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The Effect of Transformational Leadership on Employees' Innovative Behavior: The Mediating Role of Organizational Culture and Psychological Empowerment

By

Bereket Negussie Tadesse[1]; Assegid Demissie Shishigu (PhD)[2]; Meselu Alamnie Mulugeta[3]

Abstract

In today's rapidly evolving business environment, employee innovative behavior (IB) is essential for organizational resilience and sustained growth. While transformational leadership (TL) is widely recognized as a factor influencing innovation, the combined mediating roles of organizational culture (OC) and psychological empowerment (PE)—particularly in the aviation sector of developing economies—remain underexplored. This study examines how TL influences IB both directly and indirectly through OC and PE, using survey data from 371 Ethiopian Airlines employees, analyzed via Partial Least Squares Structural Equation Modeling (PLS-SEM). Study results indicate that TL significantly enhances IB, both directly and through two key mediation pathways: by fostering an innovation-supportive OC and by increasing employees' PE. Additionally, OC positively influences PE, suggesting a cascading mechanism where leadership and culture jointly empower employees to innovate. The study recommends that Ethiopian Airlines and similar organizations should cultivate TL behaviors such as vision-setting, empowerment, and innovation support; institutionalize empowerment practices like participatory decision-making and task autonomy; and foster an open, collaborative, and risk-tolerant OC. Together, these strategies support the development of an integrated innovation ecosystem capable of sustaining competitive advantage. This study adds to the body of research on leadership and innovation literature by offering novel empirical insights from a leading African airline, illustrating how leadership style and organizational context synergistically promote employee innovation.

Keywords: *Employees' Innovative Behavior, Ethiopian Airlines, Organizational Culture, Psychological Empowerment, Transformational Leadership.*

1 Department of Management, Bahir Dar University, Bahir Dar, Ethiopia
2 Department of Management, University of Gondar, Gondar, Ethiopia
3 Department of Management, Bahir Dar University, Bahir Dar, Ethiopia

1. Introduction

In a time marked by swift technological progress, global uncertainty, and competitive turbulence, innovation has emerged as a key factor in ensuring organizational resilience and sustained success (Carlucci et al., 2020). Employees' innovative behavior—encompassing the generation, promotion, and implementation of new ideas in the workplace—stands out as a fundamental driver of sustained organizational innovation among the various organizational resources (Bos-Nehles et al., 2017; Shin et al., 2017). Particularly in the aviation industry, where operational agility and service innovation are imperative, fostering IB has become indispensable for navigating complex crises such as the COVID-19 pandemic (Angela & Iman, 2024). Ethiopian Airlines Group (EAG) exemplifies an adaptive enterprise that leveraged internal innovation to maintain operations during the pandemic, including repurposing passenger aircraft for cargo use to support global vaccine delivery (UNCTAD, 2021). Such successful innovation initiatives often stem not solely from executive strategy but from empowered employees equipped and motivated to act innovatively in uncertain conditions (Miao et al., 2018). Meaning, an organization's capacity to adapt to such external changes starts with its employees' innovative behavior. Thus, understanding the antecedents and mechanisms that drive employee IB is not only theoretically compelling but also vital for organizational practice.

Despite the growing body of literature linking TL, OC, and PE to IB, findings remain inconsistent and context-dependent. For TL, studies report positive associations with IB (e.g., Ashfaq et al., 2021; Garg et al., 2023), yet others find non-significant (Rahman et al., 2023; Wibowo et al., 2023) or even negative effects (Bednall et al., 2018; Byantara et al., 2023), indicating that the effectiveness of TL may depend on contextual or mediating variables.

Similarly, the influence of OC on IB has produced inconsistent study results. Some studies report a positive influence, showing that supportive and adaptive cultures enhance IB (e.g., Khan et al., 2020; Mutonyi et al., 2021). In contrast, other research finds either no significant association (e.g., Nguyen et al., 2023) or negative effects, depending on the specific cultural type (Xanthopoulou & Sahinidis, 2022). For instance, Leal-Rodríguez et al. (2019) emphasize the positive impact of adhocracy cultures—characterized by flexibility and innovation—on IB. However, Herminingsih (2019) found no significant influence of either adhocracy or hierarchical cultures on IB. Moreover, Leal-Rodríguez et al. (2019) concluded that hierarchical and outcome-driven cultures actually suppress innovation by discouraging autonomy and risk-taking. These inconsistencies suggest that the relationship between OC and IB is not uniform and may vary according to the dominant cultural dimensions and organizational context.

The relationship between PE and IB is likewise nuanced. While many studies affirm a positive and significant effect (e.g., Garg et al., 2023; Setiyawami et al., 2023), some suggest that not all dimensions of PE contribute equally. For instance, Mustafa et al. (2023) found that the "impact" and "meaning" dimensions positively influenced IB, whereas "competence" and "self-determination" did not. Similarly, Singh & Sarkar (2012) reported that only self-determination significantly predicted IB. These inconsistencies highlight the importance of a more integrated, context-sensitive approach to understanding how TL, OC, and PE shape employees' innovative behavior. Second, existing studies often adopt overly simplistic linear models and are concentrated in Western or Asian contexts, with minimal investigation into African aviation settings.

Against this backdrop, the current study addresses two primary objectives: (1) to examine the direct influence of TL, OC, & PE on employees' IB; (2) to examine the mediating roles of OC & PE in the relationships between TL and IB. Drawing on Self-Determination Theory (Ryan & Deci, 2020), which posits that the fulfillment of fundamental psychological needs—autonomy, competence, and relatedness—enhances intrinsic motivation and optimal functioning, we examine how contextual variables like leadership and culture influence IB. TL is expected to shape a conducive environment for innovation by articulating a compelling vision, modeling risk-taking, and encouraging intellectual stimulation (Afsar & Umrani, 2020). OC, is posited to support innovation through openness, collaboration, and risk-tolerance (Cho & Song, 2021), while PE enhances employees' intrinsic motivation and self-efficacy to innovate (Grošelj et al., 2021).

The current study offers three novel contributions. Methodologically, it integrates multiple antecedents of IB into a comprehensive PLS-SEM framework using data from a large, stratified sample of Ethiopian Airlines Group (EAG) employees. Theoretically, it deepens our knowledge of the mediating mechanisms (OC and PE) through which TL influences IB in a high-stakes, non-Western organizational context which confines generalizability of study results in underrepresented contexts. Practically, it offers aviation leaders actionable insights on how to align leadership styles, cultural dynamics, and empowerment practices to cultivate IB.

2. Statement of the Problem

Global environmental changes have forced companies to engage in "forced innovation" - the accelerated development of new capabilities in response to disruptions like COVID-19 (Angela & Iman, 2024). Ethiopian Airlines (EAL) exemplified this by converting passenger aircraft to cargo operations during the pandemic, allowing it to transport vaccines and medical equipment while maintaining financial stability without bailouts (UNCTAD, 2021). This adaptive capacity reflects Ethiopia's unique collectivist culture where hierarchical leadership structures coexist with collaborative decision-making, potentially creating different innovation dynamics compared to individualistic Western contexts. In light of these arguments, the researcher believes that the risk-mitigating strategies adopted by EAL during the crisis emanated from its employees' innovative behavior. However, to thrive in today's dynamic environment, organizations must foster an internal climate that empowers employees at all levels to innovate and develop groundbreaking solutions. Therefore, knowledge of employees' innovative behavior is essential for modern organizations to maintain competitive edge in the today's dynamic environment (Carlucci et al., 2020).

Many researchers have tried to determine the antecedent factors that affect employees' innovative behavior. Research shows TL significantly influences IB (e.g., Ashfaq et al., 2021; Garg et al., 2023), though some studies found non-significant (e.g., Rahman et al., 2023; Wibowo et al., 2023), and negative (e.g., Bednall et al., 2018; Byantara et al., 2023) relationships between TL and IB. OC's impact on innovation also shows mixed results. While some studies indicate its critical role (Khan et al., 2020; Mutonyi et al., 2021), others found (e.g., Nguyen et al., 2023; Xanthopoulou & Sahinidis, 2022) negative relationships with IB. In addition, some dimensions of OC do not significantly influence IB. For example, while Herminingsih (2019) found that adhocracy and hierarchy cultures had non-significant and negative effects on IB respectively, Leal-Rodríguez et al. (2019) revealed a significant positive influence of adhocracy culture. Similarly, hierarchy and outcome-oriented cultures were found to stifle innovativeness (Leal-Rodríguez et al., 2019). The relationship between PE and IB is also complex.

Garg et al. (2023) and Setiyawami et al. (2023) found a positive and significant influence of PE on IB, but Mustafa et al. (2023) showed that only the impact and meaning dimensions of PE directly affect IB, while competence and self-determination do not. Similarly, Singh & Sarkar (2012) found that self-determination directly influenced IB, but competence and impact dimensions had no direct or indirect effects. These studies highlight that the relationship between OC, PE, and IB is not straightforward and may vary based on context and individuals.

In addition, previous related studies employed quantitative approaches (e.g., Cho & Song, 2021; Rafique et al., 2021), but scholars are moving toward more complex models incorporating multiple interactions and contexts (Mutonyi et al., 2020). Rafique et al. (2021) contend that though employee IB has drawn more attention from empirical research, it has not been adequately theorized in terms of model complexity. Studies frequently use straightforward models that adopt a universalistic viewpoint (Günzel-Jensen et al., 2018). There's also a need for advanced statistical methods (Carlucci et al., 2020) and research in diverse global settings (Rafique et al., 2021), particularly in Ethiopian contexts. This study seeks to address this gap by employing a more complex model that incorporates the interactions between TL, OC, PE, and IB, offering a detailed insight into these dynamics within the unique context of Ethiopian Airlines.

Finally, the existing research on IB has predominantly focused on Western contexts, with a lack of studies examining this topic in the Ethiopian context. Given Ethiopia's unique cultural characteristics—including high power distance, communal decision-making traditions, and state-enterprise dynamics—existing Western-derived theories may not fully explain innovation behaviors in this context (Rafique et al., 2021). Ethiopian Airlines, as one of the fastest-growing airlines in Africa, represents a leading example of successful leadership and innovation practices within the African aviation industry. Its rapid expansion and recognition as a top carrier provide a compelling backdrop for examining the influence of TL on employee PE and IB. The organization operates within a unique cultural and regional context, facing distinct challenges and opportunities that are underrepresented in the existing literature. By focusing on Ethiopian Airlines, this study aims to fill a gap in the literature by providing insights into how leadership and innovation practices operate in this specific context.

To address these gaps, this study seeks to explore the relationships between TL, OC, PE, and IB within Ethiopian Airlines. It provides an important contribution from a new cultural and organizational context, offering insights that are relevant to both academic and practical audiences.

3. Self-Determination Theory (SDT) - Underpinning Theory

SDT provides a strong theory that accounts for the intricate relationship between TL, OC, PE, and IB. SDT does so by integrating intrinsic and extrinsic motivations (Howard et al., 2021) and focusing on basic psychological needs (such as autonomy, competence, and relatedness—in line with TL and PE (Slemp et al., 2018), which are core components of the theory. SDT recognizes that psychological need satisfaction propels innovation and has the cultural sensitivity to recognize variations across varied organizational contexts (Ryan & Deci, 2020); it fits well with examining PE's mediating role in the relationship between TL and IB. Yet, limitations exist: Because of its comprehensive scope, the theory may be difficult to test empirically, potentially missing out on structural organizational aspects (Howard et al., 2021) and failing to capture all important motivational dimensions of cultural differences (Chirkov et al., 2005).

To address these theoretical limitations in the existing study, some methodological strategies were employed. First, recognizing SDT's difficulty to be tested empirically due to its broad applicability, this study defined PE as a mediator construct rather than testing SDT in its entirety. This dimensional approach harmonizes with Ryan & Deci (2020) recommendation for measuring SDT constructs within organizational contexts. By placing PE as a mediator within the relationship of TL-IB, the study focuses on some motivational pathways that are theory-driven and empirically noticeable. This enables hypotheses to be tested with greater precision and avoid the complexity of examining SDT's whole theoretical framework. Second, to counter SDT's potential neglect of structural organizational factors, the study incorporates OC both as a mediator between TL and IB and as an antecedent to PE. This double-mediation strategy specifies how structural-environmental factors (OC) interact with states of personal motivation (PE) in order to influence innovative outcomes. Third, in consideration of issues of differential motivational dimensions between cultures, the study employs culturally validated measures and tests the mediation effects in the African aviation context, thereby examining whether SDT-based PE operates similarly across cultures. Moreover, there is sufficient empirical backing for the efficacy of SDT in investigating IB antecedents (e.g., Fateh et al., 2021; Wang et al., 2021), thus rendering it a sound framework to test the TL-OC-PE-IB nexus in particular and even in divergent cultural settings, like that of the Ethiopian aviation industry.

4. Theoretical Background and Hypothesis Development

4.1. Theoretical Background

Innovation within organizations is increasingly conceptualized not merely as a technical process but as a behavioral and social phenomenon embedded in individual agency and organizational context. IB, defined as the deliberate generation, promotion, and implementation of new ideas within a role or group, requires employees to go beyond routine performance to contribute creatively to organizational goals (Shin et al., 2017). Theoretical perspectives have emphasized that IB is shaped by both internal motivational states and external environmental cues, making it a multidimensional outcome situated at the intersection of leadership, empowerment, and culture.

TL has emerged as a central theoretical lens for understanding how leaders influence followers' innovation-related behaviors. Grounded in the work of Bass (1985) and later extended by Bass & Riggio (2006), TL is characterized by articulating a clear vision, intellectual stimulation, providing inspirational motivation, and offering individualized support and attention. Theoretically, TL aligns with SDT (Ryan & Deci, 2020), in that it facilitates the fulfillment of fundamental psychological needs - autonomy, competence, and relatedness - which are precursors to intrinsic motivation and creative engagement. Leaders who stimulate intellectual curiosity and foster psychological safety help create conditions in which employees feel encouraged to explore creative solutions without the fear of making mistakes (Ashfaq et al., 2021). However, theoretical critiques suggest that TL's influence may be moderated by contextual factors such as structural rigidity or employee support, requiring a more nuanced understanding of its mechanisms (Grošelj et al., 2021).

PE represents an individual's mental state marked by a sense of purpose, capability, autonomy, and influence in their job (Spreitzer, 1995). As a motivational construct, PE provides the psychological conditions necessary for employees to take ownership of their roles, explore alternatives, and persist in the face of challenges - all critical for IB. From a theoretical standpoint, PE is often considered both an outcome of leadership and a driver of discretionary effort, including innovative initiatives (Thomas &

Velthouse, 1990). Yet, not all components of PE uniformly predict IB, prompting scholars to examine how different PE dimensions interact with leadership and organizational norms (Mustafa et al., 2023; Singh & Sarkar, 2012).

OC provides the normative context that shapes how innovation is perceived, supported, or constrained. Drawing on the competing values framework (Cameron & Quinn, 2011), certain cultures - such as adhocracy or clan - are theorized to promote innovation through flexibility, collaboration, and openness to risk. Theoretically, OC serves as both a structural enabler and a psychological climate, influencing whether employees feel psychologically safe and socially supported to innovate (Chatman & Cha, 2003). However, cultural typologies such as hierarchy or market cultures may inhibit IB due to their emphasis on control and predictability (Herminingsih, 2019; Leal-Rodríguez et al., 2019), suggesting that OC's role is not uniformly positive but highly contingent.

Taken together, TL, PE, and OC represent interrelated forces in shaping employees' IB. While each construct has been robustly theorized in its own right, emerging theoretical perspectives suggest that their combined influence may produce synergistic effects that exceed the sum of their individual parts (Grošelj et al., 2021). Yet, the interactive pathways between these constructs - such as how TL shapes OC or how OC fosters PE - remain under-theorized in integrated frameworks. Addressing this theoretical intricacy allows for a deeper insight into how leadership, empowerment, & culture coalesce to influence innovative behavior at work.

4.2. Hypothesis Development

Transformational Leadership and Employees' Innovative Behavior

The link between TL & IB has received considerable scholarly attention, yet findings remain theoretically and empirically inconsistent. Grounded in Bass's (1985) TL theory, numerous studies demonstrate that TL fosters IB by inspiring followers to transcend self-interest, embrace risk, and engage in creative problem-solving (Ashfaq et al., 2021). Empirical evidence from education (Margana et al., 2019), healthcare (Ahmed et al., 2019), and public sector contexts (Bak et al., 2022) supports this positive association, often attributing it to leaders' capacity for intellectual stimulation and individualized support.

However, other studies present a more complex picture. Some report non-significant effects (Rahman et al., 2023; Wibowo et al., 2023), while others even identify negative correlations between TL and IB (Bednall et al., 2018; Byantara et al., 2023). These contradictions implies that TL's influence on IB is not universal but context-dependent. For example, in cultures or organizations characterized by rigid hierarchies or low tolerance for risk, TL may be insufficient - or even counterproductive - if not accompanied by systemic support for innovation. Moreover, scholars argue that TL's effect may be indirect, operating through mediators such as PE (Garg et al., 2023), OC (Khan et al., 2020), or innovation climate (Grošelj et al., 2021). In such cases, leaders create enabling conditions, but these must be filtered through employees' perceptions and workplace norms to produce innovative outcomes.

Theoretical frameworks such as SDT (Ryan & Deci, 2020) further illuminate these inconsistencies. While TL may satisfy fundamental psychological needs (autonomy, competence, relatedness), this motivational pathway is likely moderated by contextual variables such as cultural expectations, employee readiness, or the nature of tasks. In organizations with high power distance, for example, employees may hesitate to act innovatively even under transformational leaders due to fear of failure or ingrained deference

to authority (Luo et al., 2020). Conversely, in flatter, participatory cultures, TL may be more readily internalized, leading to proactive behavior. Therefore, rather than assuming a direct, uniform effect of TL on IB, a more plausible model is one in which TL acts as a foundational enabler, with its impact contingent on mediating and moderating mechanisms. This underscores the importance of testing such pathways empirically. Therefore, we hypothesize:

H1: Transformational leadership has a statistically significant and positive influences on employees' innovative behavior.

Organizational Culture and Employees' Innovative Behavior

The influence of OC on IB has been extensively studied, yet findings remain theoretically complex and empirically inconsistent. Broadly, OC is understood to shape employees' perceptions, values, and behavior by providing the normative environment in which innovation may be encouraged or suppressed (Khan et al., 2020; Mutonyi et al., 2021). These studies generally suggest that cultures emphasizing openness, flexibility, and collaboration tend to foster more innovative outcomes.

However, closer examination reveals a more nuanced and dimension-specific picture. The Competing Values Framework (CVF) (Cameron & Quinn, 2011) identifies four dominant cultural dimensions - clan, adhocracy, market, and hierarchy - each with distinct implications for innovation. While adhocracy cultures, characterized by risk-taking, autonomy, and flexibility, are widely theorized to support IB, empirical results are mixed. For example, while Leal-Rodríguez et al. (2019) report positive associations between adhocracy culture and IB, Herminingsih (2019) found no significant relationship. These inconsistencies may reflect variations in innovation orientation, organizational maturity, or national culture that influence how employees interpret and respond to cultural cues.

Findings are similarly contradictory regarding market cultures, which prioritize results, competition, and efficiency. Some studies, like Leal-Rodríguez et al. (2019), highlight their potential to stimulate IB by fostering a performance-driven climate. In contrast, Naranjo-Valencia et al. (2017) report no significant effect, possibly due to the rigid goal orientation crowding out creative risk-taking. Hierarchical cultures, marked by centralized control, rule enforcement, and formal procedures, tend to suppress IB by restricting autonomy and psychological safety. This is reinforced by consistent results from Brettel et al. (2015), who contend that hierarchical control mechanisms limit empowerment - an essential precursor for innovation.

Adding to this complexity, several studies suggest that no direct relationship may exist between OC and IB in certain contexts. Nguyen et al. (2023) found null effects, raising the possibility that culture's influence might be mediated by variables like PE, leadership style, or innovation climate. In this view, culture sets the background conditions but requires supportive structures to translate its values into behavior.

Leal-Rodríguez et al. (2019) emphasize that innovation outcomes are shaped not by culture in the abstract but by specific cultural dimensions and their interaction with contextual factors - including sectoral dynamics, leadership practices, and employee agency. Thus, rather than assuming OC exerts a uniform influence on IB, it is more accurate to view it as a context-dependent enabler or constraint, whose effects are mediated and moderated by other organizational and psychological mechanisms. Therefore, we hypothesize:

H2a: Organizational culture positively influences employees' innovative behavior.

TL is broadly acknowledged as a crucial factor shaping OC, particularly those cultures that foster innovation and adaptability. TL promotes values such as collaboration, intellectual stimulation, and shared vision, which align with adhocracy and clan cultures characterized by flexibility and creativity (Setiawan & Yohanes, 2020). Empirical studies consistently show that transformational leaders shape innovation-friendly environments by encouraging participative decision-making and continuous learning (Kaur Bagga et al., 2023). The robustness of this relationship is further confirmed by evidence that effective TL implementation directly correlates with the development of adaptive cultural norms (Fibriandhini et al., 2022). Therefore, we hypothesize:

H2b: Transformational leadership positively influences organizational culture.

Beyond this direct effect, studies increasingly suggest that OC mediates the relationship between TL and IB. While TL sets the vision and provides motivation, it is the cultural context that determines whether these efforts translate into sustained innovation (Gashema & Mokua, 2019). Studies across diverse sectors - including education and tourism - find that TL enhances IB most effectively when coupled with cultures that support autonomy, risk-taking, and knowledge sharing (Khan et al., 2020). Specifically, TL-driven adhocracy cultures are linked to increased psychological safety and learning, which subsequently enable employees to act innovatively (Setiawan & Yohanes, 2020). This suggests that TL alone may not be sufficient; its impact on IB is amplified in cultures that reinforce openness and support for innovation. Therefore, we hypothesize:

H2c: Organizational culture plays a mediator role in the relationship between transformational leadership and innovative behavior.

Psychological Empowerment and Innovative Behavior

PE - defined as an individual's feeling of meaning, competence, self-determination, and influence in their role - has been widely linked to IB. Studies confirm this positive relationship, suggesting that empowered employees are more inclined to take initiative, generate new ideas, & pursue change (Ashfaq et al., 2021). However, empirical findings are not consistently supportive. The relationship between PE and IB is also complex. Garg et al. (2023) and Setiyawami et al. (2023) revealed a positive and significant effect of PE on IB, but Mustafa et al. (2023) showed that only the impact and meaning dimensions of PE directly affect IB, while competence and self-determination do not. Similarly, Singh & Sarkar (2012) found that self-determination directly influenced IB, but competence and impact dimensions had no direct or indirect effects. These studies highlight that the relationship between OC, PE, and IB is not straightforward and may vary based on context and individuals. Therefore, we hypothesize:

H3a: Psychological empowerment positively influences employees' innovative behavior.

TL is frequently identified as a key antecedent of PE, especially through mechanisms such as intellectual stimulation and individualized support (Stanescu et al., 2021). Cross-cultural studies reinforce this link, showing that TL enhances PE in diverse settings, including China (Liu et al., 2019), Saudi Arabia (Bin Bakr & Alfayez, 2022), and Malaysia (Ibrahim et al., 2021). Yet, recent research points to important qualifications. For instance, Minai et al. (2020) found that TL primarily influenced self-determination, not competence, while Tsevaridou & Matsouka (2019) observed negative associations between certain

TL dimensions and empowerment in hierarchical environments. Setiyawami et al. (2023) argue that TL's ability to foster PE may depend on contextual factors such as organizational uncertainty or cultural expectations. This highlights the need to consider how and when TL facilitates empowerment, rather than assuming a direct and uniform effect. Therefore, we hypothesize:

H3b: Transformational leadership positively influences psychological empowerment.

OC is widely recognized as a significant driver of PE, though its influence varies across cultural types and contexts. Empowering cultures - such as clan and adhocracy - are consistently associated with enhanced PE, as they promote autonomy, involvement, and adaptability (Liu et al., 2019). Supportive elements like participation, innovation, and flexibility have been shown to strengthen employees' sense of meaning and self-determination (Chatpunyakul et al., 2019). In contrast, hierarchical or control-oriented cultures often suppress PE by limiting autonomy and initiative (Jiang & Fu, 2011). However, some studies - such as (Park & Kim, 2020) in South Korean airlines - suggest that hierarchy can support empowerment in collectivist or highly structured national contexts. These findings imply that OC's impact on PE is dependent on cultural and organizational settings (Grošelj et al., 2021). While the link between OC and PE is well established, identifying which cultural dimensions empower - and under what conditions - remains an open research frontier. Therefore, we hypothesize:

H3c: Organizational culture positively influences psychological empowerment.

Studies also position PE as a critical mediator between TL and IB. TL enhances PE by fostering autonomy, confidence, and a sense of purpose, which then drives employees to act innovatively (Garg et al., 2023; Grošelj et al., 2021). Sectoral evidence from banking (Al Harbi et al., 2019), hospitality (Arslan, 2022), and media (Kustanto & Eliyana, 2020) confirms this mediating pathway. However, not all contexts yield consistent results; for example, in Indonesia's public sector, PE did not strengthen the TL - IB link (Sinaga et al., 2021), suggesting that institutional constraints may hinder empowerment's role. Still, the prevailing evidence supports PE as a key mechanism translating leadership influence into innovation. Therefore, we hypothesize:

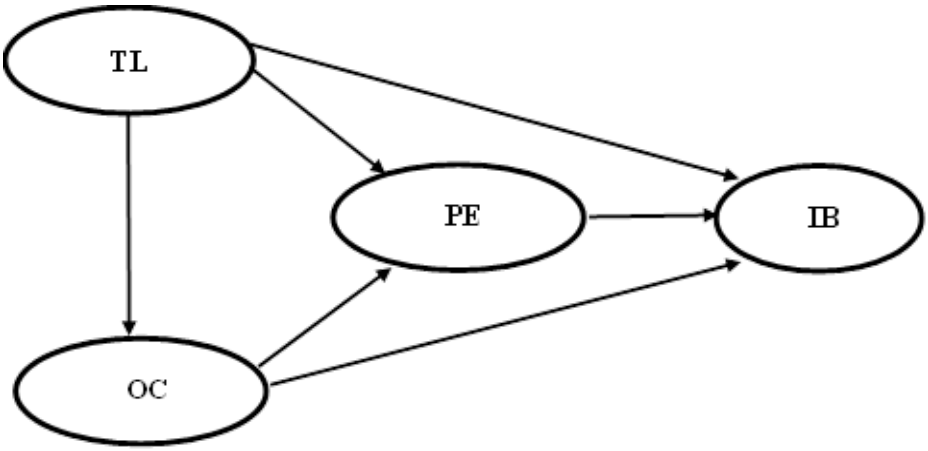
H3d: Psychological empowerment mediates the relationship between transformational leadership and innovative behavior.

Similarly, OC influences IB indirectly through PE. Cultures that emphasize flexibility, involvement, and mission-orientation create empowering climates where employees feel psychologically equipped to innovate (Nguyen et al., 2023). Nonetheless, the mediating effect of PE is not uniform- market cultures, for instance, show weaker indirect effects (Ergün, 2018). Moreover, national cultural dimensions, such as power distance or collectivism, can moderate this mediation process (Çakar & Ertürk, 2010). These findings affirm PE's mediating role while underscoring the need for culturally sensitive frameworks. Therefore, we hypothesize:

H3e: Psychological empowerment mediates the relationship between organizational culture and innovative behavior.

Overall, the study proposes six direct hypotheses examining the relationships among TL, OC, PE, and employees' IB. In addition, three hypotheses examine the mediating effects of OC and PE. These relationships are visually illustrated in the conceptual framework presented in Fig 1.

Fig 1: Conceptual Model of the Study



Note: PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture

Figure 1 presents two categories of antecedents influencing IB.TL is hypothesized to have both direct and indirect effects. Specifically, TL is expected to directly influence IB, OC, and PE, while also impacting IB indirectly through the mediating roles of OC and PE. Additionally, OC is proposed to mediate the association between TL and PE.

5. Methodology

5.1. Study Population, sample, & data collection

Using a positivist and deductive approach, this quantitative, cross-sectional study examines IB within the Ethiopian Airlines Group. IB is defined as employees' engagement with new ideas and solutions (Bos-Nehles et al., 2017), emphasizing that innovation can originate at any organizational level. The study analyzes data from individual employees across EAL's seven divisions to reflect the distributed nature of innovation. Applying the determination formula from Kothari (2004), 384 participants were chosen through stratified random sampling, resulting in 371 valid responses obtained via hand-delivered questionnaires.

5.2. Measurement of study variables

The current study employed a structured questionnaire with validated factors and a five-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). IB was measured using a two-dimensional framework (Dorenbosch et al., 2005; Krause, 2004), including idea generation (10-item "creativity-oriented work behavior" subscale) and idea implementation (6-item "implementation-oriented work behavior" subscale). The Multifactor Leadership Questionnaire (Form 5X-Short) assessed TL through 20 employee-rated questions. OC was measured using Cameron & Quinn's (2011) 24-item Organizational Culture Assessment Instrument (OCAI), while PE was evaluated with Spreitzer's (1995) 12-item scale.

5.3. Measurement Model

Validity and reliability of the study model were thoroughly assessed, yielding strong results that confirm

its accuracy.

Reliability

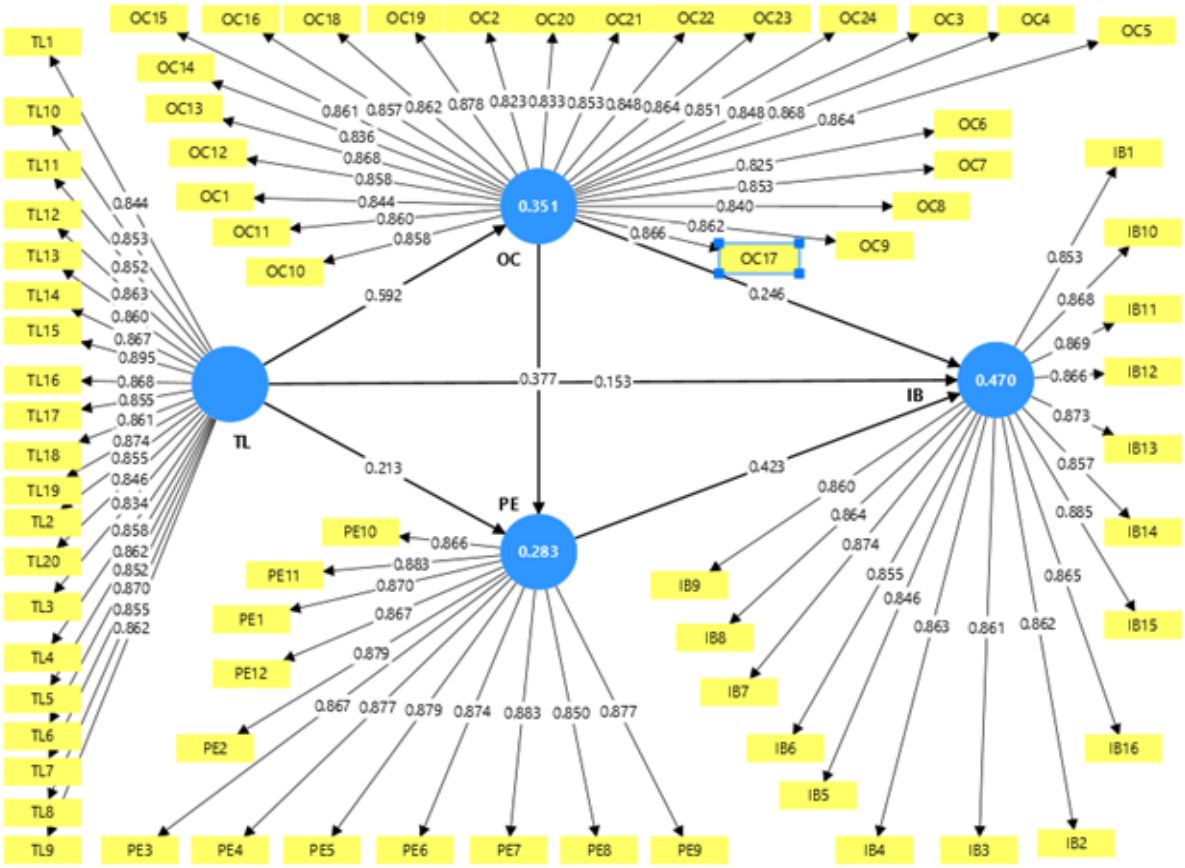
The study tested the measurement model for convergent and discriminant validity using outer loadings, Cronbach's alpha, composite reliability, and average variance extracted (Hair et al., 2021). As illustrated in Figure 2, all item factor loadings met the recommended range of 0.50–0.70 (Sarstedt et al., 2020). Convergent validity, assessed through AVE, measures how much variance a construct shares with its indicators, with values exceeded 0.5 (Bagozzi & Yi, 1988), confirming satisfactory validity. Cronbach's alpha and composite reliability was also used to test internal reliability, which assess whether all indicators consistently measure the same construct. Table 1 shows strong internal consistency for all constructs, with values exceeding 0.7 and 0.8 for Cronbach's alpha and composite reliability, respectively (Hair et al., 2021). Thus, the measurement model exhibited acceptable levels of reliability and validity.

Table 1: Reliability Analysis

Variables	Cronbach's alpha	CR (rho_a)	CR (rho_c)	(AVE)
PE	0.972	0.972	0.975	0.762
IB	0.977	0.978	0.979	0.746
TL	0.981	0.982	0.983	0.738
OC	0.984	0.984	0.985	0.728

Note: CR = Composite reliability, AVE= Average variance extracted, PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

Figure 2: Measurement Model



Validity

Finally, we evaluated the measurement model to confirm that the constructs under investigation were distinct from one another. Based on Hair et al. (2021)'s guidance, we utilized the heterotrait-monotrait (HTMT) ratio to verify that the variance shared within each individual construct (as indicated by AVE) exceeded the variance shared between different constructs. The results shown in Table 2 demonstrate that all HTMT ratios fell below the 0.9 cutoff point (Hair et al., 2021), thereby validating that discriminant validity had been achieved.

Table 2: Discriminant Validity Test - HTMT

	IB	OC	PE
IB			
OC	0.560		
PE	0.628	0.514	
TL	0.493	0.602	0.446

Note: PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

In addition, Fornell-Larcker criterion was applied to evaluate discriminant validity. This criterion

involves creating a matrix where the square root of each construct's Average Variance Extracted (AVE) appears on the diagonal, while the correlations between different constructs are displayed in the off-diagonal positions. For discriminant validity to be confirmed, a construct's square root of AVE should be greater than its correlations with any other construct. As illustrated in Table 3, this condition is met—for instance, the AVE for the IB construct is 0.864, which exceeds its correlations with all other constructs. This pattern holds true across all constructs, indicating that each one is conceptually distinct and not overlapping with others. Therefore, the Fornell-Larcker criterion supports the presence of adequate discriminant validity. Taken together, these findings confirm that the reflective measurement model used in this study is both reliable and valid.

Table 3: Discriminant Validity Test - Fornell-Larcker Criterion

	IB	OC	PE	TL
IB	0.864			
OC	0.550	0.853		
PE	0.614	0.504	0.873	
TL	0.484	0.592	0.436	0.859

Note: PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

5.4. Structural Model

Before assessing the structural model, collinearity among the latent variables was examined using variance inflation factor (VIF) values. As shown in Table 4, all VIF values were below 2, indicating the absence of multi-collinearity issues. Furthermore, according to (Kock, 2015), VIF values above 3.3 may indicate potential common method bias (CMB). Since all VIF values in the inner model, based on the full collinearity test, were at or below the 3.3 threshold, the model is considered free from common method bias.

Table 4: Multi-collinearity Test (VIF)

	IB	OC	PE
IB			
OC	1.739		1.541
PE	1.395		
TL	1.604	1.000	1.541

Note: PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

Second, the study evaluated the predictive relevance of the PLS-SEM structural model. The in-sample predictive capacity for the endogenous constructs was initially examined through the coefficient of determination (R^2). According to the guidelines of (Hair et al., 2021), the R^2 values of 0.349 for OC, 0.465 for IB, and 0.279 for PE demonstrate moderate explanatory power (see Figure 3). To determine

each predictor's influence on the endogenous constructs, effect size (f^2) was calculated by analyzing R^2 changes when a particular exogenous construct is excluded. Based on Cohen's (2013) benchmarks, f^2 values of 0.02, 0.15, and 0.35 correspond small, medium, and large effects, respectively. The findings (see Table 4) showed f^2 values ranging from 0.028 (small) for the effect of TL on IB, to 0.541 (large) for the effect of TL on OC.

Table 4: Effect Size (f2)

	IB	OC	PE
IB			
OC	0.066		0.129
PE	0.243		
TL	0.028	0.541	0.041

Note: PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

Third, following the assessment of the model's in-sample explanatory strength, its out-of-sample predictive relevance (Q^2) was evaluated. As previously mentioned, the reflective model was analyzed using the PLS-SEM approach. The blindfolding procedure was employed to generate cross-validated redundancy values for calculating Q^2. According to standard benchmarks, Q^2 values of 0.02, 0.15, and 0.35 indicate small, moderate, and large predictive relevance, respectively. The results showed that the model had moderate predictive relevance for all endogenous variables: 0.229 for IB, 0.347 for OC, and 0.185 for PE (see Table 5). Additionally, all Q^2 values were above the minimum threshold of 0 (Hair et al., 2021), confirming the model's predictive capability.

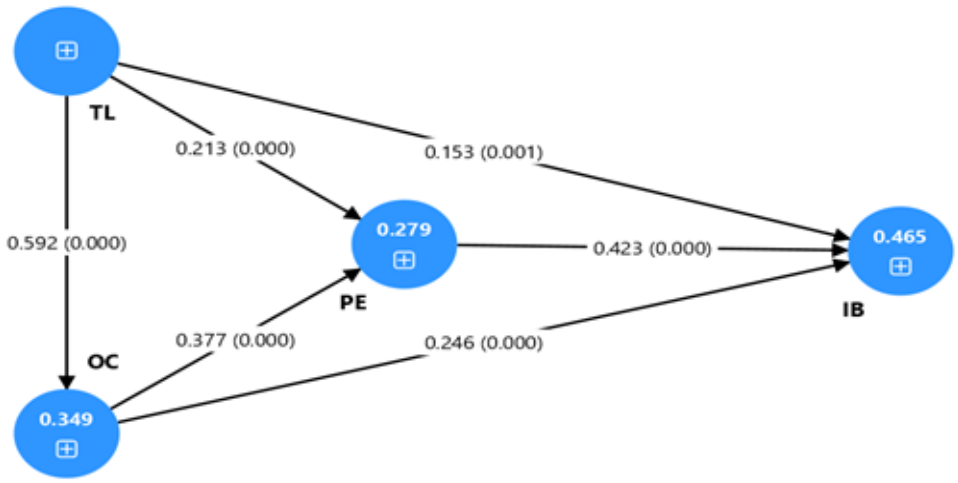
Table 5: Q2 Values

	Q^2predict
IB	0.229
OC	0.347
PE	0.185

Note: PE = Psychological Empowerment, IB= Innovative Behavior, OC = Organizational Culture.

Finally, the structural model's relationships among the constructs are depicted in Figure 3. All direct paths were statistically significant and positive. The highest standardized path coefficient was between TL and OC, at 0.592. The next strongest was the link between PE and IB, with a coefficient of 0.423, followed by the relationship between OC and PE at 0.377. These results provide full support for the study's proposed hypotheses and relationships (see Figure 3).

Figure 3: Structural Model



Note: Standardized path coefficients obtained through PLS-SEM bootstrapping; p-values are shown in parentheses. PE = Psychological Empowerment, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

6. Data analysis and results

6.1. Descriptive result

This sample size is considered appropriate for conducting data analysis using PLS path modeling alongside structural equation modeling (SEM). We conducted individual-level frequency and descriptive analyses using SPSS software. Men comprised 66.85% of the study's respondents, while women comprised 33.15 %. Most responders (42.86%) were between 36 and 45 and had five to ten years of experience.

6.2. Direct Hypothesis Testing

The study demonstrated good predictive power for the SM model, with an R^2 of 0.465. Henseler et al. (2014) introduced the SRMR as a goodness-of-fit measure in PLS-SEM to help prevent model misspecification. The Normed Fit Index (NFI) suggests that values above 0.9 reflect a good model fit by comparing the chi-square value of the proposed model against a baseline model. Henseler et al. (2014) suggested using measures like d_G and squared Euclidean distance to assess exact model fit by evaluating the differences between the model and empirical covariance matrices. A model is considered well-fitting when statistically non-significant difference ($p > 0.05$) exists between the empirical and suggested correlation matrices. Henseler et al. (2014) noted that d_ULS and d_G should be less than the 95% bootstrapped quantile for an acceptable fit. In this analysis, the saturated model showed no free paths, meaning the measured and predicted structural fit values were the same. The observed values were SRMR (0.027) and d_ULS (1.910), all lower than the bootstrapped 95% d_ULS threshold (2.336). Additionally, the bootstrapped 95% confidence interval for d_G was 1.790, while the value was 1.435, indicating a strong match between the data and the model. Further normal fit index (NFI) is used to measure the SEM goodness of fit. The Normed Fit Index (NFI) assesses how well a specified model fits compared to a baseline model, usually one in which all variables are assumed to be uncorrelated. NFI values range from 0 to 1, with values nearer to 1 representing a better fit. The NFI value of 0.916 for this

model suggests a satisfactory fit.

Additionally, as represented in Figure 3 and demonstrated in Table 6, the bootstrapping of the conceptual model produced significant findings. The results supported H1, showing a positive and statistically significant relationship between TL and employees' IB ($\beta = 0.153$, $p < 0.001$). H2b was also supported, confirming a positive correlation between TL and OC ($\beta = 0.592$, $p < 0.000$). Findings related to H2a indicated a positive association between OC and employees' IB ($\beta = 0.246$, $p < 0.000$). The results for H3b demonstrated a positive association between TL and PE ($\beta = 0.213$, $p < 0.000$), which also supported H3a regarding the correlation between PE and employees' IB ($\beta = 0.423$, $p < 0.000$). Finally, H3c was supported, indicating a significant association between OC and PE ($\beta = 0.377$, $p < 0.000$).

Table 6: Results of Hypothesis Testing (β Coefficient, t-Statistic, and p-Value).

Hypothesis		β - Coefficient	SD	T- Value	P - Value	Results
H1	TL -> IB	0.153	0.048	3.179	0.001	Supported
H2a	OC -> IB	0.246	0.051	4.815	0.000	Supported
H2b	TL -> OC	0.592	0.034	17.376	0.000	Supported
H2c	TL -> OC -> IB	0.146	0.032	4.577	0.000	Supported
H3a	PE -> IB	0.423	0.045	9.481	0.000	Supported
H3b	TL -> PE	0.213	0.054	3.975	0.000	Supported
H3c	OC -> PE	0.377	0.053	7.148	0.000	Supported
H3d	TL -> PE -> IB	0.090	0.024	3.680	0.000	Supported
H3e	OC -> PE -> IB	0.160	0.029	5.548	0.000	Supported

Note. IB = Innovative Behavior; OC = Organizational Culture; PE = Psychological Empowerment; TL = Transformational Leadership.

6.3. Mediation analysis results

To validate the proposed mediation roles, we first estimated the indirect effects and then examined the statistical significance of PE and OC as mediators. Our study's findings showed that H2c, which states that OC mediates the relationship between TL and IB, was supported ($\beta = 0.146$, $p < 0.000$). The data also showed that PE partly mediated the association between TL and employees' IB, supporting H3d ($\beta = 0.090$, $p < 0.000$). Furthermore, the relationship between OC and employees' IB is partly mediated by PE, as indicated by H3e ($\beta = 0.160$, $p < 0.000$).

Even though these mediating effects are significant statistically, the otherwise modest effect sizes—particularly for TL → OC → IB and TL → PE → IB—favor partial over full mediation. This implies that while OC and PE play important parts in translating leadership influence to innovative behavior, direct leadership influence on IB remains significant and cannot be fully explained away by the mediators. In practice, this finding highlights that building a supportive culture and empowering staff, while beneficial, may possibly not fully substitute for the explicit contribution of TL in fostering IB. The partial mediation

also captures the intricate, multi-level character of IB, whereby factors such as group diversity (Yang et al., 2022), individual initiative (Mustafa et al., 2023), trust in leadership (Hoang et al., 2022) might also contribute. This supports the need to link leadership practices with wider organizational policies that promote autonomy, experimentation, and trust.

6.4. Discussion and Implications

The study developed and tested a model to investigate the impact of TL on employees' IB, emphasizing the mediating effects of OC and PE. The results provide strong support for all hypothesized relationships, confirming that TL has a notable influence on IB. In the context of Ethiopian Airlines, transformational leaders can serve as a vital factor in sustaining innovation across operational units. These results align with prior studies demonstrating the positive impact of TL on IB (e.g., Ashfaq et al., 2021; Garg et al., 2023).

Contrary to studies suggesting non-significant (Rahman et al., 2023; Wibowo et al., 2023) and negative (Bednall et al., 2018; Byantara et al., 2023) relationship between TL and IB, this study confirms a significant and direct effect ($\beta = 0.156$). Transformational leaders, distinguished by their capacity to communicate an inspiring vision, establish trust, and provide personalized support, evidently serve a crucial function in encouraging employees to engage in creative thinking and engage in calculated risk-taking (Setiawan & Yohanes, 2020).

In addition to the direct effect, TL also exerts a significant indirect influence on IB through PE. The results show a positive link between transformational leadership (TL) and psychological empowerment (PE) ($\beta = 0.213$), suggesting that transformational leaders boost employees' feelings of ownership, competence, and autonomy. Leaders who create psychologically safe environments and encourage experimentation enable employees to explore new approaches and engage in innovative behavior (Setiyawami et al., 2023). This highlight the significance of leadership practices that nurture empowerment as a key pathway to innovation.

OC also emerged as a strong predictor of IB ($\beta = 0.246$), highlighting the significance of an innovation-friendly and supportive environment. A culture that encourages collaboration, transparency, and learning helps employees feel safe in proposing creative ideas and engaging in problem-solving (Lubis & Hanum, 2020). Supporting this view, (Sena, 2020) found that OC significantly influenced the IB of flight instructors in Indonesia's aviation sector, emphasized the central role of OC in fostering entrepreneurial innovation in contemporary organizations.

The positive relationship between OC and PE ($\beta = 0.377$) further reinforces the idea that culture serves as a powerful mechanism for empowerment. Employees who perceive their organizational culture as open, inclusive, and growth-oriented are inclined to feel empowered and confident in sharing novel ideas (Chung & Kim, 2018). Cultures defined by flexibility and participation—such as clan or adhocracy types—tend to enhance employee autonomy and innovation readiness (Leal-Rodríguez et al., 2019). Conversely, rigid or hierarchical cultures may suppress even the most capable employees or well-intentioned leadership efforts.

Finally, the strong direct association between PE and IB ($\beta = 0.423$) underscores the essential role of empowerment in stimulating innovation. Empowered employees—those who feel competent, autonomous, and psychologically safe—are more likely to challenge norms, propose novel solutions,

and actively contribute to organizational growth. As previous research affirms, empowerment supports the confidence and initiative needed to drive creativity, particularly in high-pressure or uncertain work environments (Setiyawami et al., 2023).

These study results have meaningful practical significance, particularly for Ethiopian Airlines and similar organizations. First, leadership development should emphasize transformational competencies such as vision-setting, empowerment, and innovation support. Second, organizations should institutionalize empowerment structures—through participatory decision-making, task autonomy, and recognition—to enhance employees' intrinsic motivation to be innovative. Third, leaders need to proactively cultivate an organizational culture that embraces openness, teamwork, and thoughtful risk-taking. A combined focus on leadership, empowerment, and culture can strengthen the innovation ecosystem and enhance organizational adaptability.

The study further offers theoretical contributions to the fields of leadership and innovation in multiple aspects. First, it affirms that TL influences IB through PE and OC, while offering clarity on previously inconsistent findings. Second, it provides empirical evidence for PE's mediating effects between OC and IB, reinforcing the idea that empowerment is shaped by cultural context (Nguyen et al., 2023). Third, by drawing on data from a large African airline, the study extends existing models into a non-Western, underrepresented setting, addressing geographic limitations noted by Rafique et al. (2021). Lastly, the integration of TL, OC, PE, and IB into a single framework offers a holistic theoretical model for understanding how leadership, culture, and employee psychology interact to drive innovation—particularly in complex service industries like aviation.

7. Conclusions, Limitations, and Recommendations for Future Research

This study establishes a model to examine the influence of TL on IB, with OC and PE serving as mediating variables. The study was carried out with Ethiopian Airlines employees, offering important insights into leadership's function within Ethiopia's aviation industry. The findings make a valuable contribution to the literature on leadership, innovation, and organizational behavior by showing that TL positively impacts IB through the mediating roles of OC and PE. Specifically, the results suggest that transformational leaders can encourage employees to pursue creative solutions to workplace problems, thereby fostering a culture of innovation. This, in turn, enhances employees' self-esteem and deepens their sense of purpose in their roles.

Practically, the study recommends that Ethiopian Airlines' management adopt and strengthen TL practices to effectively promote innovation among staff. By embracing such leadership, organizations can create an empowering workplace that promotes innovativeness and enhances organizational performance. The study's focus on the aviation sector fills a notable research gap in existing studies, which has predominantly concentrated on industries like manufacturing, finance, healthcare, and telecommunications. Thus, it extends theoretical understanding and offers practical implications relevant to a critical and often-overlooked industry. Furthermore, the findings validate theoretical assumptions and align with previous research conducted in different contexts. They highlight the importance of transformational leadership in cultivating employees who are both empowered and innovative. Ultimately, this research emphasizes the critical role of leadership in fostering an innovation-driven organizational culture and strengthening the overall capacity for creativity and change.

Although this study offers valuable contributions, it does have certain limitations. Firstly, it focused

solely on TL; examining other styles—such as transactional, charismatic, autocratic, and democratic—could provide a broader understanding of leadership's impact on IB. Secondly, the cross-sectional survey design limits the study's ability to infer causality. Future studies using longitudinal or experimental designs could more accurately capture changes over time and establish causality. Third, although stratified sampling was used, the study was confined to a single organization—Ethiopian Airlines—which may limit generalizability. Future research should include diverse sectors like finance and telecommunications. Fourth, while variance inflation factor (VIF) analysis showed no significant common method bias, the use of self-reported data may still lead to response bias. Incorporating data from multiple sources, such as supervisor evaluations or objective performance measures, would enhance the study's validity. Lastly, the study highlights TL's positive effect on IB, but future studies should investigate additional potential mediators—such as dynamic capabilities, citizenship behavior, commitment, and learning— to gain a more comprehensive understanding of this relationship.

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