Exploring Transactional Leadership on Construction Workers Intellectual Capital Effect: Knowledge Sharing as Mediator

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Abstract

This study aims to investigate, with eye on mediating function of knowledge sharing among construction workers, the association among transactional leadership and intellectual capital three dimensions. The study examines how transactional leadership, characterized by task-oriented guidance and performance-based rewards, influences the development of intellectual capital in construction organizations, particularly through the facilitation of knowledge sharing. The research follows a descriptive design with a causal model and is applied in terms of its purpose. It also employs a field research approach for data collection. The target population consists of employees from various construction companies. A sample size of 268 participants was determined, and data was gathered through a questionnaire, which was validated and tested for reliability before distribution. To analyze the data and examine the proposed relationships, SEM using LISREL software was employed. The findings of this study indicate that transactional leadership contributes to the enhancement of intellectual capital. Additionally, the impact of knowledge sharing serves as a mediator between transactional leadership and the various components of intellectual capital. These findings suggest that transactional leadership is essential for construction companies to promote knowledge exchange and intellectual capital growth. The research offers insightful information that can be useful to leaders in the construction sector who are looking to enhance performance by utilizing transaction leadership techniques that enhance knowledge sharing processes.

Keywords: *Construction, Intellectual Capital, Transactional Leadership, knowledge sharing.*

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Introduction

In intellectual capital studies, construction sector has frequently been ignored, despite the fact that it plays a significant role in all economies. In its most basic form, intellectual capital is comprised of firm's innovative capabilities, accumulated experience, knowledge base,

customer connections, and workforce proficiency (Gulakdeniz & Karadas, 2024). The only viable method for construction industry to traverse this competitive climate is to construct stronger, more effective organizations that producing business assets (Chatterjee et al., 2023). This is the only way that construction sector can successfully navigate this environment. It is for this reason that the management of intellectual capital has evolved into a task of the utmost importance within the construction sector structure (Weqar & Haque, 2020).

Intellectual capital is a resource that has the potential to facilitate long-term advancement. It is a resource that can be useful. The components that comprise this totality are referred to as relational capital, human capital, and structural capital (Rehman et al., 2022). It places an emphasis on maintaining competitive strategies through the utilization of resources, which is consistent with the resource-based perspective of a company (Gerhart & Feng, 2021). In order to be considered resources, they must possess particular characteristics, such as being unique, unrivalled, and outstanding. It is possible to observe these characteristics in the experiences and abilities that employees amass during the course of their employment, as well as in the process of the organization. The fact that such internal resources have the potential to generate wealth and intellectual capital widely accepted as driving force for expansion of a corporation (Haldorai et al., 2022).

In construction sector, managing intellectual capital could effectively approached through implementation of knowledge framework. In organizational structures, knowledge sharing is a valuable strategic activity (Azeem et al., 2021). This practice is considered to be an essential component of knowledge management. The successful execution of this process requires comprehension, adaptability, and integration on the part of the person involved. It is therefore possible for construction sector to recognize and leverage their intellectual resources to accomplish their goals and enhance performance by implementing a knowledge management system (Alrowwad et al., 2020) describe intellectual capital as ‘thing intangible that does not involve money and is very important to business growth. It is derived from the knowledge-based values of the institution. Consequently, it is necessary for organizations operating in the public sector to provide their employees with the opportunity to experiment with new ideas, gain knowledge and skills from their mistakes, and learn from their experiences. Keep in mind that managing intellectual capital is not a one-time occurrence but rather an ongoing effort. This is an extremely important point to keep in mind.

In addition, the academic corpus conducts a comprehensive investigation into leadership, including a wide range of leadership styles as well as the ways in which leadership is associated with a variety of organizational characteristics. The results of these academic endeavors provide complexities of different leadership effect people, and overall performance (Khoshnaw & Karadaş, 2024). Moreover, Jaroliya & Gyanchandani (2022) that the position of leadership substantial impact on organization success. Since successful leaders have the ability to enhance the well-being of organization diverse stakeholders, notably organization owners. Leadership is considered to be one of the most important managerial functions in any organization. Furthermore, leadership helps in the coordination of persons, resources, and scheduling in order to achieve the goals that have been defined for the individual or organization. On the other hand, leadership refers to the relationship that exists between a leader and the people who follow them.

Good leaders are those who acknowledge the significance of the growth of their workforce and the degree to which it is necessary to enable change.

Many businesses make investments in the professional advancement of their employees in order to ensure the continued expansion of their intellectual capital. Research indicates that leadership is substantial influence on intangible assets. As a consequence of this, it is typically considered to be a vital component in every organization. Leadership is the foundation upon which human capital organizations are built, and it transforms into a component of intellectual capital in some way. The favorable relationship that exists between intellectual capital and leadership is another aspect that is reflected in leadership. Leaders generate intellectual capital to help firms stay ahead in markets (Kucharska, 2021).

In today's knowledge-based world, knowledge is an indispensable foundational component for the competitiveness, growth, and long-term viability of an organization. The cultivation of a culture that encourages employees to share their expertise with one another and the provision of incentives for employees to incorporate their specialized skills into tasks could provide substantial advantage (Arsawan et al., 2022). There is widespread belief that sharing act has substantial influence on overall performance (Alrowwad et al., 2020). As a consequence of this, businesses who are working towards gaining competitive advantage acknowledged knowledge sharing necessity (Arsawan et al., 2022). Also, the exchange of information is inextricably tied to strategies that assist an organization in maintaining its core capabilities and competitive advantage (Alrowwad et al., 2020).

Numerous countries, including Pakistan, and others, have conducted extensive research on the association among leadership and intellectual capital in construction industry. Only a few numbers of studies have been conducted to investigate the association among transactional leadership (TL) and intellectual capital (IC) in construction industry. Moreover, there is insufficient study regarding the impact of transactional leadership on organizational outcomes, and there is an increasing acknowledgement of intellectual capital as an essential asset for organizational success. Consequently, a more profound comprehension of unique mechanisms governing interactions of different factors within the construction sector is essential. While the mediating role of knowledge sharing has been examined in various private sector contexts, its impact within the construction sector remains little explored. This study aims to examine how transactional leadership influences intellectual capital, emphasizing knowledge sharing mediating role.

Literature review

Transactional leadership

Leaders and subordinates have a transactional leadership relationship. Optimization of tasks and conditional rewards and penalties steers followers toward goals (Alrowwad et al., 2020). This leadership approach predominantly motivates team members through contingent rewards and intervenes only, when necessary (management by exception) (Alrowwad et al., 2020).

As stated in Kucharska (2021), a transactional leader offers incentives to ensure people fulfill their job tasks and implements sanctions to rectify any deviant behavior in the workplace. Transactional leadership is defined as a pragmatic approach that emphasizes the use of rewards to motivate followers.

Intellectual capital

Employee intellectual capital includes knowledge, experience, and abilities. Organizational intellectual capital includes databases, culture, philosophy, and system. Intellectual capital includes knowledge assets that create income and boost competitiveness (Garcia-Perez et al., 2020; Rehman et al., 2022). It also includes technology skills and professional knowledge (Paoloni et al., 2020). Intellectual capital helps the organization achieve CA and offers value. IP is the most powerful competitive weapon affecting innovation performance in a firm (Kucharska, 2021). In response to financial crisis and the rapid reduction in product life cycles, firms have prioritized strategic utilization of intellectual capital to adapt to shifting market requirements. Likewise, intellectual capital types i.e. Human capital (skills, experience, competencies, and knowledge), structural capital (organizational processes, business processes, software, & databases), and relational capital (customers, suppliers, creditors, investors, and other stakeholders) add value to organization.

Knowledge sharing

Knowledge sharing is vital organizational practice that facilitates the exchange of information, experiences, and expertise among employees to foster learning, collaboration, and innovation. It encompasses activities i.e. providing feedback, analyzing errors, and identifying best practices to optimize performance (Swanson et al., 2020). This process integrates new insights with existing knowledge, creating foundation for continuous improvement. Rooted in social interactions, knowledge sharing reflects culturally embedded practice where employees transfer skills, insights, and competencies across departments. Its effectiveness depends significantly on knowledge provider willingness and behavior, highlighting its dynamic and relational nature (Al-Husseini et al., 2021). Moreover, knowledge sharing offers numerous benefits, including expanding professional networks, creating commercial opportunities, and enhancing processes for product and service development (Muhammed & Zaim, 2020). By encouraging employees to share facts, ideas, and methodologies, organizations can build a collaborative environment that drives efficiency, adaptability, and sustained competitive advantage.

Transactional leadership and intellectual capital

Leadership affects organizational outcomes, notably intellectual capital development. Among various leadership styles, transactional leadership has been widely recognized for its influence on performance management and resource optimization (Mubarik & Bontis, 2022; Ahmad et al., 2024). Transactional leaders emphasize structured interactions with subordinates, clearly defining roles, responsibilities, and performance expectations. Through a system of rewards and punishments, they encourage employees to meet organizational goals. The

formation and maintenance of intellectual capital, which includes relational, structural, and human capital, are directly aligned with this methodical approach (Khan et al., 2021).

Previous studies highlight that transactional leadership fosters a disciplined and goal-oriented environment that contributes to the development of intellectual capital. For instance, human capital, characterized by employees' skills, knowledge, and competencies, is significantly enhanced when transactional leaders reward high performers, motivating them to acquire and apply new knowledge (Zhao et al., 2023). Structural capital, including organizational processes and systems, also benefits from the leader's focus on efficiency and performance optimization. By emphasizing accountability and continuous improvement, transactional leadership creates robust systems that capture and utilize knowledge effectively (Lee et al., 2023). Relational capital explains organization's external networks and partnerships, and strengthened transactional leaders establish clear protocols for interactions and maintain professional credibility (Alrowwad et al., 2020).

Transactional leadership emphasis on immediate and tangible outcomes aligns with intellectual capital strategic deployment to meet organizational goals. This approach creates a direct link between leadership actions and the practical application of intellectual resources. Empirical evidence across various industries supports transactional leadership and intellectual capital interaction (Gürlek, 2021). Thus, building on this theoretical and empirical foundation, the following hypothesis is proposed:

H_1: Transactional leadership enhances intellectual capital significantly.

Transactional leadership and knowledge sharing

Transactional leaders play pivotal role in shaping organizational environment conducive to knowledge sharing (Swanson et al., 2020). By clearly communicating expectations and linking performance to tangible rewards, leaders create environment that motivates employees to engage in knowledge-sharing activities. The transactional leadership structured framework ensures that employees understand value contributions and collaboration benefits, encouraging the information dissemination across departments (Abbas & Ali, 2023). Research has demonstrated that monetary incentives and recognition use under transactional leadership positively influences employee’s willingness to share knowledge, also aligns individual interests with organizational goals. Moreover, transactional leaders enhance compliance through reward-and-penalty mechanism, which fosters sense of accountability and encourages employees to meet performance standards. This structured approach is particularly effective in environments where knowledge sharing requires active participation and trust. Studies by (Putra et al., 2020), emphasize that contingent rewards offered by transactional leaders significantly encourage knowledge-sharing behaviors, while (Abbas & Ali, 2023) highlight crucial role of transactional leadership in facilitating the flow of information within organizations. Hence, proposed that:

H_2: Transactional Leadership increases knowledge sharing significantly.

Knowledge sharing and intellectual capital

Knowledge sharing is a vital organizational strategy that helps staff members to exchange information, skills, and experience so promoting innovation, enhancing organizational capacities, and keeping competitive advantage. In addition to improving operational efficiency, it boosts relational, structural, and human intellectual capital. Each of these represents a vital organizational resource that gains from efficient knowledge-sharing procedures (Chatterjee et al., 2023; Gürlek, 2021). Human capital, which includes the abilities, know-how, and creative potential of an organization's workers, is positively impacted by information sharing. Knowledge sharing improves both individual and group competence by allowing staff members to share best practices, insights, and experiences. Workers that actively engage in these activities are better able to solve problems, learn new skills, and support organizational innovation. Additionally, collaborative settings encourage lifelong learning, which immediately raises the caliber and potential of human resources. According to research, information sharing fosters employee growth, innovation, and problem-solving skills, making crucial component of developing strong human capital (Putra et al., 2020). Therefore, proposed that:

H3a. Knowledge sharing positive effect on human capital.
H3b. Knowledge sharing positive effect on structural capital.
H3c. Knowledge sharing positive effect on relational capital.

Knowledge sharing mediating role

Transactional leadership characterized by structured interactions, where leaders motivate employees through contingent rewards and corrective actions to achieve set objectives. Hence, leadership style fosters systematic environment conducive to knowledge sharing, as transactional leaders often establish clear communication channels and boost collaboration to meet organizational goals (Khoshnaw & Karadaş, 2024). Knowledge sharing, in turn, plays critical role in the intellectual capital development, which encompasses human, structural, and relational capital. Furthermore, human capital refers to the collective knowledge, skills, and abilities of an organization’s workforce. When leaders prioritize systematic processes and reward mechanisms, encourage employees to actively share and acquire knowledge, thereby enhancing skills and expertise. This indicates that knowledge sharing mediates the relationship between transactional leadership and human capital (Khoshnaw & Karadaş, 2024).

On the other hand, Structural capital, representing non-human assets of an organization such as databases, processes, and organizational culture, equally influenced by knowledge sharing. Transactional leaders also facilitate structured environments that encourage documentation and dissemination of knowledge, which strengthens organization's structural capital (Garcia-Perez et al., 2020; Paoloni et al., 2020).

Relational capital reflects value derived from organization’s relationships with stakeholders, including customers, suppliers, and partners. Transactional leadership’s emphasis on clear roles and outcomes fosters environment, also employees are motivated to share knowledge that enhances relational ties. Knowledge sharing allows organizations to build

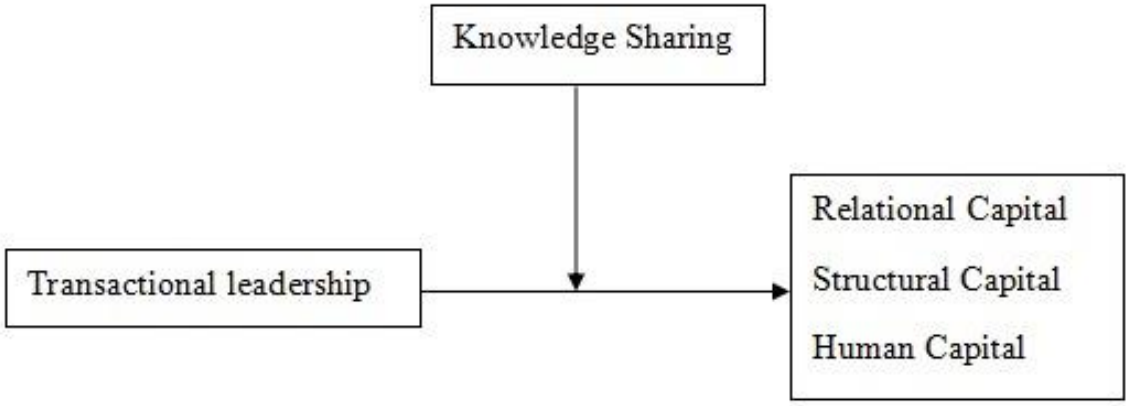
stronger stakeholder connections, making critical mediator among transactional leadership and relational capital (Khoshnaw & Karadaş, 2024). Therefore, proposed that:

H4a. Knowledge sharing has a mediating role between transactional leadership and human capital.

H4b. Knowledge sharing has a mediating role between transactional leadership and structural capital.

H4c. Knowledge sharing has a mediating role between transactional leadership and relational capital.

Based on the discussion and crafting hypothesis above the research model is created as shown in (Fig. 1).



Methodology

The sample for this study comprised project managers and technicians actively engaged in various construction projects across Pakistan. Participants were either part of the same project team or affiliated with different teams. Data collection focused on individuals representing a diverse range of construction projects. A total of 340 questionnaires were distributed to potential respondents. These questionnaires collected essential project information and assessed key constructs, including the type of construction project, transactional leadership styles, social capital, human capital, structural capital and knowledge sharing in project-based settings. Out of the distributed questionnaires, 288 were fully completed and returned. However, 20 responses were excluded from the final dataset due to issues such as missing data or patterns indicative of inattentive completion. The final sample comprised 268 valid responses. Among these, 36.94% (99 participants) were involved in building construction projects, 32.84% (88 participants) in highway construction projects, and 30.22% (81 participants) in railway construction projects. Participants' ages ranged from 18 & lower, has 38.06% of respondents. Additional details on the respondents' profiles are presented in Table 1.

Table 1 Descriptive Statistics

Items	Frequency	%
Designation-Senior Manager	76	28.36
Supervisor	88	32.84
Lower Staff	104	38.81
Age-18 & lower	102	38.06
19-24	72	26.87
25-30	53	19.78
30 & above	41	15.30
Project Type- Building Project	99	36.94
Highway Project	88	32.84
Railway Project	81	30.22

Measurement Scale

All metrics in the study utilized a 5-point Likert scale. Five measures to assess transactional leadership were utilized, specifically employing the multi-factor leadership measure (Khan et al., 2021) Employees were enquired about their supervisor's conduct, for example, "My leader evaluates my performance and records errors." Six scales for assessing knowledge sharing were utilized (Zhao et al., 2023). Employees were enquired about their knowledge-sharing practices with one another. For instance, "I endeavor to disseminate my knowledge acquired from education or training to other group members more efficiently." Intellectual capital, comprising fifteen items, was utilized (Mubarik & Bontis, 2022), with each of the three dimensions of intellectual capital containing its respective questions. Five components were established for each facet of intellectual capital: human, structural, and relational capital. SPSS 26 statistical software was used to evaluate questioners after data collection to determine construct validity.

Results and discussion

Common method bias

The research employed Harmann's Single-Factor test to assess common method variance. The test was performed with principal component analysis (PCA) with all items loaded onto a single factor. The factor analysis reveals that less than 25% of the total variance was reclaimed, with 15% of the variables exhibiting inadequate factor loading, much below 0.5. The results indicated that common method variance was not a substantial issue in the dataset.

Validity Analysis

Data were initially analyzed to verify instrument quality through convergent and discriminant validity. Principal components analysis (PCA) was performed using SPSS to assess the underlying dimension related to 25 items. Construct validity was assessed through Bartlett's test of Sphericity and the Kaiser–Mayer–Olkin (KMO) measure, which evaluates the sampling adequacy of individual variables. The overall KMO value should be 0.6 or higher to conduct

factor analysis (Effendi et al., 2019). The results of Bartlett's test of Sphericity and the KMO measure indicate that both are significant and appropriate for factor analysis (Table 2). The cumulative variance explained is 78.5 %, surpassing the acceptable threshold of 60% (Effendi et al., 2019). Bartlett's test of Sphericity indicates a sufficient correlation among the variables, with a value of 4305.94 and significance ($p < 0.000$). All items of each scale demonstrate factor loadings greater than 0.5 (Hair et al., 2014). All factors exhibited loadings exceeding 0.6, and one items related to transactional leadership (TL4) were excluded during the process (Table 3); consequently, these values provide evidence of convergent validity. This data analysis indicates that the measurements exhibited acceptable convergent validity. The composite reliability of the measurements should attain a minimum of 0.6 (Fornell & Larcker, 1981). The results indicated that all latent variables achieved a standard score of 0.765 or higher. The reliability coefficient was assessed using Cronbach's alpha (α) to evaluate the reliability of a set of two or more constructs (Table 3), surpassing the 0.7 threshold established by (Nunnally, 1978). A value of 0.7 or greater indicates a good scale of reliability (Kucharska, 2021). The Cronbach's alpha for the eight factors ranges from 0.881 to 0.940, indicating their reliability.

Additionally, convergent and discriminant validities were assessed through the average variance extracted. Also, criterion for the average variance extracted in the basis test should be a minimum of 0.5. The average variance extracted for measurements ranges from 0.663 to 0.843, surpassing the threshold of 0.5 (dos Santos & Cirillo, 2023), indicating that the study demonstrates adequate levels of convergent and discriminant validity.

Table 2: KMO Bartlett's test

Kaiser–Mayer–Olkin sampling measures adequacy	0.785
Bartlett's Test of Sphericity	
Approx. chi-square	4305.939
Df	435
Sig	0.000

Table 3: Factor loading

Construct	Items	F. L	CR	α	AVE
TL	TL1-TL5	0.892- 0.920	0.941	0.940	0.843
KS	KS1-KS5	0.829- 0.853	0.895	0.893	0.740
HC	HC1-HC5	0.853-0.901	0.886	0.881	0.663
RC	RC1-RC5	0.765-0.906	0.913	0.923	0.726
SC	SC1-SC5	0.834-0.904	0.918	0.913	0.789

Table 3: Discriminant Validity

Construct	1	2	3	4	5
TL	(0.918)				
KS	0.850	(0.888)			
HC	0.746	0.840	(0.916)		
RC	0.531	0.723	0.611	(0.860)	
SC	0.497	0.588	0.547	0.588	(0.814)

Structural model

The structural model representing the presumed linear, causal links among constructs was evaluated. Model fit indices, such as the chi-square test statistic, goodness of fit index (GFI), non-normed fit index (NNFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA), are utilized to evaluate model fit. (Hair et al., 2014) enumerated the recommended values (i.e. $\chi 2/df \leq 5$, GFI ≥ 0.8, CFI ≥ 0.9, RMSEA ≤ 0.08) and the references for all model fit indices. Upon comparing the results, the proposed model fell within acceptable thresholds.

Hypothesis Testing

The hypothesis testing results suggest a robust and substantial correlation between intellectual capital and transformational leadership, as well as between knowledge exchange and transformational leadership (H1 and H2). This implies that transformational leadership practices are essential for the improvement of both intellectual capital and knowledge-sharing behaviors within organizations. Additionally, the results verify that knowledge sharing has a beneficial effect on human capital, structural capital, and relational capital (H3a, H3b, and H3c). This emphasizes the importance of exchanging organizational knowledge and expertise to facilitate the development of employee competencies, reinforce organizational processes, and cultivate internal and external relationships.

The mediating role of transformational capability also received partial support. The relationship between knowledge sharing and human capital (H4a) and knowledge sharing and structural capital (H4b) is significantly mediated by transformational capability, underscoring its critical role in transforming shared knowledge into tangible improvements in individual skills and organizational frameworks. Nevertheless, the mediating effect of transformational capability on the relationship between knowledge sharing and relational capital (H4c) was determined to be non-significant at a 95% confidence level, suggesting the necessity of additional research into the factors that influence this connection.

Overall, these results underscore the significance of transformational leadership, knowledge-sharing practices, and transformational capabilities in the development of organizational intellectual capital and its dimensions. This has the potential to affect strategic leadership and resource management within organizations.

Table 4: Hypothesis Testing

Hypothesis	B	T	Significance	LL	UL
H1: TL-IC	0.367	4.432	0.000	0.204699	0.529301
H2. TL-KS	0.447	6.150	0.000	0.304541	0.589459
H3a. KS - HC	0.386	4.560	0.000	0.220088	0.551912
H3b. KS - SC	0.172	3.118	0.001	0.063879	0.280121
H3c. KS – RC	0.181	2.297	0.022	0.026555	0.335445
H4b. KS-TC-SC	0.178	3.182	0.002	0.068358	0.287642
H4c. KS-TC-RC	0.152	1.824	0.068	-0.011333	0.315333

Discussion

The study provides significant insights into the relationship between transactional leadership, knowledge sharing, and intellectual capital in the construction sector. The study indicates a substantial positive influence of transactional leadership on the elements of intellectual capital supported Hypotheses H1. Consequently, our results align with the research conducted by (Khoshnaw & Karadaş, 2024). Especially transactional leadership has a strong and significant impact on the intellectual capital. These findings are very important because transactional leadership is one of the most influential factors for developing the intellectual capital within the firm. As well as leadership could be the main element in creating and growing intellectual capital for long-term organizations success.

Further, the present study in line with (Zhao et al., 2023), reinforce Hypothesis H2 and illustrating transactional leadership positive relation with knowledge-sharing. Hence, active and appropriate participation of leader fosters effective knowledge sharing, as leaders play crucial role in facilitating communication and raising awareness of essential knowledge needed to accomplish objectives. Overall, effective leaders play critical role in fostering knowledge sharing by facilitating communication and ensuring essential knowledge and also accessible to achieve shared goals.

Secondly, the research findings support Hypotheses (H3a, H3b, and H3c), highlighting the knowledge sharing's significant and positive relation with human capital, relational capital and structural capital. Also, supported by prior studies (Garcia-Perez et al., 2020; Lee et al., 2023). The robust influence of knowledge sharing on human capital suggests that engaging employees in mutual learning processes significantly strengthens their capabilities, enabling the organization to maintain a competitive edge.

Thirdly, Knowledge sharing, in turn, has demonstrated a positive and significant impact on various dimensions of intellectual capital. These findings are consistent with prior studies suggesting that knowledge-sharing behaviors enhance individual skills and competencies (human capital), reinforce organizational systems and routines (structural capital), and foster trust and collaboration among team members (relational capital) (Swanson et al., 2020; Arsawan et al., 2022). The robust influence of knowledge sharing on intellectual capital suggests that engaging employees in mutual learning processes significantly strengthens their capabilities, enabling the organization to maintain a competitive edge.

Lastly, the findings of the present study demonstrate that knowledge sharing serves as a mediator between transactional leadership and the components of intellectual capital, hence supporting hypotheses H4a, H4b, and H4c, consistent with (Amjadi et al., 2014) An adaptive environment facilitates employee contact, encourages the exchange of perspectives, and promotes assistance among colleagues. Therefore, knowledge sharing will transpire to assist one another. Consequently, the exchange of knowledge among employees will enhance, and a robust social link will be established (Al-Husseini et al., 2021). Knowledge will not solely be acquired internally; suppliers and customers may serve as valuable sources of learning for employees through the exchange of perspectives. Organizational contingent rewards motivate individuals to

enhance their expertise by engaging in dialogue with stakeholders and customers (Muhammed & Zaim, 2020). This will enable firms to operate more efficiently and implement a new system.

Theoretical Implications

This study contributes significantly to the theoretical understanding of transactional leadership and its relationship with intellectual capital, particularly within the construction industry. Firstly, it broadens leadership theories by demonstrating the impact of transactional leadership—a style often associated with task-oriented environments—on the intellectual capital of workers in the construction sector. Intellectual capital, traditionally linked to knowledge-intensive industries, is rarely examined in the construction domain, where manual labor predominates. By exploring this relationship, the study opens up new theoretical perspectives and emphasizes that intellectual capital is a critical asset even in industries not conventionally perceived as knowledge-driven. Secondly, the study contributes to the literature by highlighting knowledge sharing as a mediating mechanism between transactional leadership and intellectual capital. Knowledge sharing is central to the development of intellectual capital, as it enables the transfer of tacit knowledge, collaboration, and innovation. The study enriches existing theories by providing empirical evidence that transactional leadership influences intellectual capital indirectly through the promotion of knowledge-sharing behaviors. This insight is particularly valuable in understanding how leadership styles shape the cognitive and social assets of an organization. Thirdly, the study underscores the contextual nature of knowledge sharing and intellectual capital. By situating the research within the unique environment of construction, which is characterized by short-term projects, hierarchical teams, and performance-oriented cultures, it adds a contextual layer to existing theories. Leadership research often generalizes findings across industries, but this study emphasizes that leadership styles such as transactional leadership have specific implications depending on the sector. This insight helps refine leadership theories by acknowledging that their effectiveness can vary significantly depending on industry-specific factors. Fourthly, this research contributes to intellectual capital and knowledge-sharing literature by integrating them with leadership theories. It bridges a critical gap by linking individual and organizational behaviors—fostered through leadership—with broader organizational outcomes such as enhanced intellectual capital. The study, therefore, aligns transactional leadership, knowledge-sharing practices, and intellectual capital into a cohesive framework, providing a robust theoretical model that future researchers can test and expand upon. Finally, the findings challenge traditional perspectives on leadership in construction, which often emphasize authoritarian or directive styles. By showing that transactional leadership can cultivate intellectual capital through knowledge sharing, the study prompts a reevaluation of leadership styles in construction. This encourages researchers to explore the dynamic interplay between leadership, knowledge-sharing behaviors, and intangible organizational assets, creating avenues for future interdisciplinary research. However, the theoretical implications of this study lie in its ability to bridge leadership, knowledge-sharing, and intellectual capital frameworks, enrich leadership theory with industry-specific insights, and provide new directions for future scholarly exploration.

Practical Implications

The study offers several practical implications for the construction industry, particularly in how transactional leadership can enhance intellectual capital through knowledge-sharing practices. Firstly, construction firms can develop and implement leadership training programs that emphasize transactional leadership techniques. These include clear role definitions, performance-based rewards, and close monitoring of tasks, which can create a structured and goal-oriented work environment. Such leadership practices not only improve task performance but also foster an environment where intellectual contributions are valued and encouraged. Secondly, the study highlights the importance of knowledge-sharing mechanisms in leveraging intellectual capital. Construction firms are encouraged to invest in digital tools, collaborative platforms, or structured meetings where workers can share insights, experiences, and best practices. These mechanisms ensure that knowledge is effectively exchanged, retained, and utilized, even in highly dynamic and project-specific environments. Thirdly, human resource policies should integrate transactional leadership principles into performance management and appraisal systems. By linking employee performance to tangible rewards and recognition, organizations can motivate workers to share knowledge and contribute to the organization's intellectual resources. This structured approach to performance management enhances productivity while promoting intellectual growth and collaboration among workers. Fourthly, by fostering intellectual capital through knowledge sharing and effective leadership, construction firms can better position themselves to address competitive challenges. In an industry increasingly shaped by innovation and sustainability requirements, leveraging intellectual capital can result in better project outcomes, higher client satisfaction, and long-term competitiveness. Lastly, project teams in the construction industry can incorporate leadership practices that promote communication and collaboration among workers at all levels. This encourages the dissemination of tacit knowledge, skill development, and problem-solving, directly benefiting project performance. These practical steps ensure that transactional leadership and knowledge sharing together contribute to enhancing intellectual capital, ultimately leading to organizational success and innovation in the construction sector.

Limitations and future directions

This research offers important insights into the interplay between transactional leadership, knowledge sharing, and intellectual capital within the construction industry. Nonetheless, it possesses limitations that present avenues for future investigation. The study is constrained by its cross-sectional design, which collects data at a singular moment in time. The findings indicate significant associations; however, causality remains unestablished. Future research may utilize longitudinal designs to examine the temporal evolution of the effects of transactional leadership and knowledge sharing on intellectual capital. Secondly, the research is specific to the context of the construction industry. This specificity improves relevance but restricts generalizability to other sectors. Future research may investigate analogous frameworks in different sectors, including manufacturing or services, to validate the findings and analyze cross-industry dynamics. The study significantly depends on self-reported data, which may introduce biases, including social desirability and misinterpretation. Utilizing various data sources, including supervisor evaluations, peer reviews, and observational techniques, enhances

the understanding of the variables involved. The mediating role of knowledge sharing is examined; however, other potential mediators or moderators, including organizational culture, job satisfaction, and team dynamics, are not considered. Future research may explore these additional factors to enhance the understanding of the impact of transactional leadership on intellectual capital. The study primarily focuses on transactional leadership and does not explore the interaction of other leadership styles, such as transformational or servant leadership, with knowledge sharing in relation to intellectual capital. Comparative studies examining various leadership styles may provide a comprehensive perspective and assist in identifying the most effective strategies for diverse organizational contexts. Future research must address these limitations by employing longitudinal methods, examining various industries, integrating diverse data sources, investigating additional mediators or moderators, and comparing leadership styles. These efforts will enhance understanding and contribute to the advancement of more robust theoretical and practical insights into leadership and intellectual capital in the construction sector and beyond.

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