Transformational Leadership as a Driver of Innovative Behavior in the Aviation Sector: The Mediating Role of Organizational Culture

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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 driver of innovation, the mediating role of organizational culture (OC), particularly in the aviation sector of developing economies, remains underexplored. This study examines how TL influences IB both directly and indirectly through OC, using survey data from 371 Ethiopian Airlines employees, analyzed via Partial Least Squares Structural Equation Modeling (PLS-SEM). Findings indicate that TL significantly enhances IB, both directly and through OC mediation pathway: by fostering an innovation-supportive OC. The study recommends that Ethiopian Airlines and similar organizations should cultivate TL behaviors such as vision-setting, empowerment, and innovation support 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 contributes to the 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, Transformational Leadership.*

1. Introduction

In an era defined by rapid technological advancement, global uncertainty, and competitive turbulence, innovation has emerged as a critical determinant of organizational resilience and long-term success (Carlucci et al., 2020). Among the various organizational assets, employees' IB - defined as the generation, promotion, and realization of novel ideas within a work role - has been recognized as the bedrock of sustained organizational innovation (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 respond 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 and OC 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 mixed findings. Some studies report a positive relationship, 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 even 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. These inconsistencies underscore the need for a more integrated, context-sensitive approach to understanding how TL and OC 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 effects of TL and OC on employees' IB; (2) to investigate the mediating roles of OC in the relationships between TL and IB. Guided by Self-Determination Theory (Ryan & Deci, 2020), which posits that the fulfillment of basic psychological needs—autonomy, competence, and relatedness—fosters 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).

This study makes three novel contributions. Methodologically, it integrates antecedents of IB into a comprehensive PLS-SEM framework using data from a large, stratified sample of Ethiopian Airlines Group (EAG) employees. Theoretically, it advances our understanding of the mediating mechanisms (OC) through which TL influences IB in a high-stakes, non-Western organizational context which limits generalizability of the findings in underrepresented contexts. Practically, it offers aviation leaders actionable insights on how to align leadership styles and cultural dynamics 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 advantage in the current 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) reported a significant positive effect of adhocracy culture. Similarly, hierarchy and outcome-oriented cultures were found to stifle innovativeness (Leal-Rodríguez et al., 2019). These studies highlight that the relationship between TL, OC, 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) argued 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 aims to address this gap by employing a more complex model that incorporates the interactions between TL, OC, and IB, providing a nuanced understanding of these relationships 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 transformational leadership on employee empowerment and innovative behavior. 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 aims to investigate the relationships between TL, OC, 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. Theoretical Background and Hypothesis Development

3.1. 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 intentional generation, promotion, and realization 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 vision articulation, intellectual stimulation, inspirational motivation, and individualized consideration. Theoretically, TL aligns with SDT (Ryan & Deci, 2020), in that it facilitates the satisfaction of basic psychological needs - autonomy, competence, and relatedness - which are precursors to intrinsic motivation and creative engagement. Leaders who stimulate intellectual curiosity and foster psychological safety create conditions in which employees feel encouraged to explore novel solutions without fear of failure (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).

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 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 - remain under-theorized in integrated frameworks. Addressing this theoretical intricacy offers a more holistic understanding of how leadership, empowerment, and culture coalesce to influence innovative behavior at work.

3.2. Hypothesis Development

Transformational Leadership and Employees' Innovative Behavior

The relationship between TL and 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 suggest 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 basic 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 positively influences employees' innovative work behavior.

Organizational Culture and Employees' Innovative Behavior

The influence of OC on employees' 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 types - 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, such as 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 supported by consistent findings from Brettel et al. (2015), who argue 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 may be mediated by variables such as PE, innovation climate, or leadership style. 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:

H2: Organizational culture positively influences employees' innovative behavior.

TL is widely recognized as a key driver of 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 strength 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:

H3: Transformational leadership positively influences organizational culture.

Beyond this direct effect, studies increasingly support the idea 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 greater psychological safety and learning, which in turn 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:

H4: The relationship between transformational leadership and innovative behavior is mediated by organizational culture.

Figure 1: Conceptual Model of the Study

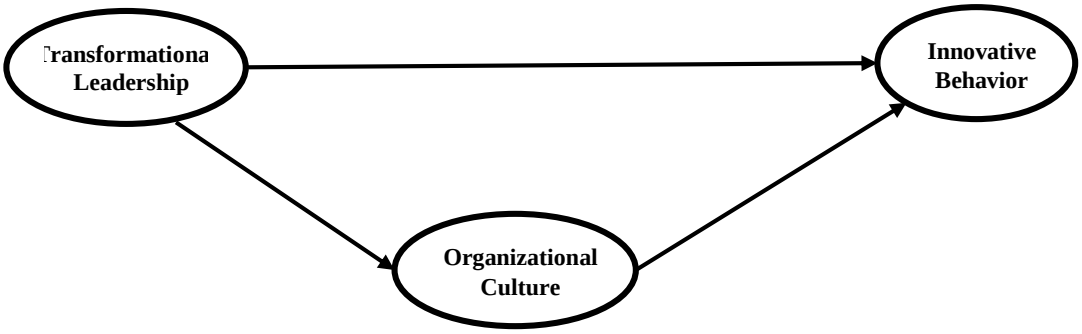


Figure 1 presents two categories of antecedents influencing IB.TL is hypothesized to have both direct and indirect effects. Specifically, TL is expected to directly influence IB and OC while also impacting IB indirectly through the mediating roles of OC.

4. Methodology

4.1. Population, sample, and 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. Using (Kothari, 2004) determination formula, 384 participants were selected via stratified random sampling, with 371 usable responses collected through hand-delivered questionnaires.

4.2. Measurement of study variables

This study employed a structured questionnaire with validated factors and a five-point Likert scale ranging 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).

4.3. Measurement Model

The validity and reliability of the measurement model were thoroughly assessed, yielding strong results that confirm its accuracy.

Reliability

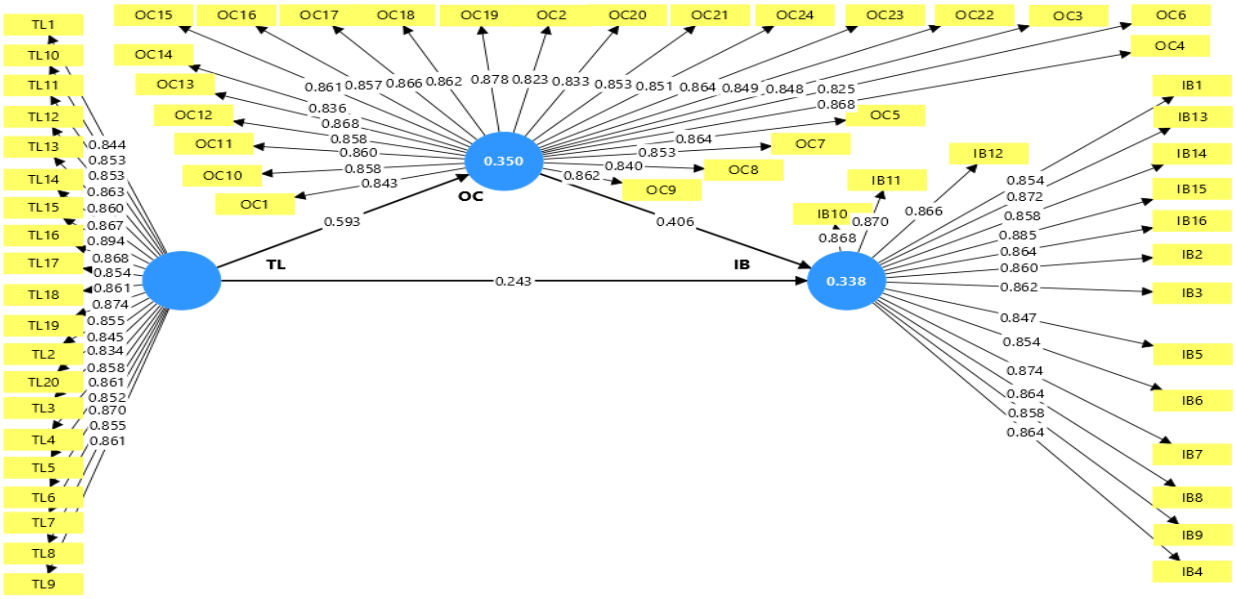
The measurement model was tested for convergent and discriminant validity based on outer loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) (Hair et al., 2021). As shown in Figure 2, all item factor loadings met the recommended threshold of 0.50–0.70 (Sarstedt et al., 2020). Convergent validity, is also assessed using the AVE, measures the extent to which a construct shares variance with its indicators. The AVE values exceeded 0.5 (Bagozzi & Yi, 1988), confirming satisfactory convergent validity. Internal reliability was evaluated using Cronbach's alpha and composite reliability, which assess whether all indicators consistently measure the same construct. As presented in Table 1, the constructs demonstrated strong internal consistency, with Cronbach's alpha values above 0.7 and composite reliability values above 0.8 (Hair et al., 2021). Thus, the measurement model exhibited acceptable reliability and validity.

Table 1: Reliability Analysis

Constructs	Cronbach's alpha	CR (rho_a)	CR (rho_c)	(AVE
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 (rho_a) = Composite reliability (rho_a), CR (rho_c) = Composite reliability (rho_c), AVE= The average variance extracted, IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

Figure 2: Measurement Model



Validity

Lastly, we assessed the measurement model to ensure the distinctiveness of the studied constructs. Following the recommendation of Hair et al. (2021), we employed the heterotrait-monotrait (HTMT) ratio to determine whether the shared variance within each construct (measured by AVE) was greater than the shared variance between constructs. As presented in Table 2, all HTMT ratios were below the threshold of 0.9 (Hair et al., 2021), confirming that discriminant validity was established.

Table 2: Heterotrait-monotrait ratio (HTMT)

	IB	OC
IB		
OC	0.560	
TL	0.493	0.602

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

Further, Fornell-Larcker criterion is used to assess discriminant validity. Fornell-Larcker criterion table is a matrix that displays the square root of the Average Variance Extracted (AVE) for each construct along the diagonal and the correlations between constructs in the off-diagonal cells. The AVE serves as a measure of internal consistency, and for discriminant validity to be established, a construct's AVE should exceed its correlations with all other constructs. In this table, the diagonal values (square roots of AVEs) are all greater than the off-diagonal correlation values, indicating satisfactory discriminant validity. For example, as shown in Table 3, the AVE for the IB construct is 0.864, which is higher than its correlations with all other constructs. The same pattern applies to all other constructs, confirming that they are distinct and do not measure the same underlying concept. Thus, the Fornell-Larcker criterion test provides evidence of sufficient discriminant validity among the constructs. Overall, the tests suggest that the proposed reflective measurement model in this study is both reliable and valid.

Table 3: Fornell-Larcker Criterion

	IB	OC	TL
IB	0.864		
OC	0.550	0.853	
TL	0.484	0.593	0.859

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

4.4. 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), a VIF value exceeding 3.3 may suggest the presence of common method bias (CMB)**.** Therefore, since all VIF values in the inner model, based on the full collinearity test, were equal to or below 3.3, the model can be considered free from common method bias.

Table 4: Multi-collinearity Test (VIF)

	IB	OC
IB		
OC	1.542	
TL	1.542	1.000

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

Second, the study assessed the predictive relevance of the PLS-SEM structural model. The in-sample predictive power for the endogenous constructs was first examined using the coefficient of determination (R^2). According to the guidelines of (Hair et al., 2021), the R^2 values for OC at 0.350 and IB at 0.338 indicate moderate explanatory power (see Figure 3). To assess the impact of each predictor on the endogenous constructs, effect size (f^2) was calculated by evaluating changes in R^2 when a specific exogenous construct is removed. Based on Cohen's (2013) benchmarks, f^2 values of 0.02**,** 0.15, and 0.35 represent small**,** medium, and large effects, respectively. The results (see Table 4) showed f^2 values ranging from 0.058 (small) for the effect of TL on IB, to 0.542 (large) for the effect of TL on OC.

Table 4: Effect Size (f^2)

	IB	OC
IB		
OC	0.163	
TL	0.058	0.542

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

Third, after evaluating the model's in-sample predictive power, we assessed its out-of-sample predictive relevance (Q^2). As noted earlier, the PLS-SEM approach was used to analyze the reflective model. To calculate Q^2 values, the blindfolding technique was applied to obtain cross-validated redundancy values. According to established guidelines, Q^2 values of 0.02**,** 0.15, and 0.35 represent small**,** moderate, and large predictive relevance, respectively. Our structural model demonstrated moderate predictive power for all endogenous constructs: IB at 0.229 and OC at

0.347 (see Table 5). Furthermore, all Q^2 values exceeded the minimum threshold of 0 (Hair et al., 2021), confirming the model's predictive relevance.

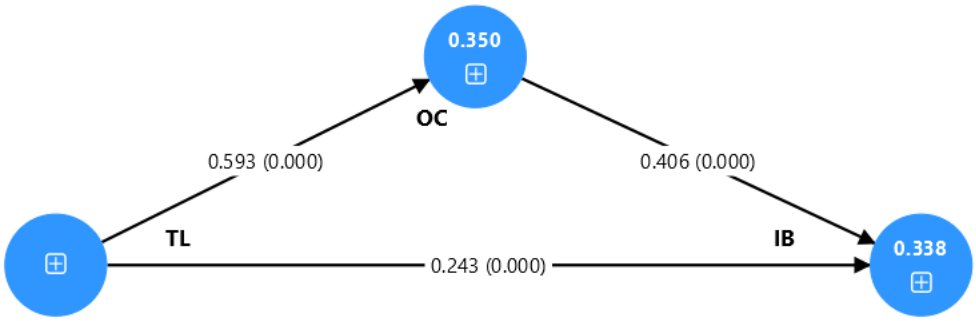
Table 5: Q^2 Values

	Q^2predict
IB	0.229
OC	0.347

Note: IB= Innovative Behavior, OC = Organizational Culture.

Finally, the direct relationships in the structural model are illustrated in Figure 3. All direct paths were found to be statistically significant and positive. The strongest standardized path coefficient was observed between TL and OC at 0.593. The second strongest relationship was between OC and IB, with a coefficient of 0.406, followed by the relationship between TL and IB, with a coefficient of 0.243. These findings support all the proposed relationships and hypotheses of the study (see Figure 3).

Figure 3: Structural Model



Note: Standardized path coefficients (Bootstrap by PLS-SEM) p-values in parentheses. IB= Innovative Behavior, TL = Transformational Leadership, OC = Organizational Culture.

5. Data analysis and results

5.1. Descriptive result

For data analysis utilizing partial least squares path modeling (PLS-SEM) in conjunction with structural equation modeling (SEM), this sample size is appropriate. 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.

5.2. Direct Hypothesis Testing

The study demonstrated good predictive power for the SM model, with an R^2 of 0.338. Henseler et al. (2014) developed the SRMR as a goodness-of-fit metric for PLS-SEM to avoid model misspecification. According to the Normed Fit Index (NFI), values greater than 0.9 indicate an adequate fit, comparing the proposed model's chi-square value to a benchmark. 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 no statistically 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. NFI compares the fit of a specified model to a baseline model, typically a null model where all variables are assumed to be uncorrelated. NFI values range from 0 to 1, where values closer to 1 indicate a better fit. The NFI for this model is 0.916, indicates an acceptable fit.

Additionally, as illustrated in Figure 3 and detailed 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 ($\beta = 0.243$, $p < 0.001$). H2 was also supported, confirming a positive correlation between TL and OC ($\beta = 0.593$, $p < 0.000$). Findings related to H3 indicated a positive relationship between OC and employees' IB ($\beta = 0.406$, $p < 0.000$). Finally, to verify the validity of the postulated mediation role, we first estimated the indirect effect and then tested the statistical significance of OC as mediating variable. Our study's findings showed that H4, which states that the relationship between TL and IB is mediated by OC, was supported ($\beta = 0.241$, $p < 0.000$).

Table 6: Hypothesis Testing (β-Value, t-Value, and p-Value).

	β - value	**Std. Dev.**	**T- statistics**	**P - values**	Results
OC -> IB	0.406	0.050	8.157	0.000	Supported
TL -> IB	0.243	0.052	4.705	0.000	Supported
TL -> OC	0.593	0.034	17.424	0.000	Supported
TL -> OC -> IB	0.241	0.034	7.093	0.000	Supported

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

5.3.Discussion and Implications

This study developed and tested a model to examine the impact of TL on employees' IB, with a particular focus on the mediating roles of OC. The results provide strong support for all hypothesized relationships, confirming that TL has a notable influence on IB. In the context of Ethiopian Airlines, the presence of transformational leaders can play a critical role in sustaining innovation across operational units. These findings are consistent with previous 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 ($\beta = 0.243$). Transformational leaders—characterized by their ability to articulate a compelling vision, build trust, and offer individualized support—clearly play a vital role in motivating employees to think creatively and engage in calculated risk-taking (Setiawan & Yohanes, 2020). These results reaffirm that innovation within organizations often begins with leadership that acts as a catalyst for change and exploration.

OC also emerged as a strong predictor of IB (β = 0.406), highlighting the critical role of a supportive and innovation-friendly 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.

These findings have meaningful implications for practice, particularly for Ethiopian Airlines and similar organizations. First, leadership development should emphasize transformational competencies such as vision-setting and innovation support. Second, leaders must actively shape an organizational culture that values openness, collaboration, and calculated risk-taking. A combined focus on leadership and culture can strengthen the innovation ecosystem and enhance organizational adaptability.

The study also contributes theoretically to the leadership and innovation literature in several ways. First, it affirms that TL influences IB through OC, while offering clarity on previously inconsistent findings. Second, 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, 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.

6. Conclusions, Limitations, and Suggestions for Future Study

This research establishes a framework to examine the influence of TL on IB, with OC serving as mediating variables. The study was conducted among employees of Ethiopian Airlines, providing valuable insights into the role of leadership in the Ethiopian aviation sector. The findings contribute significantly to the literature on leadership, innovation, and organizational behavior by demonstrating that TL positively influences IB through the mediating effects of OC. Specifically, the results suggest that transformational leaders can inspire employees to seek creative solutions to workplace challenges, thereby fostering a culture of innovation.

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 work environment that encourages creativity and enhances organizational performance. The study's focus on the aviation sector addresses a notable gap in existing research, which has largely concentrated on industries such as 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 underscore the role of transformational leadership in cultivating innovative employees. Ultimately, this research emphasizes the importance of leadership in shaping an innovation-driven organizational culture and enhancing the overall capacity for creativity and change.

Despite its contributions, this study is not without limitations. First, it focused solely on TL; examining other styles—such as transactional, charismatic, autocratic, and democratic—could offer a more comprehensive view of leadership's impact on IB. Second, the cross-sectional survey design limits causal inferences. Longitudinal or experimental designs could better capture dynamic effects 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 VIF analysis showed no significant common method bias, reliance on self-reported data may still introduce response bias. Multi-source data, such as supervisor ratings or objective performance metrics, would strengthen validity. Finally, the study highlights TL's positive effect on IB, but future research should explore other possible mediating variables—such as dynamic capabilities, organizational citizenship behavior, commitment, and learning—to deepen understanding of the relationship.

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