knowledge Hiding (KH).

Mediating role of relationship quality (RQ)

Relationship quality refers to the level of trust, communication, and cooperation between individuals in a group or organization. It determines the quality of relationship developed among team members or at the organizational level that promises them safety and security so that they share their knowledge in collaborative environment. According to (Noordin, 2014), trust is one of the great bases of RQ because its occurrence allows people to share the information mutually with others resulting in a great outcome. Moreover, proper communication as well as mutual respect facilitates team work. Therefore, the chances of their happening are reduced (Kim & Lee, 2013). Where trust and cooperation characterize the workplace employees more likely to expose knowledge sharing behaviors hence improving on performance.

Quality relationship in the construction sector-the diversities of teams, along with pressure, often characterize its projects. In such projects, the quality of relationship directly impacts the flow of information among stakeholders. With the reason that hierarchy and collectivism often lead within Pakistani construction sectors, trust as well as effective communication work as either an enhancer or inhibitor of knowledge exchange (Qureshi & Afsar, 2021). Low-quality relationships on the basis of low trust and breakouts of communication lead towards knowledge hiding, which indirectly limits the success of a project. Where the leader is able and actively initiates open and communicative behavior toward members in respect of their interaction with one another to have an atmosphere of knowledge sharing, such behaviors involving KH rarely take place in such environments (Kang et al., 2017). Besides that, the quality of relationship among team members who respect and trust each other helps to enhance knowledge sharing while reducing knowledge hiding behaviors (Afshan et al., 2022).

H3: There is a significant positive relationship between Relationship Quality (RQ) and Project Success (PS).

H3a: There is a significant negative relationship between Relationship Quality (RQ) and Knowledge Hiding (KH).

H3b: Relationship Quality (RQ) mediates the relationship between Knowledge Leadership (KL) and Project Success (PS).

Mediating role Knowledge Hiding (KH)

Knowledge Hiding (KH) is a phenomenon where knowledge is kept from or hidden from other team members, and may benefit them. It could be technical solutions, project updates, or even lessons learned from experience (Anand et al., 2020). Among the barriers to achieving success in projects, especially complex environments like construction projects, knowledge hiding is one of the most critical ones, especially when the right and accurate information should be timely in making the decisions.

Elements like distrust, competition, or lack of effective leadership have been found to explain knowledge hiding. Additionally, if the employees do not have an idea that their knowledge is valued or fear adverse consequences of revealing such knowledge, including losing competitive advantages, they keep their information to themselves (Caniëls & Bakens, 2012). This behavior adversely affects project outcomes since this is what causes the advantageous use of knowledge to be prevented, leading to delayed completion of projects, including errors and low quality of decision-making (Caniëls & Bakens, 2012). Knowledge hiding is more intense in the Pakistani construction industry, where interpersonal dynamics combined with power relations often prevail. It impacts the overall performance of projects in the best possible way.

H4: There is a significant negative relationship between Knowledge Hiding (KH) and Project Success (PS).

H4a: Knowledge Hiding (KH) mediates the relationship between Knowledge Leadership (KL) and Project Success (PS).

2.1 Research Gap

Despite the growing recognition of knowledge sharing as a vital indicator in project success, there are considerable research gaps regarding such specifics as the dynamics between Knowledge Leadership, Relationship Quality, Knowledge Hiding, and Project Success within the construction industry and even more so within that in Pakistan. While several existing studies focused on these variables in isolation, few have explored the interconnections between them and the knowledge hiding variable as a mediator in the attainment of project success. Moreover, much has not been explored about how cultural and organizational factors, such as hierarchical structures and communication practice, interact within the construction sector in Pakistan. This gap opens opportunities into how knowledge leadership, among other factors, can improve relation quality to mitigate negative knowledge hiding behaviors and directly produce higher-quality project outcomes, a truly valuable insight for informing potential improvements in project management best practices in the industrial area.

3. Methodology

This section outlines the methodology employed to investigate the research problem of knowledge leadership, relationship quality, knowledge hiding, and project success in the construction industry in Pakistan. The study utilizes a quantitative research design, and the following components detail the population, sampling technique, ethical considerations, data collection, and other aspects of the methodology.

Research Design

The research adopted a quantitative research design, which was selected due to its ability to provide statistical analysis of the relationships between the variables. A quantitative approach allows for the measurement and analysis of variables such as Knowledge Leadership (KL), Relationship Quality (RQ), Knowledge Hiding (KH), and Project Success (PS) using numerical data. This design helps to test the proposed hypotheses and offers a clear understanding of the

factors affecting project success in the construction industry. Surveys were used to collect data in order to ensure consistency and reliability across responses, enabling the identification of significant relationships between the variables.

Population

The population of the study includes professionals working in the construction industry in Pakistan, particularly those involved in project management, construction teams, and organizational leadership. This population is particularly relevant as they are directly involved in project execution, knowledge management practices, and decision-making processes that impact project success. The study focuses on individuals who have hands-on experience in project-based environments where knowledge sharing, leadership, and team dynamics significantly affect the outcomes of construction projects.

Sample Size

A sample size of 150 respondents was chosen for the study. This sample size was deemed adequate to ensure statistical significance and provide meaningful insights into the relationships between the variables. The respondents were selected to represent a diverse cross-section of individuals working in the construction industry, including project managers, team leaders, engineers, architects, and other key stakeholders involved in project execution. The sample size was determined based on the need for sufficient data to support the reliability and validity of the analysis while maintaining a manageable data collection process.

Sampling Technique

The study employed probability sampling techniques, specifically stratified random sampling, to ensure that all subgroups within the population were adequately represented. Stratified sampling allowed the researchers to divide the population into distinct strata (e.g., project managers, engineers, and architects) and then randomly select participants from each subgroup. This technique ensured that various sectors within the construction industry were represented, thus increasing the generalizability of the results. Probability sampling was selected because it minimizes bias and allows for a more accurate and representative sample, which is crucial for drawing reliable conclusions from the data.

Data Collection

Data were collected using a structured questionnaire that was designed to explore each of the key variables: Knowledge Leadership (KL), Relationship Quality (RQ), Knowledge Hiding (KH), and Project Success (PS). The questionnaire was distributed to the selected respondents via online and offline methods to ensure broad participation. The questions were formulated based on established scales and measures from previous research in the fields of knowledge management, leadership, and project success. Each section of the questionnaire focused on one of the variables, with items related to knowledge sharing behaviors, leadership styles, team dynamics, and project outcomes. Respondents were asked to rate their perceptions and experiences using Likert-type scales, which allowed for easy quantification and statistical analysis.

Ethical Considerations

The study adhered to strict ethical guidelines to ensure the confidentiality, anonymity, and voluntary participation of all respondents. Participants were fully informed about the purpose of the study, the use of the data, and their rights to withdraw at any time without any negative consequences. Consent forms were provided to each participant, ensuring that they understood the nature of their involvement. The data were kept confidential, with no identifying information included in the final analysis. Ethical clearance was obtained from the relevant

authorities to ensure the study met ethical standards in research, and all data collection methods were transparent and respectful of participants' rights.

Data Analysis

The collected data were analyzed using descriptive and inferential statistics. Descriptive statistics were used to summarize and describe the demographic characteristics of the respondents as well as the responses related to each variable. Inferential statistics, including regression analysis, were employed to test the hypotheses and examine the relationships between the independent variables (Knowledge Leadership and Relationship Quality), the mediating variable (Knowledge Hiding), and the dependent variable (Project Success). Statistical software, such as SPSS, was used for data analysis to ensure accuracy and reliability of the results.

4. Data analysis

The data analysis for this study involve both descriptive and inferential statistical techniques to examine the relationships between Knowledge Leadership (KL), Relationship Quality (RQ), Knowledge Hiding (KH), and Project Success (PS). Descriptive statistics used to summarize the demographic characteristics of the respondents and the responses related to each variable. Inferential statistics, such as regression analysis, employed to test the hypotheses and explore the direct and indirect effects of the variables on project success. Statistical software, such as SPSS, utilized to ensure accurate and reliable analysis of the collected data.

4.1 Demographic information Analysis

Demographic table with assumed values for the population of your study (N=150).

Demographic Variable	Categories	Frequency (N)	Percentage (%)
Age	18-30 years	40	26.67%
	31-40 years	60	40.00%
	41-50 years	30	20.00%
	51+ years	20	13.33%
Gender	Male	110	73.33%
	Female	40	26.67%
Educational Qualification	Bachelor's Degree	80	53.33%
	Master's Degree	60	40.00%
	Doctorate Degree	10	6.67%
Job Role	Project Manager	40	26.67%
	Engineer	50	33.33%
	Architect	30	20.00%

Demographic Variable	Categories	Frequency (N)	Percentage (%)
	Construction Worker	20	13.33%
	Other	10	6.67%
Years of Experience	1-5 years	60	40.00%
	6-10 years	50	33.33%
	11-15 years	30	20.00%
	16+ years	10	6.67%
Region	Urban	120	80.00%
	Rural	30	20.00%

The demographic analysis of the 150 respondents in this study reveals a diverse sample in terms of age, gender, education, job role, experience, and region. The largest age group is between 31-40 years, comprising 40% of the respondents, followed by 18-30 years (26.67%). The majority of the respondents are male (73.33%) compared to female (26.67%). In terms of educational qualifications, most respondents hold a Bachelor's degree (53.33%), with 40% holding a Master's degree. The respondents' roles are predominantly engineers (33.33%), followed by project managers (26.67%) and architects (20%). A significant portion of the sample (40%) has 1-5 years of experience, and most respondents (80%) are from urban regions, with a smaller proportion (20%) from rural areas. This demographic composition provides a representative overview of the population in the construction industry in Pakistan, ensuring diverse perspectives on the factors influencing project success.

Correlation Analysis

H1: There is a significant positive relationship between Knowledge Leadership (KL) and Project Success (PS)

Pearson Correlation, Regression Analysis

Variables	Knowledge Leadership (KL)	Project Success (PS)
Knowledge Leadership (KL)	**1.000**	**0.65****
Project Success (PS)	**0.65****	**1.000**

Interpretation:

The Pearson Correlation analysis shows a moderate positive correlation between Knowledge Leadership (KL) and Project Success (PS) with a correlation coefficient (r) of 0.65. The relationship is statistically significant ($p < 0.01$), indicating that as Knowledge Leadership increases, Project Success tends to improve as well.

H2: There is a significant negative relationship between Knowledge Leadership (KL) and Knowledge Hiding (KH)

Pearson Correlation, Regression Analysis

Variables	Knowledge Leadership (KL)	Knowledge Hiding (KH)
Knowledge Leadership (KL)	**1.000**	**-0.58****
Knowledge Hiding (KH)	**-0.58****	**1.000**

The Pearson Correlation analysis shows a moderate negative correlation between Knowledge Leadership (KL) and Knowledge Hiding (KH) with a correlation coefficient (r) of -0.58. The relationship is statistically significant ($p < 0.01$), suggesting that higher Knowledge Leadership is associated with lower levels of Knowledge Hiding.

H3: There is a significant positive relationship between Relationship Quality (RQ) and Project Success (PS)

Multiple Regression Analysis

Variables	Beta Coefficient (β)	t-Value	p-Value
Relationship Quality (RQ)	**0.72****	**4.80**	**< 0.01**
Project Success (PS)	**1.000**	**-**	**-**

The regression analysis reveals that Relationship Quality (RQ) has a significant positive impact on Project Success (PS), with a $\beta = 0.72$ and a p-value < 0.01. This supports the hypothesis that better Relationship Quality is positively related to higher Project Success.

H3a: There is a significant negative relationship between Relationship Quality (RQ) and Knowledge Hiding (KH)
Pearson Correlation

Variables	Relationship Quality (RQ)	Knowledge Hiding (KH)
Relationship Quality (RQ)	1.000	-0.60**
Knowledge Hiding (KH)	-0.60**	1.000

The Pearson Correlation analysis shows a moderate negative correlation between Relationship Quality (RQ) and Knowledge Hiding (KH) with a correlation coefficient (r) of -0.60. The result is statistically significant ($p < 0.01$), indicating that better Relationship Quality reduces the likelihood of Knowledge Hiding.

H3b: Relationship Quality (RQ) mediates the relationship between Knowledge Leadership (KL) and Project Success (PS)
Mediation Analysis (Indirect Effect Calculation)

Variables	Knowledge Leadership (KL)	Relationship Quality (RQ)	Project Success (PS)
Knowledge Leadership (KL)	**1.000**	**0.65****	**0.72****

Variables	Knowledge Leadership (KL)	Relationship Quality (RQ)	Project Success (PS)
Relationship Quality (RQ)	**0.65****	**1.000**	**0.70****
Project Success (PS)	**0.72****	**0.70****	**1.000**

Mediation analysis confirms that Relationship Quality (RQ) partially mediates the relationship between Knowledge Leadership (KL) and Project Success (PS). The indirect effect ($r = 0.45$) indicates that Knowledge Leadership enhances Project Success both directly and indirectly via Relationship Quality. The mediation effect is statistically significant ($p < 0.05$).

H4: Knowledge Hiding negatively impacts Project Success (PS)
Statistical Test: Pearson Correlation, Regression Analysis

Variables	Knowledge Hiding (KH)	Project Success (PS)
Knowledge Hiding (KH)	**1.000**	**-0.50****
Project Success (PS)	**-0.50****	**1.000**

The Pearson Correlation analysis shows a moderate negative correlation between Knowledge Hiding (KH) and Project Success (PS), with a correlation coefficient (r) of -0.50. This indicates that as Knowledge Hiding increases, Project Success tends to decrease. The relationship is statistically significant ($p < 0.01$).

Mediation Analysis: Knowledge Hiding (KH) Mediates the Negative Impact of Knowledge Leadership (KL), Relationship Quality (RQ), and Project Success (PS)
Model 1: Direct Effect of Knowledge Leadership (KL) on Knowledge Hiding (KH)

Variables	Beta Coefficient (β)	t-Value	p-Value
Knowledge Leadership (KL)	-0.58**	-4.50	< 0.01
Knowledge Hiding (KH)	1.000	-	-

This regression analysis shows that Knowledge Leadership (KL) has a significant negative effect on Knowledge Hiding (KH) with a **$\beta = -0.58$** and **$p < 0.01$**, indicating that as Knowledge Leadership increases, Knowledge Hiding decreases.

Model 2: Direct Effect of Relationship Quality (RQ) on Knowledge Hiding (KH)

Variables	Beta Coefficient (β)	t-Value	p-Value
Relationship Quality (RQ)	-0.60**	-4.80	< 0.01
Knowledge Hiding (KH)	1.000	-	-

This regression analysis indicates that Relationship Quality (RQ) has a significant negative effect on Knowledge Hiding (KH), with a **$\beta = -0.60$** and **$p < 0.01$**. This suggests that higher Relationship Quality is associated with lower levels of Knowledge Hiding.

Model 3: Direct Effect of Knowledge Hiding (KH) on Project Success (PS)

Variables	Beta Coefficient (β)	t-Value	p-Value
Knowledge Hiding (KH)	-0.50**	-4.00	< 0.01
Project Success (PS)	1.000	-	-

The regression results show that Knowledge Hiding (KH) has a significant negative effect on Project Success (PS), with a **β = -0.50** and **p < 0.01**, indicating that higher Knowledge Hiding reduces Project Success.

Model 4: Full Mediation Analysis

In this model, we test the full mediation model by including Knowledge Hiding (KH) as the mediator between Knowledge Leadership (KL), Relationship Quality (RQ), and Project Success (PS).

Variables	Beta Coefficient (β)	t-Value	p-Value
Knowledge Leadership (KL)	-0.40**	-3.50	< 0.01
Relationship Quality (RQ)	-0.35**	-2.80	< 0.01
Knowledge Hiding (KH)	-0.50**	-4.00	< 0.01
Project Success (PS)	1.000	-	-

This model assesses the mediation effect of Knowledge Hiding (KH) on the relationship between Knowledge Leadership (KL), Relationship Quality (RQ), and Project Success (PS). The analysis shows that both Knowledge Leadership (KL) (**β = -0.40**, **p < 0.01**) and Relationship Quality (RQ) (**β = -0.35**, **p < 0.01**) have significant negative effects on Knowledge Hiding (KH). Furthermore, Knowledge Hiding (KH) also has a significant negative effect on Project Success (PS) (**β = -0.50**, **p < 0.01**).

These results suggest that Knowledge Hiding (KH) mediates the relationship between Knowledge Leadership (KL), Relationship Quality (RQ), and Project Success (PS). Specifically, higher levels of Knowledge Leadership and Relationship Quality are linked to reduce Knowledge Hiding, which in turn negatively affects Project Success.

Sobel Test (for Mediation Significance)

Indirect Effect	Standard Error (SE)	Z-Score	p-Value
Indirect Effect of KL on PS via KH	0.29**	4.45	< 0.01
Indirect Effect of RQ on PS via KH	0.31**	4.60	< 0.01

The Sobel test confirms that the mediation effect of Knowledge Hiding (KH) is statistically significant for both Knowledge Leadership (KL) (**p < 0.01**) and Relationship Quality (RQ) (**p < 0.01**). The positive Z-scores indicate a significant mediation effect of Knowledge Hiding on the relationship between these variables and Project Success.

5. Discussion

This study aimed to explore the relationships between Knowledge Leadership (KL), Relationship Quality (RQ), Knowledge Hiding (KH), and Project Success (PS) in the context

of the construction industry in Pakistan. The findings from the statistical analyses provide a significant contribution to the understanding of these factors in project management, reinforcing existing theories while introducing new insights into how leadership, relationships, and knowledge behaviors impact project outcomes. The discussion outline the key findings, interpret them in the context of prior research, and provide implications for practice.

1. Knowledge Leadership (KL) and Project Success (PS)

The study found a significant positive relationship between Knowledge Leadership (KL) and Project Success (PS), with a moderate correlation ($r = 0.65$, $p < 0.01$). This aligns with the findings of previous research, which has consistently shown that effective leadership is crucial in guiding knowledge management processes to achieve project goals (Donate & de Pablo, 2015). Knowledge Leadership refers to the ability of project leaders to manage and utilize knowledge effectively within teams, ensuring that information flows efficiently and that teams collaborate effectively. In construction projects, where technical expertise and communication are vital for success, the role of leadership in managing knowledge becomes even more pronounced.

Prior studies, such as those by (Yang, 2007), have emphasized that leadership not only involves strategic vision and decision-making but also entails fostering a collaborative environment where knowledge sharing is encouraged. By promoting knowledge sharing, leaders help reduce barriers to communication, improving problem-solving and decision-making within project teams. This study's findings reinforce the idea that strong Knowledge Leadership positively influences project success by creating a conducive environment for information exchange, collaboration, and effective decision-making.

2. Knowledge Leadership (KL) and Knowledge Hiding (KH)

The study also revealed a significant negative relationship between Knowledge Leadership (KL) and Knowledge Hiding (KH) ($r = -0.58$, $p < 0.01$). This result is consistent with the work of (Anand et al., 2020), who argued that leadership plays a critical role in reducing knowledge hiding behaviors by establishing an environment of trust and openness. In the construction industry, where knowledge sharing is essential for innovation and problem-solving, leaders who cultivate an open and supportive atmosphere are more likely to reduce the tendency of team members to withhold valuable information.

Knowledge Hiding (KH) is a behavior where individuals deliberately conceal information, either due to lack of trust, fear of competition, or a reluctance to share expertise. According to (Al Hawamdeh, 2023), a key factor in preventing knowledge hiding is trust—trust between team members and trust in leadership. Leaders who demonstrate transparency, competence, and fairness are able to foster such trust, thereby reducing knowledge hiding within teams. The findings of this study suggest that effective Knowledge Leadership mitigates knowledge hiding behaviors by fostering a culture where information is shared freely, which is crucial for the success of construction projects.

3. Relationship Quality (RQ) and Project Success (PS)

A key finding of the study was the strong positive relationship between Relationship Quality (RQ) and Project Success (PS), with a correlation of ($\beta = 0.72$, $p < 0.01$). This result supports previous research that has highlighted the importance of interpersonal relationships in project management. Studies by (Wu et al., 2017) has shown that relationship quality—characterized by trust, communication, and mutual respect—plays a crucial role in the success of projects. In the context of construction projects, where multiple stakeholders (e.g., contractors, engineers, architects) interact, the quality of these relationships directly impacts how smoothly the project progresses and how efficiently problems are resolved.

The positive relationship between RQ and PS emphasizes that when project team members, stakeholders, and clients maintain high-quality relationships, project success is more likely to follow. Strong relationships facilitate better communication, which is essential for managing complex construction projects and resolving conflicts. In a high-stakes industry like construction, where delays or miscommunications can have significant financial consequences, fostering positive relationships can be a strategic approach to achieving project goals.

4. Relationship Quality (RQ) and Knowledge Hiding (KH)

Another important finding was the significant negative relationship between Relationship Quality (RQ) and Knowledge Hiding (KH), with a correlation of ($r = -0.60$, $p < 0.01$). This suggests that as the quality of relationships improves, the likelihood of knowledge hiding decreases. This result is in line with the work of (Duan et al., 2022), who demonstrated that high-quality relationships, characterized by trust and open communication, reduce the incidence of knowledge hiding behaviors. When team members have strong relationships with each other, they are more willing to share information, which can lead to better decision-making and overall project success.

In the construction industry, effective collaboration is critical for success, and the willingness to share knowledge is fundamental to this collaboration. The reduction of knowledge hiding through improved relationship quality not only helps in addressing immediate project issues but also facilitates long-term knowledge retention within teams. Teams that communicate openly and trust each other are more likely to share knowledge that can help solve problems and innovate, ultimately improving project outcomes.

5. Relationship Quality (RQ) as a Mediator between Knowledge Leadership (KL) and Project Success (PS)

The study found that Relationship Quality (RQ) partially mediates the relationship between Knowledge Leadership (KL) and Project Success (PS), with an indirect effect of 0.45 ($p < 0.05$). This mediation effect underscores the important role of relationship quality in linking leadership to project success. Previous research, such as that by (Khan, 2024), has suggested that the effectiveness of leadership in achieving project success is enhanced when the leader fosters high-quality relationships among team members.

This study's findings support the idea that Knowledge Leadership influences project success not only directly but also through the creation of strong interpersonal relationships within project teams. When leaders focus on building trust, communication, and cooperation among team members, they indirectly improve project outcomes. By improving Relationship Quality, leaders can ensure that the collaborative efforts of team members are aligned towards achieving common goals, thereby enhancing the likelihood of project success.

6. Knowledge Hiding (KH) and Project Success (PS)

The study also found a significant negative relationship between Knowledge Hiding (KH) and Project Success (PS) ($r = -0.50$, $p < 0.01$), indicating that knowledge hiding negatively impacts the successful completion of projects. This finding aligns with existing research that has shown that knowledge hiding disrupts communication, impedes decision-making, and reduces the overall effectiveness of project teams (Donate et al., 2022). In the construction industry, where timely information sharing is critical to overcoming technical challenges, knowledge hiding can significantly delay or derail projects.

The negative impact of knowledge hiding on project success reinforces the need for project managers and leaders to implement strategies that encourage knowledge sharing. By addressing the underlying causes of knowledge hiding, such as mistrust or competition, leaders can enhance team collaboration and improve project performance.

Conclusion

The findings of this study contribute to the existing literature by providing empirical evidence on the critical role of Knowledge Leadership, Relationship Quality on Knowledge Hiding in the success of construction projects. The study highlights that effective leadership, fostering positive relationships, and minimizing knowledge hiding behaviors are essential for achieving project success. These results are consistent with prior research in the field, which has demonstrated the importance of knowledge leadership in managing knowledge and relationships to enhance project outcomes. The study provides practical insights for construction industry professionals, emphasizing the need for strong knowledge leadership and high-quality relationships to improve project performance. Future research should explore additional factors that influence these relationships and further test the generalizability of these findings across different sectors and cultural contexts.

Recommendations

Few recommendations of the study are;

1. Organizations should invest in fostering strong knowledge leadership practices to enhance project success by promoting knowledge sharing and collaboration among team members.
2. Companies should prioritize developing and maintaining high-quality relationships within project teams to increase project success and minimize knowledge hiding behaviors.
3. Organizations should establish clear policies and foster a culture that discourages knowledge hiding, ensuring that knowledge is freely shared to improve overall project performance.
4. Conduct training for project managers and team members on effective knowledge sharing techniques and relationship-building strategies to improve project outcomes.
5. Use digital platforms and knowledge management systems to facilitate easy sharing and exchange of knowledge, especially in remote or distributed project teams.
6. Promote collaboration between different departments and disciplines within the organization to enhance relationship quality and knowledge transfer.
7. Regularly assess the quality of relationships within project teams and provide interventions to address any issues that could hinder knowledge sharing and project success.

Future Implications

The findings of this study have several important implications for future research in the area of project management and knowledge management. Future studies could explore how different organizational contexts, such as the type of industry or the geographical location, influence the dynamics between knowledge leadership, relationship quality, and project success. Additionally, investigating the role of technology in facilitating knowledge sharing and mitigating knowledge hiding could provide valuable insights. Further research could also focus on the impact of cultural differences on relationship quality and its subsequent effect on project success. Additionally, longitudinal studies could be conducted to assess the long-term impact of knowledge leadership and relationship quality on sustained project success. Exploring the relationship between knowledge leadership, relationship quality, and other organizational outcomes, such as employee satisfaction or innovation, would provide a more comprehensive understanding of these variables' broader effects. Finally, the role of knowledge hiding in different project phases (e.g., planning, execution, closure) could be examined to provide more granular insights into how and when knowledge hiding impacts project performance.

Conflict of Interests/Disclosures

The authors declared no potential conflicts of interest in this article's research, authorship, and publication.

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