Study on the Impact Mechanism of Transformational Leadership on Employee Innovative Behavior

Xiaoyan Zhao1 *

1 International College, Krick University, Thailand

Abstract: This article is based on the context of China, aiming to clarify the relationship between transformational leadership and employee innovation behavior by exploring the relationship between transformational leadership and organizational commitment, and investigating the mediating role of organizational commitment in the relationship between transformational leadership and employee innovation behavior. Finally, this article analyzes the regulatory relationship between transformational leadership and employee innovation behavior through organizational climate. By delving into these issues, the aim of this article is to provide effective theoretical guidance for the study of transformational leadership on employee innovation behavior and to provide feasible recommendations for business management to promote the development of employee innovation behavior. This article uses a questionnaire survey method to investigate 397 employees of Company S in China. The results of the multiple linear regression analysis show that transformational leadership positively enhances employee innovation behavior, transformational leadership positively enhances organizational commitment, organizational commitment positively enhances employee innovation behavior, transformational leadership indirectly enhances employee innovation behavior by improving organizational commitment, and organizational climate promotes the positive relationship between transformational leadership and employee innovation behavior. This article presents recommendations from the organizational level, leadership level, and employee level, respectively.

Keywords: Transformational Leadership, Organizational Commitment, Innovation Behavior

1. Introduction

Innovation is considered the primary driver for enhancing productivity and technological progress, holding significant importance for both nations and businesses (Surya et al., 2021). With the rapid development of the Chinese economy, there's an increasing demand from the populace for services and products. Therefore, addressing these needs through innovation has become a crucial concern (Chen et al., 2020). Businesses must continually improve and progress, innovating their products and services with a customer-centric approach to elevate customer satisfaction (Giacomarra et al., 2020). Hence, understanding the external factors affecting employees' innovation capabilities and their internal mechanisms has become particularly vital.

For organizations, innovation is crucial for adapting and thriving in swiftly changing environments (Akcali & Sismanoglu, 2015). Effective leadership can inspire and motivate employee innovation, thereby providing a competitive edge to the organization. Moreover, comprehending the mechanisms that either foster or impede innovative behavior among employees can aid organizations in strategizing to cultivate an innovative culture (Greco et al., 2021).

According to social theory, employee innovation is pivotal for an organization to maintain competitiveness and achieve success in the constantly evolving business landscape (Qureshi et al., 2020). Additionally, organizational commitment is a key factor influencing employee attitudes, behaviors, and performance (Gumasing & Ilo, 2023). Thus, understanding the role of organizational commitment in promoting employee innovative behavior is essential for creating a supportive and beneficial work environment within organizations, fostering creativity, a spirit of adventure, and experimental abilities.

Transformational leadership stands as a significant factor influencing employee innovative behavior. Existing research indicates that transformational leadership can stimulate employees' self-efficacy,
creativity, and autonomy, thereby fostering employee innovative behavior (Wang et al., 2011; Fang et al., 2019). Furthermore, transformational leadership can enhance employees’ loyalty and commitment to the organization, further promoting innovative behavior (Zhu et al., 2005). Therefore, transformational leadership plays a crucial role in facilitating the occurrence and development of employee innovative behavior.

Organizational commitment serves as a crucial link between transformational leadership and employee innovative behavior. Studies have shown that organizational commitment mediates the impact of transformational leadership on employee innovative behavior (Cao et al., 2021; Di Vaio et al., 2022). In other words, transformational leadership propels employee innovative behavior by increasing their commitment to the organization. Employee innovative behavior stands as one of the core capabilities of an organization. Research demonstrates that it can enhance an organization's innovative capabilities, competitive advantage, and performance (Tuan, 2020; Zhang & Yang, 2021). Hence, to stimulate employee innovative behavior, organizations need to create a conducive environment and atmosphere.

This paper aims to explore the mechanism through which transformational leadership influences employee innovative behavior, including the mediating role of organizational commitment in their relationship. By studying the interplay between transformational leadership and employee innovative behavior, the paper seeks to clarify the relationship between transformational leadership and organizational commitment, as well as investigate the mediating effect of organizational commitment on the relationship between transformational leadership and employee innovative behavior. Through a deep dive into these issues, the paper aims to offer effective theoretical guidance for studying transformational leadership's impact on employee innovative behavior and provide feasible recommendations for business management to foster the development of employee innovative behavior.

2. Literature Review

2.1 Transformational Leadership and Employee Innovative Behavior

Research suggests that stimulating employee innovative behavior should focus on establishing an organizational environment and atmosphere, fairness in systems, and the leadership style of leaders (Fang et al., 2019). This implies that organizations can enhance the performance of organizational members' innovative behavior through the leadership style of their leaders. Leaders elevate the goals of members, motivate them through individual care, and create a context that encourages organizational members to engage in innovative behavior, thereby boosting their confidence to exhibit work performance that surpasses themselves, aiming for collective organizational innovation goals (O'Reilly & Chatman, 2020). Research by Sheehan et al. (2020) indicates a significant positive impact of transformational leadership on employee innovative behavior. Moreover, the relationship between the two is influenced by the intrinsic motivation of organizational members. Therefore, this study proposes the following hypothesis:

H1: Transformational leadership positively enhances employee innovative behavior.

2.2 Transformational Leadership and Organizational Commitment

Transformational leadership is a process of change where leaders utilize their influence to establish a shared vision with organizational members. They inspire morale and stimulate minds to enable members to collaborate, viewing organizational goals as personal self-fulfillment ideals, thereby propelling the sustainable development of the organization. In this process, organizational leaders and members mutually influence each other. Through communication, involvement, and achieving consensus between the organization and individuals, commitment within the organization can be sparked. In other words, transformational leadership has a positive impact on organizational commitment (Forester & Clegg, 1991). Shifting the leadership context to the educational sphere, numerous organizational behavior scholars in schools have found that the higher the level of transformational leadership exhibited by school principals or unit supervisors, the higher the organizational commitment among school teachers or staff. Transformational leadership significantly predicts organizational commitment (Asriandi et al., 2021; Bellido, 2020; Dorta-Afonso et al., 2021; Hwang et al., 2019; Setyaningsih & Sunaryo, 2021). Therefore, this study proposes the following hypothesis:

H2: Transformational leadership positively enhances organizational commitment.
2.3 Organizational Commitment and Employee Innovative Behavior

Organizational commitment refers to the psychological willingness of organizational members to devote their efforts to the organization (Kanter, 2009). In other words, organizational commitment is an internalized normative force that prompts organizational members to perceive organizational goals and performance as their own behavioral objectives (Cherif, 2020). When members have higher levels of commitment to the organization, they identify more with the organization's vision and values, and are more inclined to exhibit extra-role behaviors. Individual innovative behavior is one manifestation of extra-role behaviors (Akram et al., 2020). For an organization aiming to foster an environment conducive to innovation, it should prioritize camaraderie among organizational members and the power of encouragement. When organizational members perceive a willingness within the organization to communicate openly, support from leaders and colleagues, and a shared expectation for the future vision, they are inclined to spontaneously engage in innovative activities. Reviewing the relevant studies on organizational commitment and innovative behavior, it's found that when organizational members have a high level of commitment, they merge their work with personal goals, enabling them to confidently utilize their strengths, experiment with different thinking to solve problems, and eventually achieve objectives. Based on this, the following hypothesis is proposed in this study:

H3: Organizational commitment positively enhances employee innovative behavior.

2.4 The Mediating Role of Organizational Commitment in the Relationship Between Transformational Leadership and Employee Innovative Behavior

Organizational commitment is influenced by various factors, including the attitudes, values, and future development of organizational members. These factors determine whether organizational members share a consensus with the organization, are willing to actively contribute and dedicate their efforts to the organization, and have the intention to continue working within the same organization. Specchia et al. (2021) using organizational learning and organizational commitment as mediating variables, studied the impact of leadership styles on organizational performance. The results showed a positive influence of organizational commitment on organizational performance, with organizational commitment and organizational learning partially mediating the effect on organizational performance. Antunes et al. (2020) using organizational commitment as a mediating variable, explored the relationship between organizational vision and market intelligence systems in the service and manufacturing industries. The results revealed that the connection between organizational traits and market intelligence systems is influenced by the mediating effect.

Based on these findings, this study proposes the following hypothesis:

H4: Transformational leadership will indirectly enhance employee innovative behavior by increasing organizational commitment.

2.5 Research Framework

This study, situated in the context of China, aims to explore the relationship between transformational leadership and employee innovative behavior. Additionally, it delves into the relationships among leadership transformation, organizational commitment, and employee innovative behavior. Furthermore, it investigates the mediating role of organizational commitment between transformational leadership and employee innovative behavior, as depicted in Figure 1.

Figure 1. Research Framework.

3. Materials and methods

3.1 Research Subjects

This study aims to validate the effectiveness of the research framework through convenience sampling for sample analysis. Company S was established in 2010, located in Beijing, with a workforce of 430 employees, categorizing it as a medium-sized enterprise. Company S has consistently prioritized sustainable operations and innovative products as critical execution plans. Approximately 70% of the staff are allocated to research and development roles, with the remaining 30% involved in administrative, product marketing, and customer service roles. It stands as a representative of large-scale high-tech
enterprises in China.

3.2 Descriptive Statistics Analysis of the Sample

A total of 418 questionnaires were collected, out of which 21 were deemed invalid, resulting in 397 valid responses, accounting for a 94.98% validity rate. The majority of the sample comprises females, constituting 51.4% of the total. Regarding age distribution, 31.7% are below 30 years old, while 30.7% fall within the 31-40 age range. In terms of educational qualifications, the majority hold college degrees, with 175 individuals, accounting for 44.1% of the sample. In terms of monthly income, the majority earn 9001 yuan or more, with 189 individuals, representing 47.6%.

3.3 Research Instruments

3.3.1 Transformational Leadership

The measurement scale for transformational leadership in this study utilizes the Bass and Avolio Multifactor Leadership Questionnaire (MLQ) revised by Samson and Ilesanmi (2019) based on Bass and Avolio's work (Bass & Avolio, 1990). It divides leadership styles into four facets of transformational leadership: charisma, inspiration, intellectual stimulation, and individualized consideration. The scale comprises a total of 14 questions. It employs a 5-point Likert scale for assessment, with higher scores indicating a higher degree of transformational leadership.

3.3.2 Innovative Behavior

The measurement scale employed in this study represents a culmination of various dimensions of innovative behavior, meticulously evaluated and synthesized from the insights of numerous scholarly contributions. It adeptly amalgamates the distinct yet interrelated components of innovative behavior delineated by Janssen (2000): idea generation, idea promotion, and idea implementation. These facets collectively form a comprehensive framework that encapsulates the multifaceted nature of innovation.

Beyond their inception, the effective dissemination and advocacy of these concepts are vital for their fruition. This facet embodies the communicative competence and persuasive skills required to garner support and traction for innovative propositions among stakeholders and colleagues.

Comprising 12 meticulously crafted questions, this scale employs a 5-point Likert scale as its measurement tool. The Likert scale offers a nuanced gradation, allowing respondents to express the extent of their alignment with specific statements regarding innovative behavior. Higher scores on this scale denote a more pronounced demonstration of innovative behavior across its diverse facets, providing a quantifiable assessment of an individual's propensity for innovation. This approach facilitates a granular analysis, enabling researchers to discern varying degrees of innovative prowess among individuals or groups within a given context.

3.3.3 Organizational Commitment

Organizational commitment in this study is defined as the consensus reached between organizational members and the organization regarding attitudes, values, and future development. It involves the voluntary dedication of effort to the organization and a high willingness to continue working within the same organization. To measure organizational commitment, this study employs the Organizational Commitment Scale developed by Mowday et al. (1979), comprising nine questions. It uses a 5-point Likert scale for measurement, where higher scores indicate a higher degree of organizational commitment.

4. Results

4.1 Common Method Bias

In this study, measures such as anonymity were adopted to control testing. During the data analysis, the Harman's single-factor test was used to examine common method bias. All observed variables were subjected to exploratory factor analysis together. The unrotated first principal component explained variance of 24.36%, significantly below the critical threshold of 40%. Therefore, the issue of common method bias in this study is not severe.

4.2 Confirmatory Factor Analysis

This study employed SPSS Amos 24.0 software to conduct confirmatory factor analysis on each variable to test its structural validity. Initially, a three-
factor model was established. Subsequently, indicators such as χ², RMSEA, CFI, GFI, NFI, among others, were used to illustrate the model fit (refer to Table 1). From Table 1, in the three-factor model, the fit indices showed χ²/df = 2.443 (p > 0.05), RMSEA = .047, CFI = .977, indicating a good model fit. Additionally, this study validated four alternative models, and by comparing the fit indices of these five models, it was found that Model 1 demonstrated a better fit with the data.

Burnham et al. (2011) introduced indices for model comparison and selection: △AIC = AIC - AICmin, where AICmin represents the minimum value among a series of different AIC values for related models. This transformation indicates that the △AIC value for the best model is 0, while for all other models, it’s a positive value. Within a range of related candidate models, △AIC provides sufficient evidence to compare differences between these models. The interpretation rules for AIC are as follows: support for a model is highest when △AIC ≤ 2; support is weaker when 4 ≤ △AIC ≤ 7, and when AIC ≥ 10, the support for that model is no longer favored. The △AIC value for the three-factor model was 0, thus indicating strong support for the uniqueness of the three variables in this study (Burnham et al., 2011).

The results of the correlation analysis indicate that all variables exhibit a positive correlation with each other (p < 0.01).

Table 1. Results of Confirmatory Factor Analysis.

<table>
<thead>
<tr>
<th>Model</th>
<th>Factor</th>
<th>χ²/df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>△AIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three factor model</td>
<td>TL, OC, IB</td>
<td>2.443</td>
<td>.047</td>
<td>.977</td>
<td>0</td>
</tr>
<tr>
<td>Two factor model</td>
<td>TL, OC+ IB</td>
<td>3.601</td>
<td>.063</td>
<td>.957</td>
<td>42.170</td>
</tr>
<tr>
<td>Two factor model</td>
<td>TL + OC, IB</td>
<td>3.977</td>
<td>.105</td>
<td>.878</td>
<td>85.830</td>
</tr>
<tr>
<td>Two factor model</td>
<td>OC, TL + IB</td>
<td>5.128</td>
<td>.081</td>
<td>.930</td>
<td>14.512</td>
</tr>
<tr>
<td>One factor model</td>
<td>TL + OC + IB</td>
<td>11.650</td>
<td>.058</td>
<td>.965</td>
<td>12.571</td>
</tr>
</tbody>
</table>

Notes: **p<.01, ***p<.001 (two-tailed tests); TL=Transformational Leadership; OC=Organizational Commitment; IB=Innovation Behavior

Table 2. Correlation Analysis.

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>TL</th>
<th>BI</th>
<th>OC</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>3.779</td>
<td>0.834</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>3.814</td>
<td>0.844</td>
<td>.418**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>OC</td>
<td>3.854</td>
<td>0.853</td>
<td>.343**</td>
<td>.335**</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: **p<0.01; ; TL=Transformational Leadership; OC=Organizational Commitment; IB=Innovation Behavior

Table 3. Summary of Regression Analysis.

<table>
<thead>
<tr>
<th>BI</th>
<th>Model 1</th>
<th>BI</th>
<th>Model 2</th>
<th>BI</th>
<th>Model 3</th>
<th>BI</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>0.338***</td>
<td></td>
<td>0.241***</td>
<td></td>
<td>0.411***</td>
<td></td>
<td>0.333***</td>
</tr>
<tr>
<td>OC</td>
<td>0.237***</td>
<td></td>
<td>0.242</td>
<td></td>
<td>0.204</td>
<td></td>
<td>0.198</td>
</tr>
<tr>
<td>R²</td>
<td>0.197</td>
<td></td>
<td>0.242</td>
<td></td>
<td>0.204</td>
<td></td>
<td>0.198</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.141</td>
<td></td>
<td>0.186</td>
<td></td>
<td>0.149</td>
<td></td>
<td>0.142</td>
</tr>
</tbody>
</table>

Note: **p<.01, ***p<.001; ; TL=Transformational Leadership; OC=Organizational Commitment; IB=Innovation Behavior

4.3 Hypothesis Testing

In Model 1, as shown in Table 3, transformational leadership (β=0.338, p<0.05) positively influences employee innovative behavior, aligning with Hypothesis H1. Thus, H1 receives support and meets the first condition of the stepwise testing method, indicating a significant influence of the independent variable on the dependent variable (Baron & Kenny,
In Model 3, transformational leadership ($\beta=0.411$, $p<0.05$) positively affects organizational commitment. This aligns with Hypothesis H2, thereby supporting H2 and fulfilling condition 2: the significant influence of the independent variable on the mediating variable (Baron & Kenny, 1986).

In Model 4, organizational commitment ($\beta=0.333$, $p<0.05$) positively influences employee innovative behavior, aligning with Hypothesis H3. Hence, H3 gains support, meeting condition 3: a significant influence of the mediating variable on the dependent variable (Baron & Kenny, 1986). In Model 2, with the inclusion of the mediating variable organizational commitment, the coefficient of transformational leadership's impact on employee innovative behavior decreases from 0.338 in Model 2 to 0.241 in Model 3, meeting condition 4: a decrease in the coefficient of the independent variable on the dependent variable after adding the mediating variable (Baron & Kenny, 1986). This indicates that organizational commitment partially mediates the relationship between transformational leadership and employee innovative behavior, supporting Hypothesis H4.

5. Discussion

Empirical analysis has revealed that transformational leadership positively enhances employee innovative behavior. Similar to findings by scholars (Fang et al., 2019; Sheehan et al., 2020; O’Reilly & Chatman, 2020), this confirms that transformational leadership is capable of inspiring and fostering innovative behavior among employees within an organization. By elevating employees‘ goals, individual care, and creating a supportive environment for innovation, transformational leadership encourages higher work performance among employees, thereby providing a competitive advantage to the organization.

Empirical analysis has also demonstrated that transformational leadership positively influences organizational commitment. In alignment with findings by scholars (Bellido, 2020; Asriandi et al., 2021; Dorta-Afonso et al., 2021; Setyaningsih & Sunaryo, 2021; Hwang et al., 2019), this confirms that transformational leadership can heighten the commitment levels of organizational members. By establishing a shared vision blueprint, fostering morale, and stimulating the minds of organizational members, transformational leadership instills a willingness among members to dedicate their efforts to the organization, thereby enhancing their identification and loyalty towards it.

Empirical analysis further confirms that organizational commitment positively enhances employee innovative behavior. Similar to findings by scholars (Akram et al., 2020; Cherif, 2020; Kanter, 2009), this proves that organizational commitment can stimulate employee innovative behavior. Organizational commitment intertwines organizational objectives with individual goals, encouraging employees to engage in innovative activities and exhibit extra-role behaviors, thereby fostering innovative performance among employees.

The empirical analysis in this study also reveals that transformational leadership indirectly enhances employee innovative behavior through the improvement of organizational commitment. Similar to findings by scholars (Antunes & Pinheiro, 2020; Specchia et al., 2021), organizational commitment acts as a partial mediator between transformational leadership and employee innovative behavior, signifying that enhancing organizational commitment indirectly promotes employee innovative behavior, thereby strengthening the impact of transformational leadership on employee innovation behavior.

6. Conclusion

By examining the positive impact of transformational leadership on employee innovative behavior, this study further confirms the significance of leadership styles in stimulating employee innovative behavior within organizations. Transformational leadership style encourages employees‘ creativity and autonomy, fostering more innovative behavior among employees, which is crucial for organizations to maintain competitive advantages and achieve success in rapidly changing business environments.

The study emphasizes that by improving organizational members‘ commitment levels, transformational leadership indirectly promotes employee innovative behavior. This revelation sheds light on the pivotal role of organizational commitment in the formation of employee innovative behavior, offering a fresh perspective on researching the internal mechanisms of employee innovative behavior.

The study affirms the positive impact of employee innovative behavior on an organization's innovation capability, competitive advantage, and performance level. Employee innovative behavior stands as one of the core competencies of an organization. By
promoting the development of employee innovative behavior, organizations can enhance their innovation capabilities, bolster their position in market competition, and achieve superior performance.

In summary, this study holds important theoretical significance for the extension and deepening of organizational management and leadership theory. Through an in-depth exploration of the relationships between transformational leadership, organizational commitment, and employee innovative behavior, this study offers a novel theoretical perspective on the study of organizational innovative behavior and provides effective guidance for business management practices. It aids in promoting the development of employee innovative behavior, thereby enhancing an organization's innovation capability and performance level.

Based on the results and theoretical significance of this study, several suggestions and managerial implications can assist organizations in effectively promoting employee innovative behavior:

- Cultivating Transformational Leadership: Organizations should prioritize leadership roles and foster leaders with a transformational leadership style. Transformational leadership inspires employees' creativity and autonomy, encouraging them to explore new innovative methods, thereby fostering more innovative behavior. Leaders should focus on employees' goals and individual care, creating an environment supportive of innovation to enhance employees' drive for innovation.

- Establishing an Innovation Culture: Organizations should create a culture that encourages innovation. Employees are more likely to exhibit creativity and adventurous spirit in an environment that supports innovation. Organizations can establish an innovation culture by rewarding innovative outcomes, encouraging employees to present new ideas, and experimenting with new methods.

- Prioritizing Organizational Commitment: Organizations should focus on employees' commitment to the organization. By enhancing the commitment levels of organizational members, organizations can indirectly promote employee innovative behavior. Organizations can enhance members' commitment by providing development opportunities, fostering good interpersonal relationships, and effective communication.

- Encouraging Team Collaboration: Organizations can foster employee innovative behavior by encouraging teamwork and diverse thinking. Team collaboration gathers different viewpoints and experiences, sparking innovative thinking and aiding employees in generating more innovative ideas.

- Providing Innovation Support: Organizations should provide ample resources and support to employees to actualize innovative ideas. This includes providing necessary training and technical support, encouraging employees to try new methods, and offering suitable rewards and recognition to incentivize innovative behavior.

- Motivating Employee Participation in Innovation Activities: Organizations can establish innovative incentive mechanisms to reward employees actively engaging in innovation activities and proposing innovative ideas. Incentive mechanisms can inspire employees' enthusiasm and proactiveness, fostering the occurrence and development of innovative behavior.

- Establishing a Learning Organization: Organizations should advocate for the concept of a learning organization, encouraging employees to continually learn and experiment with new knowledge and skills. Learning organizations can adapt to rapidly changing environments, facilitate knowledge transmission and sharing, and provide strong support for employees' innovative behavior.

In conclusion, by focusing on leadership styles, organizational commitment, and the cultivation of an innovative culture, organizations can promote employee innovative behavior, thereby enhancing innovation capability and performance levels. Establishing a supportive environment for innovation, encouraging employee participation in innovative activities, and emphasizing the development of a learning organization are effective managerial implications that aid organizations in gaining advantages and sustaining development in fiercely competitive markets.

**Conflict of interest:** The authors declare no conflict of interest.
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