Available online at www.ijournalse.org

Emerging Science Journal

(ISSN: 2610-9182)

Vol. 8, No. 6, December, 2024

Transformational Leadership and Project Success: The Role of Leader-Member Exchange and Professional Commitment

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Abstract

The purpose of this study is to explore the effects of transformational leadership (TL) on project success (PS), focusing on the indirect impacts of leader-member exchange (LMX) and the moderating influence of professional commitment (PC). This study aims to address the inconsistent findings in existing literature regarding the transformational leadership-project success relationship and to uncover the mechanisms that affect project outcomes. The unit of analysis is finished projects. The 509 project managers on projects completed within the past five years responded to the poll to collect data. The data were then assessed using Smart-PLS software. The results confirmed the study's hypotheses, demonstrating that LMX mediates the relationship between transformational leadership and project success. Additionally, professional commitment was found to moderate both the relationship between transformational leadership and LMX and the connection between LMX and project success. Furthermore, transformational leadership was shown to have a direct positive effect on project success. These findings contribute to the theoretical foundations of leadership and project management by emphasizing the critical role of relationship quality within teams, with LMX serving as an intervention mechanism and professional commitment acting as a moderating role influencing project success. The insights from this study offer practical value for developing project management strategies tailored to specific organizational contexts, enhancing efficiency in project-based organizations. Future research should consider longitudinal studies to explore how the relationships between these antecedents and project outcomes evolve over time.

Keywords:

Leader-Member Exchange;
Transformational Leadership;
Professional Commitment;
Project Management;
Project Success.

Article History:

Received:	01	August	2024
Revised:	22	November	2024
Accepted:	27	November	2024
Published:	01	December	2024

1- Introduction

To achieve business goals, many organizations have utilized projects as catalysts to enhance operational efficiency and contribute to the national economy [1], while also developing more sustainable organizational strategies [2]. However, despite the relative maturity of project management theory, project outcomes often remain disappointing in numerous organizations [3]. The main cause of poor project performance is often attributed to human factors [4, 5], specifically insufficient leadership by project managers, rather than technical issues [6].

Project leadership, including various leadership styles, has consistently captured the interest of both scholars and organizations. Many studies have explored leadership styles and their potential effects on organizational effectiveness, yet little is known about how these styles influence temporary project organizations [7]. Consequently, numerous calls have been made for further research to examine the relationship between leadership style and project success [8, 9]. Among the various leadership styles, transformational leadership is the preferred leadership style in organizational settings [10] and has garnered significant attention in project management research due to its relevance to project managers and project outcomes [11].

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DOI: http://dx.doi.org/10.28991/ESJ-2024-08-06-022

In recent years, there has been significant interest in transformational leadership within the research community (e.g., [8, 9, 11, 12]). Despite this growing attention, the academic literature in management has yet to establish the relative importance of this leadership style on project outcomes [12]. Additionally, it remains unclear whether transformational leadership at the strategic level can both positively and negatively impact firm performance [13]. Several studies [5, 8, 14] have highlighted a direct and positive relationship between transformational leadership and project outcomes and success. However, other studies suggest that transformational leadership may have no significant impact on organizational performance [15] or that there is little evidence supporting its effectiveness for organizations [16]. Tourish (2013) [17] highlighted that transformational leadership has both the bright side and the dark side, with both positive and negative effects on the organization. Furthermore, Chen et al. (2019) [13] demonstrated that transformational leadership can negatively impact firm performance, illustrating an inverted U-shaped relationship between transformational leadership and firm performance. As a result, the effectiveness of transformational leadership in project-based organizations remains inconclusive [12], casting doubt on the accepted beneficial effects of this leadership style on project success.

One reason for the inconsistent conclusions regarding the impact of transformational leadership on organizational effectiveness in general and project success in particular may be the presence of an intermediary mechanism between these two concepts. Andersen (2015) [16] argued that transformational leadership theory is fundamentally a universal theory, but its effectiveness may depend on contingency variables, as some researchers have identified mediating and moderating mechanisms. However, the explanation of this mechanism remains unclear [9]. This gap necessitates a more detailed understanding of how transformational leadership interacts with various project aspects to affect outcomes [12]. Consequently, studies exploring potential moderating and mediating variables between transformational leadership and organizational performance/project success are essential [8, 11, 12, 18].

Although previous studies have significantly advanced the understanding of transformational leadership, they have often overlooked a key mediating mechanism proposed by transformational leadership theory: the mediating effect of follower attitudes [19]. Regarding follower attitudes, researchers suggest that fostering positive relationships between leaders and followers, known as Leader-Member Exchange (LMX [20]), is a crucial way transformational leaders influence organizational outcomes [21, 22]. Additionally, positive leader-follower (LMX) relationships represent a research gap highlighted by Fareed et al. (2023) [18], who called for further investigation into the impact of management support on project teams. This also aligns with calls from He et al. (2019) [3] on the influence of human factors on project success, as well as Aga et al. (2016) [8], who emphasized the potential impact of team members in studies on project performance. Transformational leadership emphasizes motivating employees and encouraging team members to achieve project success [5]. A leader-subordinate relationship based on mutual trust and respect is essential for achieving project-based organizational goals [23, 24].

To date, studies examining the association between transformational leadership and project success have explored various mediators. These include behavioral mediators such as public service motivation [25], team-building and teamwork [8, 11], job satisfaction [26], team interaction [27], goal clarity [9], knowledge sharing [28], followers' commitment [29], and project managers' behavior [30]. Despite the recent rise in research on the mediating role of transformational leadership in the relationship between leadership and project success, Leader-Member Exchange (LMX) remains largely unexplored. LMX has attracted much attention from researchers in recent years [31]; there is still a lack of understanding of how LMX translates transformational leadership into project success. In response to the call from previous studies (e.g., [8, 11, 12, 18]) to investigate the processes between transformational leadership and project success, this study aims to propose and test a new framework. This framework seeks to provide a more comprehensive understanding of the effects of transformational leadership on project success. To explain why LMX might serve as the mediating mechanism in the relationship between transformational leadership and project success, Social Exchange Theory (SET) [32] is employed as a foundational framework. SET posits that social relationships are based on reciprocal exchanges, where positive interactions and mutual trust between leaders and followers foster cooperative behaviors. In the context of LMX, transformational leaders build strong, trust-based relationships with their followers, which can enhance team cohesion, motivation, and ultimately, project success.

In addition to the mediating role, the conflicting findings regarding the impact of leadership style on project success may suggest the possibility of a moderating role in this relationship [12]. Although the leadership role of the project manager is crucial in defining and shaping the goals of project implementation to achieve success [1, 9], the temporary nature of project activities and uncertainties such as rapid changes or unknown risks [33] may mean that the strength of the relationship between transformational leadership and project success can vary based on boundary conditions. These boundary conditions, which can include human factors or contextual factors [11, 12, 29, 34], have the potential to moderate the influence of transformational leadership on project success. This study will further explore the relevance of these boundary conditions. Investigating how these conditions influence project success addresses the call for deeper exploration of potential moderating variables by Aga et al. (2016) [8], Ali et al. (2021) [11], Abbas and Ali (2023) [12], and Gundersen et al. (2012) [34].

While examining the mediating role of Leader-Member Exchange (LMX) in the link between transformational leadership and project success, it is anticipated that the project manager's professional commitment will act as a boundary condition, potentially leading to varying project performance outcomes. Commitment is considered a human factor [35], and it is evaluated as one of the factors affecting project quality [36]. While a leader's professional commitment plays a significant role in project success [37], it has not received much attention in project management research, which often focuses on follower commitment [38]. Professional commitment is considered a key soft problem in studying project success, beyond factors like communication, coordination, rewards, and motivation [36, 39]. Despite this, there is currently no evidence on the impact of the project manager's professional commitment as a boundary condition in the transformational leadership-project success (TL-PS) relationship. Therefore, further research is needed to investigate whether project managers' commitment to their profession contributes to project success.

Vietnam, as a burgeoning economy, has experienced a substantial increase in new projects over recent decades [40]. However, Vietnamese projects face numerous issues, including delays, cost overruns, and substandard quality, which significantly impact the success of the projects [41]. The lack of project management knowledge and capacity is a major factor contributing to schedule delays and cost overruns, ultimately leading to project failures in Vietnam [42, 43]. Therefore, researching project success within the Vietnamese context is crucial.

To advance the corpus of knowledge on project management and leadership, this study makes three key contributions to the literature: first, it underscores the impact of transformational leadership (TL) on project success (PS); second, it deepens the exploration of the Leader-Member Exchange (LMX) as a mediating mechanism in the TL-PS relationship; and third, it highlights the moderated mediation effect of LMX and professional commitment in this relationship. Moreover, the application of LMX and professional commitment as mediators and moderators helps bridge the research gap identified by Aga et al. (2016) [8], Abbas & Ali (2023) [12], Ali et al. (2021) [11], Fareed et al. (2023) [18], and Gundersen et al. (2012) [34], who called for further investigation into the mechanisms behind the relationship between TL and organizational effectiveness or PS.

2- Literature Review

2-1- Social Exchange Theory (SET)

Blau (1964) [32] viewed social exchange as a fundamental process in social life, emphasizing the reciprocal exchange of personal connections that develop over time. According to Blau, social exchange refers to voluntary actions driven by the anticipation of returns. In an organizational setting, Social Exchange Theory (SET) posits that employees may feel an obligation toward their supervisors, coworkers, or the organization if they perceive benefits from these exchanges. SET is used in this study to explain how transformational leaders can influence the quality of leader-member exchange (LMX) by fostering a friendly and trusting environment. SET aligns with the leadership domain, which encompasses the leader, the follower, and the relationship between them [20]. SET explains how followers' supportive or unsupportive attitudes and behaviors toward leaders are shaped by these exchanges. In a productive work environment, when followers receive adequate support from their leader, they reciprocate by engaging in beneficial activities for the organization [44]. Thus, in a project context, when followers receive care and support from their project manager, the quality of the leader-member exchange (LMX) relationship improves. This strengthened relationship leads to enhanced team performance, which ultimately contributes to project success.

2-2- Job Demands-Resources (JD-R) Theory

The Job Demands–Resources Model (JD-R) was initially proposed by Demerouti et al. (2001) [45]. The JD-R model subsequently developed into a theoretical framework [46]. The initial investigation of the JD-R model discovered two prevalent categories of work conditions, specifically job demands and job resources. Job resources encompass the physical, psychological, social, or organizational elements of a job that help in achieving work goals or foster personal growth, learning, and development [47]. Employees with more available job resources are better positioned to meet job demands and enhance job performance [47]. Bakker et al. (2014) [46] extended the original JD-R model to include personal resources. Personal resources are individuals' beliefs about their control over their environment. Personal resources and job resources interact positively with each other, and influence job performance. In the context of this study, JD-R theory is used to explore how personal resources, specifically the project manager's professional commitment, impact job resources, such as leader-member exchange (LMX), and ultimately influence job performance, as demonstrated by project success.

2-3- Transformational Leadership

The theory of transformational leadership has received substantial scholarly attention since its introduction over 40 years ago and is widely regarded as one of the most extensively studied models of leadership [48]. It is also regarded as

a fundamental component of leadership research [49]. Transformational leadership is a multifaceted framework, mostly consisting of the aspects initially defined by Bass (1985) [50]. Originally, transformational leadership consisted of three elements: Idealized influence, Individual consideration, and Intellectual stimulation [50]. In 1994, Bass & Avolio [51] introduced the element of "Inspirational motivation" to their work. To be more precise: (1) Idealized influence: Leaders cultivate trust and instill a sense of pride in employees by their deeds, rather than relying just on their words. (2) Inspirational motivation: Leaders consistently motivate and inspire staff by showing them the meaning and challenges of work. (3) Intellectual stimulation: Leaders inspire and motivate employees to engage in innovative and creative endeavors. (4) Individualized consideration: Leaders demonstrate a high level of attentiveness towards the growth and progress of each individual by engaging in activities such as coaching or mentoring.

2-4- Leader-Member Exchange (LMX)

Leader-member exchange (LMX) is a methodology that emphasizes the importance of relationships in leadership studies [20]. Initially, LMX theory revealed that leaders develop high-quality relationships with their followers [52], characterized by affect, loyalty, contribution, and professional respect [53]. Research has shown that it is more effective to conceptualize and measure LMX at the individual level rather than the dyadic level [54, 55]. Building on the work of Liden (1998) [53], Uhl-Bien et al. (2022) [56] addressed issues related to the level of analysis [54] and the lack of structural differentiation in LMX research. They specifically examined the managerial dimensions of LMX and identified key factors influencing managers' relationships with their subordinates. Uhl-Bien et al. (2022) [56] developed a tool called managerLMX (MLMX) to measure LMX specifically from a managerial perspective. MLMX focuses on the reception of contributions from subordinates by managers rather than contributions made by managers themselves [53]. Uhl-Bien et al. (2022) [56] provided new insights into the attributes managers value in LMX relationships, shedding light on how managers perceive their roles in relation to their subordinates. The managerial framework of Leader-Member Exchange (LMX) as proposed by Uhl-Bien et al. (2022) [56] encompasses three key elements:

- Competence: refers to the manager's understanding of the capabilities and skills of their subordinates.
- Candor: indicates the extent to which managers have confidence in their subordinates' ability to communicate honesty, openness, and provide constructive feedback.
- Shared Goals: measures how well managers believe their subordinates align with common objectives and interests of both the supervisors and the organization.

2-5- Professional Commitment

While dedication refers to the extent to which an individual is willing to invest effort and persist in executing tasks within a specific project, professional commitment reflects a deeper motivation that drives individuals to pursue a career they are passionate about and align themselves with its associated goals [57-60]. Professional commitment involves an individual's psychological attachment and dedication to their chosen career path [58]. Those with strong professional commitment demonstrate a willingness to stay engaged in their work and put in sustained effort. Professional commitment is an indication of an individual's resolve to accomplish their personal career objectives [61] and does not always depend on organizational commitment [62]. People with high professional commitment remain strongly invested in their careers, regardless of workplace conditions, colleagues, or the organization itself. Even when dissatisfied with their employer, they continue in their role due to their personal aspirations and career expectations [60].

2-6- Transformational Leadership and Project Success

Transformational leadership inspires and motivates followers to accomplish organizational goals by highlighting the significance of the organization's mission, values, and goals [63]. This leadership style has been shown to enhance employee performance [64]. In the context of projects, transformational leadership fosters team unity, dedication, and collaboration, which are key to project success [9]. Under a transformational leader, team members are encouraged to generate and apply innovative ideas and approaches, improving productivity and ensuring project success [65]. Project leaders who adopt a transformational leadership style are likely to increase the success rate of projects [14]. As a result, the study anticipated that transformational project managers would be able to express a clear vision for the future and motivate their team members to meet project objectives.

Hypothesis H1: Transformational leadership positively impacts project success.

2-7- Mediating Role of Leader-Member Exchange (LMX)

Santoso et al. (2022) [66] argue that transformational leaders are able to articulate a compelling vision, motivate followers to pursue that vision, encourage creativity, and enhance follower engagement through effective internal

communication. Followers are more likely to respond positively and take a proactive role when leaders demonstrate transformational traits such as intellectual stimulation and individualized consideration [67]. As suggested by Anand et al. (2011) [68] and Molines et al. (2020) [69], this indicates that transformational leadership can lay the foundation for high-quality leader-member exchange (LMX). Since interaction with followers is a core responsibility of leadership, transformational leaders may be more adept at developing and sustaining high-quality LMX relationships [70]. For transformational leadership to have its full effect, there must be meaningful interaction between leaders and followers, often referred to as leader-member exchange (LMX) [21].

According to social exchange theory (SET), followers who experience high-quality leader-member exchange (LMX) tend to be more competent and productive [71]. Furthermore, when employees are aware of their strong performance, their self-esteem improves, which enhances their ability to complete tasks [72]. High-quality LMX has been positively correlated with workplace satisfaction, a willingness to help colleagues, leader-follower trust, and job performance [24, 73], all of which contribute to better employee outcomes [74]. Followers who interact with their leaders in a more relaxed and supportive environment are more likely to benefit from encouragement and flexibility [75]. Subordinates with higher LMX levels experience fewer negative emotions, attitudes, and behaviors, and are better equipped to handle interpersonal issues at work [74]. Higher quality levels of LMX provide followers with more support from their leaders and inspire inspiration and empowerment [76]. These outcomes are critical to attaining organizational goals, which are project outcomes in the context of a project.

As a result, the following theories are proposed:

Hypothesis 2a: Transformational leadership (TL) positively correlates with Leader-Member exchange (LMX).

Hypothesis 2b: LMX positively correlates with project success (PS).

Hypothesis 2c: The interaction between TL and PS is mediated by LMX.

2-8- Moderating Role of Professional Commitment

Professional commitment is viewed as the psychological bond between an individual and their career, shaped by their emotional attachment to the occupation [77]. It reflects a mental investment in which a person is willing to dedicate themselves to their career. Individuals with strong professional commitment tend to closely identify with their work [78] and often excel in their roles [79].

From the perspective of Job Demands-Resources (JD-R) theory [80], personal resources are defined as an individual's belief in their ability to control their environment. People with high levels of optimism and self-efficacy believe that positive outcomes will occur and that they can manage unexpected situations effectively. According to JD-R theory, personal and job resources positively interact with each other. Xanthopoulou et al. (2009) [81] support this by suggesting that personal and job resources are interrelated. LMX is considered a job resource [82], while professional commitment is viewed as a personal resource [83]. Therefore, personal resources - such as professional commitment - are likely to positively influence job resources, like LMX. In the context of LMX mediating the relationship between transformational leadership and project success, the study proposes that professional commitment can moderate the strength of the impact of transformational leadership on LMX. This indicates that transformational project managers with higher professional commitment are more likely to develop stronger leader-member relationships.

Additionally, a lack of commitment is one of the key factors contributing to project failure [84]. Individuals with high professional commitment will strongly identify with their job [78]. They tend to be high performers in their current positions, not only for performance appraisal purposes but also for the opportunity to enhance their technical skills, which are essential for their professional goals [79]. Professional commitment expectations can, therefore, have a notable impact on the project's success and the LMX relationship. While team members collaborate well, the more professionally committed the project leader is, as demonstrated through greater work engagement [85], the more likely they are to lead the project to success. Based on this, the study suggests the following hypotheses:

Hypothesis 3: Professional commitment (PC) moderates the impact of TL on LMX

Hypothesis 4: Professional commitment (PC) moderates the indirect impact of TL on PS through LMX in that higher PC levels amplify LMX's indirect effects.

The research model is shown in Figure 1.

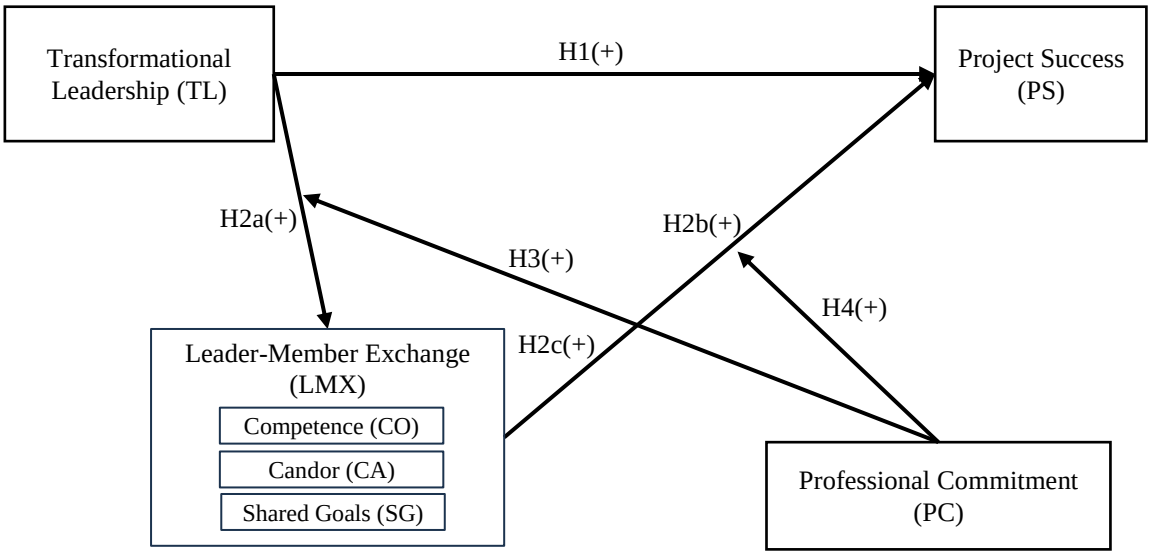

Figure 1. Research model

3- Research Methodology

This study employed a quantitative research strategy to explore the relationship between transformational leadership and project success across various projects. The methodology was carefully crafted to meet strict scientific standards, ensuring both the reliability and validity of the data collected. Through this approach, the study aimed to objectively and systematically examine how transformational leadership impacts project outcomes, offering credible and comprehensive insights into the key factors contributing to project success.

3-1- Research Process

According to Cresswell (2018) [86], the quantitative research process includes six main steps. Figure 2 provides an overview of the research process used in this study.

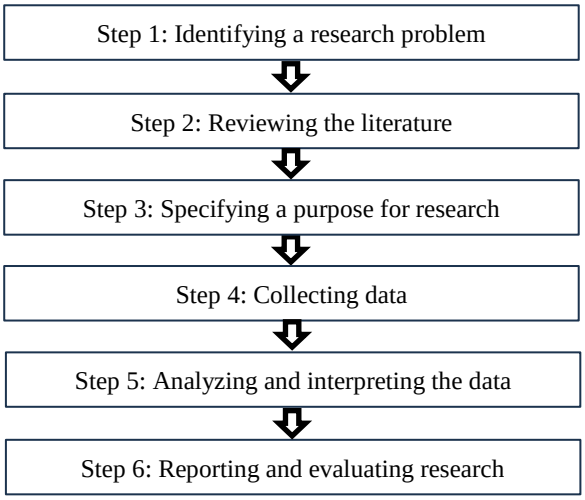

Figure 2. Research process

(1) Identifying a research problem: In project management, ensuring project success is the main concern for project-oriented organizations. While several studies have explored the influence of leadership styles on project success, there are conflicting conclusions regarding the impact of transformational leadership. Hence, this study aims to clarify the relationship between transformational leadership and project success.

(2) Reviewing the literature: To achieve this, a comprehensive review of existing literature on the role of transformational leadership in project success is conducted.

(3) Specifying a purpose for research: Following the literature review, this step involves specifying the research objectives and proposing hypotheses about the relationships between the key concepts in the research model.

(4) Collecting data: After formulating the research model, the study develops measurement scales for the identified factors by building on previous research and refining them through content analysis.

(5) Analyzing and interpreting the data: The collected data is analyzed using techniques such as SPSS and PLS-SEM, ensuring the reliability and validity of the research concepts, and assessing the proposed model.

(6) Reporting and evaluating research: In the final step, the study confirms the research hypotheses and presents relevant conclusions and findings. It also discusses theoretical and managerial implications, along with limitations and suggestions for future research.

3-2- Participants and Procedure

This study investigates the relationship between transformational leadership and project success in Vietnam, focusing on the mediating role of Leader-Member Exchange (LMX) and the moderating effect of professional commitment. The analytical unit is the completed project, with project managers of projects finalized within the last five years chosen as survey respondents. This approach, where project managers assess the link between transformational leadership and project success, aligns with previous research (e.g., [5, 8, 9, 11, 87]). Key details of the survey include the following: each project was approached via an interview with the project manager, who served as the project leader. All surveyed project managers were Vietnamese, ensuring the study's focus on the domestic context and allowing for an examination of project management within the specific cultural and business environment of Vietnam. The projects covered a wide scale, ranging in value from under 100 million VND to over 100 billion VND, and in duration from less than six months to over 48 months. This range reflects the diversity of projects, from short-term, small-scale endeavors to long-term, high-impact projects with significant economic and social implications. This diversity helps grasp the characteristics of project management in many different situations to have a comprehensive and detailed view of the influence of factors on project success.

To minimize common method bias, participants were assured of the study's anonymity and confidentiality, informed that there were no right or wrong answers, and encouraged to respond as honestly as possible. Additionally, during the questionnaire development stage, questions were thoroughly reviewed to eliminate any vague, unclear, or unfamiliar terms. Each question and the overall questionnaire design were kept as concise as possible. The scales were then validated through pilot testing. The non-probability sampling method was employed, using cross-sectional data. A total of 675 surveys were distributed to project managers, with 509 valid responses returned, resulting in a response rate of 75.4%. Of the respondents, 82.4% were men and 17.6% were women. In terms of age, 5.2% were under 26, 34.5% were between 26 and 35, 32.4% were between 36 and 45, 17.5% were between 46 and 55, and 10.4% were over 55. Regarding educational background, 40.4% held a master's degree, 3.1% held a doctorate, and 56.5% had a university degree. In terms of project type, 35.7% of respondents were project managers in engineering and construction, 25.6% in information technology, 16.3% in environmental projects, 14.8% in new product development, and 7.6% in other types of projects.

3-3- Measures

Since the research was conducted in Vietnam, the measurement scales - originally published in reputable English-language journals - were translated into Vietnamese by a proficient linguist. Participants in the pilot study also provided feedback on the Vietnamese terminology used. After refining the phrasing of the Vietnamese version, a different language specialist translated the questionnaire back into English. Two linguistic experts then conducted a comparative analysis between the original English scale and the back-translated English version to ensure the Vietnamese translation accurately reflected the content of the original scale. Revisions continued until both experts agreed that the Vietnamese version was the most faithful representation of the original scales. This process ensured the precision of the translated scales and guaranteed that respondents fully understood each item in the questionnaire.

Responses to the latent variables were collected using a seven-point Likert scale (ranging from "1 = strongly disagree" to "7 = strongly agree"), a commonly used scale in business and management research, alongside five- and six-point scales [88]. The transformational leadership scale was modified from Aga et al. (2016) [8] and consisted of 13 observed variables. Leader-member exchange (LMX) was measured using the MLMX (managerLMX) scale from Uhl-Bien et al. (2022) [56], which included 9 observed variables across three aspects: (1) competence (CO), (2) candor (CA), and (3) shared goals (SG). This scale more accurately reflects managers' perspectives compared to subordinates' [56]. Professional commitment was assessed using a 7-item scale developed by Wang & Armstrong (2004) [89], while project success was evaluated with a 14-item scale from Aga et al. (2016) [8]. Table 1 provides a detailed breakdown of the constructs and indicators.

The study selected SmartPLS as the primary tool for applying Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze data and validate the proposed conceptual model. SmartPLS was chosen for its user-friendly interface, especially for estimating morderating effects, and its extensive use in prior project management research. Alongside SmartPLS version 4.0.9.5, which was used for regression analysis as well as examining mediation and moderation relationships, the study also employed Microsoft Excel 365 and SPSS version 20 for data analysis. Microsoft Excel was used for managing data, while SPSS was utilized for conducting descriptive statistics.

Table 1. Constructs and indicators

Constructs and indicators	Source
Transformational Leadership - TL	
TL1. "Team members have complete faith in me."	Aga et al. (2016) [8]
TL2. "I provide appealing images about the project to my team."	
TL3. "I enable team members to think about old problems in new ways."	
TL4. "I give personal attention to a team member who seems neglected."	
TL5. "Team members are proud of being associated with me."	
TL6. "I let my team know that I am confident that the project goals will be achieved."	
TL7. "I provide team members with new ways of looking at puzzling things."	
TL8. "I help each member of the team to develop his/her strengths."	
TL9. "I make the team members feel good to be around me."	
TL10. "I help team members find meaning in their work."	
TL11. "I get team members to rethink ideas that they had never questioned before."	
TL12. "I am attentive to the unique concerns of each team member."	
TL13. "I show my team that I am optimistic about the future of the project."	
Leader-Member Exchange - LMX	
Candor - CA	
CA1. "This employee provides me with constructive feedback."	Uhl-Bien et al. (2022) [56]
CA2. "This employee openly questions me when he/she doesn't think I'm right."	
CA3. "This employee openly questions me when he/she doesn't think I'm right."	
Competence - CO	
CO1. "Managing this employee requires little effort on my part."	Uhl-Bien et al. (2022) [56]
CO2. "I don't have to give this employee a great deal of direction."	
CO3. "I don't have to micromanage this employee."	
Shared goal - SG	
SG1. "This person has the best interests of the department in mind."	Uhl-Bien et al. (2022) [56]
SG2. "This employee's goals are consistent with the organization's goals."	
SG3. "This employee looks out for our organization's best interests."	
Professional Commitment - PC	
PC1. "Build my professional reputation in project management."	Wang & Armstrong (2004) [89]
PC2. "Belong to the professional community of project management."	
PC3. "Improve my knowledge in project management."	
PC4. "Have adequate career prospects within the PM profession."	
PC5. "Keep contact with others in the PM profession."	
PC6. "Earn excellence in the eyes of PM colleagues outside my employing organization."	
PC7. "Have an adequate level of salary relative to other PM professionals outside my employing organization."	
Project Success - PS	
PS1. "The project was completed on time."	Aga et al. (2016) [8]
PS2. "The project was completed according to the budget allocated."	
PS3. "The outcomes of the project are used by its intended end users."	
PS4. "The outcomes of the project are likely to be sustained."	
PS5. "The outcomes of the project have directly benefited the intended end users, either through increasing efficiency or effectiveness."	
PS6. "Given the problem for which it was developed, the project seems to do the best job of solving that problem."	
PS7. "I was satisfied with the process by which the project was implemented."	
PS8. "Project team members were satisfied with the process by which the project was implemented."	
PS9. "The project had no or minimal start-up problems because it was readily accepted by its end users."	
PS10. "The project has directly led to improved performance for the end users/target beneficiaries."	
PS11. "The project has made a visible positive impact on the target beneficiaries."	
PS12. "Project specifications were met by the time of handover to the target beneficiaries."	
PS13. "The target beneficiaries were satisfied with the outcomes of the project."	
PS14. "Our principal donors were satisfied with the outcomes of the project implementation."	

3-4- Ethical Considerations

Before data collection commenced, ethical approval for the study was secured. Participants were comprehensively informed about the study's objectives, their right to withdraw at any time, and the confidentiality of their responses. They were also assured that personally identifiable data would be anonymized and that the study data would be used solely for research purposes. Informed consent was obtained from all participants to ensure their voluntary involvement. These measures were taken to uphold ethical standards and protect the integrity of the participants' information throughout the study. This is a harmless, low-risk study and participation is completely voluntary.

4- Results

4-1- Measurement Model of Lower-order Variables (Stage 1)

The measurement model assesses several key aspects, including indicator reliability, internal consistency, discriminant validity, and convergent validity. Indicator reliability is evaluated through the outer loading factor, which represents the extent to which the variance in the outcome indicator is explained by the corresponding latent variable [90]. As shown in Table 2, all outer loading factors exceed 0.708, which satisfies the reliability threshold recommended by Hair et al. (2022) [91].

Internal consistency, the first component of the measurement model, is evaluated using Cronbach's alpha (CA) and composite reliability (CR). Table 2 presents the CA and CR values for each latent variable within the path model. Both CA and CR values fall between 0.700 and 0.950, indicating good internal consistency [91]. As a result, no indicators were excluded from the analysis.

The second component, convergent validity, is assessed using the Average Variance Extracted (AVE) index, with a minimum criterion value of 0.50 [92]. Table 2 shows that all of lower-order latent variables exceed the AVE threshold of 0.50. These findings confirm that all latent constructs in the model exhibit both composite reliability and convergent validity.

Table 2. Convergent validity and reliability of internal consistency of lower-order variables

Concepts	Loading	CA	CR	AVE	Concepts	Loading	CA	CR	AVE
PS					**TL**				
PS1	0.774				TL1	0.746			
PS2	0.759				TL2	0.752			
PS3	0.797				TL3	0.775			
PS4	0.732				TL4	0.738			
PS5	0.770				TL5	0.786			
PS6	0.764				TL6	0.763			
PS7	0.717	0.944	0.944	0.579	TL7	0.776	0.938	0.939	0.575
PS8	0.748				TL8	0.778			
PS9	0.749				TL9	0.746			
PS10	0.809				TL10	0.734			
PS11	0.767				TL11	0.743			
PS12	0.721				TL12	0.729			
PS13	0.750				TL13	0.793			
PS14	0.789								
CO					**PC**				
CO1	0.931				PC1	0.875			
CO2	0.922	0.920	0.920	0.861	PC2	0.866			
CO3	0.931				PC3	0.858			
CA					PC4	0.711	0.923	0.936	0.686
CA1	0.907				PC5	0.829			
CA2	0.932	0.913	0.915	0.852	PC6	0.832			
CA3	0.931				PC7	0.815			
SG									
SG1	0.938								
SG2	0.921	0.924	0.925	0.868					
SG3	0.937								

The third component of the measurement model, discriminant validity, is assessed using the Fornell-Larcker criterion. This criterion assumes that a research construct should share more variance with its own indicators than with any other construct [93]. The square root of the Average Variance Extracted (AVE) for each lower-order latent variable is displayed in a matrix format in Table 3.

Table 3. Fornell-Larcker of first-order variables

Concepts	CA	CO	PS	SG	TL
CA	0.923				
CO	0.486	0.928			
PS	0.480	0.502	0.761		
SG	0.412	0.430	0.532	0.932	
TL	0.502	0.535	0.789	0.531	0.759

In Table 3, the square root of the Average Variance Extracted (AVE) for each latent variable is presented on the diagonal, while the correlations between pairs of latent variables are shown below the diagonal. The results indicate that the square root of the AVE for all latent variables is greater than the highest correlation with any other latent variable. Thus, the square root of the AVE values meets the criteria for assessing discriminant validity of the latent variables in the measurement model [93].

However, the Fornell-Larcker criterion has faced criticism for its ability to accurately determine discriminant validity. To address this, Henseler et al. (2015) [94] proposed using the Heterotrait-Monotrait Ratio (HTMT) of correlations as a more precise measure. Hair et al. (2022) [91] recommend that the HTMT value should be less than 1 to achieve discriminant validity, with an ideal threshold being less than 0.85. All HTMT values in this study meet these requirements. Therefore, the discriminant validity of the constructs is confirmed, as shown in Table 4.

Table 4. HTMT of first-order variables

Concepts	CA	CO	PS	SG	TL
CA					
CO	0.529				
PS	0.515	0.539			
SG	0.448	0.465	0.569		
TL	0.540	0.575	0.839	0.569	

4-2- Measurement Model of Second-Order Variables (Stage 2)

After evaluating the measurement model with the lower-order latent variables in stage 1, the scores of the first-order latent variables of the PLS Algorithm results were extracted. Specifically, the scores of the latent variables Competence (CA), Candor (CO), and Shared Goals (SG) are denoted as LV score – CA, LV score – CO, LV score – SG, respectively. These scores are then assigned to second-order latent variables to facilitate the evaluation of the stage 2 measurement model.

In this stage, the criteria evaluated include collinearity (assessed by the Variance Inflation Factor – VIF), statistical significance, and the relevance of indicator weights. As presented in Table 5, LV scores - SG has the highest VIF value (1.907). All VIF values are below the threshold of 5, as recommended by Hair et al. (2022) [91], and even below the more stringent threshold of 3, suggested by Becker et al. (2015) [95]. Therefore, it can be concluded that collinearity is not a problem for estimating the PLS path model.

Table 5. VIF values of Second-order Variables

	VIF
LV scores – CA	1.817
LV scores – CO	1.851
LV scores - SG	1.907

The results of applying the Bootstrapping technique with 5000 subsamples are presented in Table 6, which includes indicator weights, t-values, and p-values. The results indicate that the t-values for all indicators exceed 1.96 (in a two-

tailed test), with a p-value of 0.000, providing evidence that the weights assigned to the indicators are statistically significant.

Table 6. Results of testing the statistical significance and relevance of the indicator weights

	Outer weights	t value	p value
LV scores - CA → LMX	0.346	6.120	0.000
LV scores - CO → LMX	0.419	7.255	0.000
LV scores - SG → LMX	0.495	10.201	0.000

4-3- Structural Model Assessment

4-3-1- Direct Effect

The structural model of the suggested research model demonstrates the relationships among the constructs. A partial least squares structural equation modeling (PLS-SEM) approach is applied to 5000 bootstrapped samples to assess these connections. Hypothesis H1 seeks to determine whether transformational leadership (TL) positively influences project success (PS). According to the results in Table 7 (β = 0.551, p = 0.000), TL has a significant positive effect on PS, confirming the validity of H1.

The second hypothesis, H2a, explores whether TL positively impacts leader-member exchange (LMX). Table 7 demonstrates a significant relationship between TL and LMX (β = 0.578, p = 0.000), thus validating H2a. Hypothesis H2b investigates the impact of LMX on PS. The results, as shown in Table 7 (β = 0.188, p = 0.000), support H2b, confirming a positive relationship between LMX and PS.

Table 7. Results

Hypothesis	β	P-value	Results
H1: TL → PS	0.551	0.000	Supported
H2a: TL → LMX	0.578	0.000	Supported
H2b: LMX → PS	0.188	0.000	Supported

4-3-2- Mediation Effect

Hypothesis H2c explores whether leader-member exchange (LMX) mediates the relationship between transformational leadership (TL) and project success (PS). To test the statistical significance of the mediation effect, the bootstrapping technique with 5000 subsamples was applied, and the results of the indirect effects are shown in Table 8. The results indicate that the indirect effect of TL → LMX → PS is 0.108, with a p-value of 0.000, confirming statistical significance. Therefore, LMX plays a mediating role in the relationship between TL and PS. Thus, H2c is supported.

Table 8. Mediating effect

Hypothesis	Path coefficients (β)	P value	Confidence intervals bias corrected	
			Lower confidence level	Upper confidence level
H2c: TL → LMX → PS	0.108	0.000	0.060	0.160

According to the results in Table 7, transformational leadership (TL) has a direct positive impact on project success (PS) with a path coefficient of 0.551. Additionally, the indirect effect of TL on PS through leader-member exchange (LMX) is also positive, with a path coefficient of 0.108 (Table 8). Therefore, LMX serves as a complementary partial mediator in the relationship between TL and PS. This indicates that part of TL's influence on PS is mediated by LMX. However, this complementary partial mediation suggests that the research model does not fully explain the mechanisms through which TL impacts PS. In other words, there may be other latent variables acting as mediators that further explain the effect of TL on PS.

4-3-3- Evaluating the Coefficient of Determination (R^2)

The most commonly used method to assess the explanatory power of the structural model is the R^2 value. This coefficient represents the cumulative effect of exogenous latent variables on an endogenous latent variable. The higher the R^2 value, the greater the explanatory power. According to Hair et al. (2011) [96], R^2 values are considered weak, moderate, and high at thresholds of 25%, 50%, and 75%, respectively.

The R^2 values of the structural model, obtained from the SmartPLS 4 software, are presented in Table 9. The results show that the R^2 value of the model for variables affecting LMX is considered low, as it falls within the range of [0.25; 0.50]. The R^2 value for the model's variables impacting PS is evaluated as moderate, falling within the range of [0.5; 0.75]. Overall, these R^2 values ensure predictive accuracy among the specified latent variables.

Table 9. Coefficient of Determination R^2

	R-square	R-square adjusted
LMX	0.476	0.473
PS	0.688	0.685

4-3-4- Moderating Effect

In the final stage, Hypotheses H3 and H4 evaluate whether PC enhances or diminishes the effect of TL on LMX and the effect of LMX on PS. The results presented in Table 10 demonstrate that these interactions have a positive impact, with β for PC*TL → LMX = 0.211 (p = 0.000) and β for PC*LMX → PS = 0.198 (p = 0.000). Consequently, both Hypothesis H3 and H4 are supported.

Table 10. Moderating effect

Hypothesis	Path coefficients (β)	P value	Results
H3: PC*TL → LMX	0.211	0.000	Supported
H4: PC*LMX → PS	0.198	0.000	Supported

Figures 3 and 4 present simple slope analyzes of the moderating effect of professional commitment.

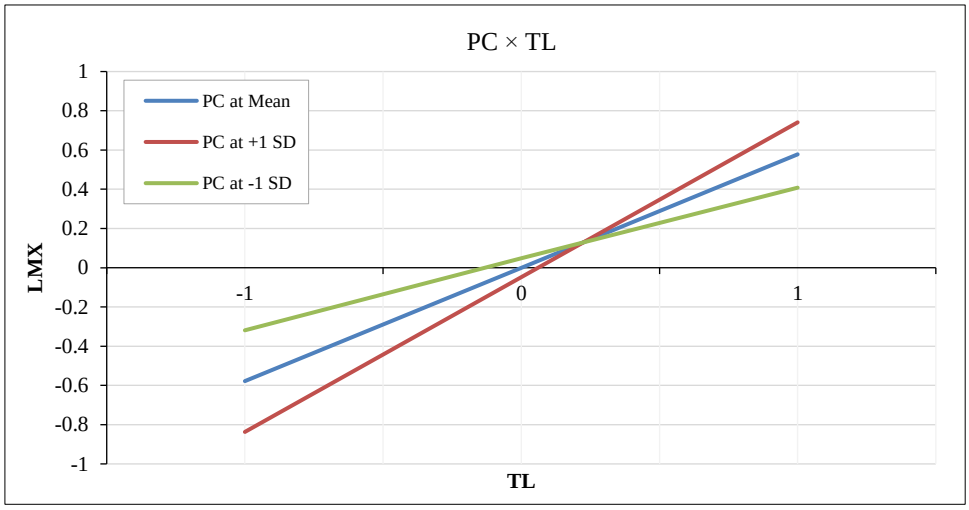

Figure 3. Simple slope analysis of PC's moderating effect in the TL-LMX relationship

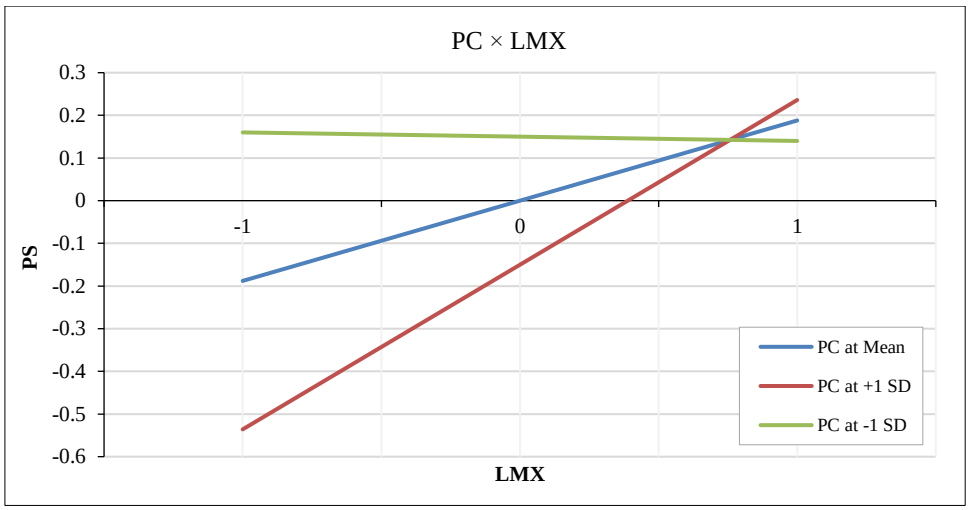

Figure 4. Simple slope analysis of PC's moderating effect in the LMX-PS relationship

The results of assessing the moderating influence of professional commitment (PC) through the three straight lines in Figure 3 show that the relationship between TL and LMX is positive for all three lines as indicated by their positive slopes. In other words, whether the value of PC is low, medium, or high, as long as there is PC, the relationship between TL and LMX is always promoted, but the rate of increase of LMX is different when PC changes. The top blue line, representing low levels of the PC moderator variable, has a flatter slope while the bottom red line, representing high levels of the PC moderator variable, has a steeper slope. Meanwhile, for the moderation of professional commitment in the LMX-PS relationship, the results of Figure 4 show that the lower the value of PC (shown by the blue line), the more negative how LMX and PS are connected. The influence of LMX on PS is only positive when PC is at medium or high levels. In general, the moderating role of PC in this context implies that the project manager's level of professional commitment moderates both the effect of TL on LMX and of LMX on PS.

4-3-5- Evaluating the Impact of Project Type on Project Success

In assessing the impact of transformational leadership on project success, the study surveyed project managers across a variety of project types, including engineering and construction, information technology, environmental projects, new product development, and others. This diversity offers valuable insights from different perspectives. However, due to the distinct characteristics and requirements of each project type, transformational leadership may influence project success in varying ways. Therefore, the next step is to evaluate how project type affects project success. This approach will help determine whether there is a significant difference between project types in terms of success when applying transformational leadership. To achieve this, the study applies the analysis of variance (ANOVA) technique using SPSS software.

Levene's test for the subgroups of the project types yielded the results shown in Table 11, where the Sig. value is 0.173, which is greater than 0.05. This indicates homogeneity of variance among the subgroups of project types. Given this result, the F-test in the ANOVA table (Table 12) was used to further evaluate differences between the subgroups.

Table 11. Test of homogeneity of variances

Project success			
Levene Statistic	**df1**	**df2**	**Sig.**
1.602	4	504	0.173

Table 12. ANOVA test between project type and project success

Project success					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	524.617	4	131.154	1.328	0.258
Within Groups	49781.819	504	98.773		
Total	**50306.436**	**508**			

The ANOVA results presented in Table 12 show a Sig. value of 0.258, which is greater than 0.05. This indicates that there are no significant differences in project success among the various types of projects.

5- Discussion

Transformational leadership is a well-established leadership model designed to help leaders address challenges effectively, and it is extensively studied as a foundational concept in leadership research [48, 97]. The study's findings confirm the positive influence of transformational leadership on project success and highlight the mediating role of Leader-Member Exchange (LMX) in this relationship. Additionally, the presence of professional commitment as a moderating variable enhances the impact of LMX on the relationship between transformational leadership and project success.

To begin with, the first hypothesis, which examined the relationship between transformational leadership (TL) and project success (PS), yielded positive results. Although some researchers have found that transformational leadership is not always the most suitable predictor of organizational effectiveness or project success [12, 13, 15], the first hypothesis (H1) of this study supports the existing literature that transformational leadership is an exceptionally effective style for achieving project success. This finding is also corroborated by previous research [8, 14, 98]. This can be explained by the fact that transformational leadership encompasses various aspects of organizational dynamics, such as activating intrinsic motivation, developing skills, enhancing ethical standards, initiating change, fostering maturity, and creating a supportive environment for project success [5]. The actions of project managers play a crucial role in determining the success of their projects [8]. Transformational leadership, characterized by its focus on communicating a vision and motivating followers to achieve goals aligned with that vision, is emphasized by Balwant (2020) [70] as essential for effective project coordination and success.

Secondly, the results support hypotheses H2a, H2b, and H2c, confirming that TL positively impacts LMX, LMX positively impacts PS, and LMX mediates the TL-PS relationship. These findings are consistent with earlier research [89, 90, 91], which suggests that leadership capacity can foster trust, communication, and shared values. A positive LMX relationship, in turn, enhances workplace outcomes [68]. The study highlights the mediating role of LMX in the TL-PS relationship, aligning with previous research [99-101] that highlights leadership capacity as a catalyst for improving trust, communication, and shared values. Yang et al. (2013) [102] also found that leadership competency is related to the quality of LMX in projects. This positive LMX relationship further boosts workplace outcomes [74]. Although the mediating role of LMX in the context of transformational leadership and project success has not been extensively tested, LMX has previously been demonstrated as a mediator in various contexts, such as the relationship between transformational leadership and desired behaviors [22, 103], transformational leadership and organizational performance [104, 105], and leadership competency and project performance [102].

Lastly, hypotheses H3 and H4 provide evidence supporting the role of professional commitment in amplifying the positive effects of TL on LMX and LMX on PS. Specifically, the impact of TL on LMX and LMX on PS is influenced by the level of professional commitment a project manager has to their work. This aligns with previous studies that suggest individuals with high professional commitment exhibit a strong identification with their roles [78]. Such commitment drives them to persist and put in the necessary effort to overcome challenges and ensure project success [37, 92]. Tyssen et al. (2014) [106] also note that leaders who are deeply committed to change are highly invested in the success of their projects and will not abandon them easily. This commitment boosts confidence among project managers and team members, positively affecting project outcomes.

Additionally, the results from testing differences among various groups affecting project success indicate that, in the context of project management in Vietnam, the impact of transformational leadership on project success is consistent across different types of projects. This consistency may be due to Vietnam's cultural emphasis on collectivism and social relationships. Transformational leadership, with its ability to create a harmonious work environment, can foster cooperation and cohesion among project team members. This leads to enhanced team spirit, reduced conflict, and increased consensus throughout the project execution. Furthermore, in Vietnam, where organizational culture often emphasizes the role of leaders, the influence of transformational leadership may be stronger and more consistent. Leaders are capable of shaping and guiding the team's work culture, which helps ensure that common goals are achieved regardless of the specific characteristics of each project.

6- Conclusion

By focusing on the outlined aims, this study has clarified some of the ambiguity surrounding the relationship between transformational leadership (TL) and project success (PS) that has persisted in prior investigations. It examined the roles of professional commitment and Leader-Member Exchange (LMX), offering deeper insights into how TL and PS are causally linked. The findings emphasize that project success is more likely when project managers adopt transformational leadership. LMX mediates the effect of TL on PS by fostering open communication, enhancing both individual and team competence, and aligning efforts toward shared goals. When project members exhibit these qualities, they collaborate more effectively, innovate, and, under the guidance of transformational leaders, contribute to positive project outcomes. This underscores the importance of a strong, reciprocal relationship between the project manager and the team, which serves as a key motivator for achieving project success. Furthermore, the study not only establishes the mediating role of LMX in the TL-PS relationship but also reveals the significant influence that project managers' professional commitment has on this relationship. Additionally, the results indicate that transformational leadership consistently impacts project success across various types of projects. TL's adaptability to diverse contexts - whether in complex engineering and construction projects or environmental projects - allows it to meet the specific needs of each project while maintaining a similar level of influence on success, regardless of the project's unique characteristics. In sum, from a theoretical perspective, the study, drawing on both Social Exchange Theory (SET) and Job Demands-Resources (JD-R) theory, positions TL as a foundational factor for successful project execution, with LMX as a mediating mechanism and professional commitment as a moderating factor. These findings offer empirical support for integrating transformational leadership, leader-member exchange, and project managers' professional commitment - an area rarely explored in the project management literature.

Besides its theoretical contributions, the study offers valuable insights for project management practice in Vietnam. In the Vietnamese context, where innovation and continuous improvement are necessary to keep up with economic growth, these findings are relevant for both project managers (PMs) and organizations in developing effective project management strategies. From the perspective of PMs, it is crucial that they recognize the significant role TL plays in PS. PMs should evaluate their own leadership styles and work on improving different aspects of TL, as enhancing these skills can lead to better project management outcomes. Additionally, PMs must develop a strong passion for their profession and demonstrate commitment to their role in order to effectively lead their projects to success. From the organizational perspective, human resource departments in project-oriented organizations should prioritize two key competencies when recruiting for project management positions: transformational leadership and professional commitment (PC). To help PMs excel in their roles, organizations should implement training programs that focus on TL

and support PMs in identifying and developing their personal and professional goals. By integrating these management functions, both PMs and organizations can enhance the efficiency of the path from TL to LMX and ultimately to PS, with PC serving as a critical amplifying factor. This study has certain limitations that should be addressed in future research. Since the data was gathered from Vietnamese PMs, replicating the study in different cultural and organizational contexts will be necessary to generalize the findings. To further understand how TL affects PS, future research could investigate the impact of additional mediating variables within this framework. Additionally, employing longitudinal methods could provide insights into how the relationships between TL, PC, LMX, and PS evolve over time, offering a more dynamic perspective on how these factors interact throughout various stages of a project.

7- Declarations

7-1- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-2- Funding

The author received no financial support for the research, authorship, and/or publication of this article.

7-3- Acknowledgements

The author expresses deep gratitude to the Ho Chi Minh City Open University for their assistance in conducting this work. Their support has been a significant catalyst in successfully finishing the study within the designated timeframe.

7-4- Ethical Approval

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Ho Chi Minh City Open University according to decision No. 3723/QD-DHM dated December 18, 2023.

7-5- Informed Consent Statement

Informed consent was obtained from the project managers who participated in the study.

7-6- Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

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