[FINTECH ADOPTION AS A DRIVER OF SUSTAINABLE PERFORMANCE: EXPLORING THE MEDIATING ROLE OF INNOVATION CAPABILITY AND THE MODERATING ROLE OF ETHICAL LEADERSHIP]

Asma Mushtaq*
University of Balochistan, Quetta. Corresponding Author Email: Asmakhan.uob@gmail.com
Kashif Akbar
Phd Scholar, Department of Industrial Engineering, University of Padua, Italy.
Email: kashif.akbar@studenti.unipd.it
Dr. Muhammad Nabeel Ashraf
Assistant Professor, Department of Management Sciences, National University of Modern Languages, Karachi. Email: nabeel.ashraf@numl.edu.pk
Ali Gul
Computer Science Department University of Balochistan, Quetta. Email: alidotgul@gmail.com

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ABSTRACT

The strategic integration of FinTech has emerged as a critical enabler of sustainable performance, particularly in developing economies. While prior research has explored the individual roles of technology adoption, innovation, and leadership, limited attention has been given to their interrelated impact on sustainability outcomes. Grounded in the Resource-Based View (RBV), this study aims to examine the direct effect of FinTech adoption on sustainable performance, the mediating role of innovation capability, and the moderating role of ethical leadership in this relationship. The study adopts a quantitative, cross-sectional design using structural equation modeling (SEM) to test a moderated mediation framework. Data were collected from 457 senior- and mid-level managers working in FinTech-integrated financial institutions in Pakistan through a structured questionnaire. Validated measurement scales and stratified random sampling ensured empirical robustness. The results provide strong support for the positive impact of FinTech adoption on sustainable performance. Innovation capability was found to partially mediate this relationship, highlighting its role as a conduit for translating technological investments into sustainable outcomes. Contrary to expectations, ethical leadership did not significantly moderate the relationship between FinTech adoption and sustainable performance, suggesting that leadership ethics alone may be insufficient to amplify the impact of digital transformation on sustainability. These findings contribute to the theoretical integration of digital innovation and sustainability through the RBV lens and offer practical implications for managers seeking to align technology adoption with long-term environmental and social objectives. The study also invites future research into context-specific leadership dynamics in digitally evolving sectors.

Keywords: FinTech Adoption, Sustainable Performance, Innovation Capability, Ethical Leadership

Introduction

In the contemporary business landscape, sustainability has transitioned from a peripheral concern to a core strategic objective. Amid escalating environmental, social, and regulatory pressures, organizations are compelled to re-evaluate traditional growth models in favor of more sustainable practices that ensure long-term viability. Scholars and practitioners alike are engaged in an ongoing discourse about the balance between technological advancement and sustainable development, especially in industries shaped by digital transformation. Central to this debate is the question of how organizations can harness emerging technologies not just for-profit maximization, but for fostering innovation, resilience, and sustainable performance. Ethical leadership has increasingly emerged as a pivotal influence on organizational behavior, culture, and governance. As businesses strive to integrate ethical considerations into technology adoption and innovation strategies, a critical need arises to understand the interplay between leadership ethics, innovation capabilities, and digital transformation. The discourse is further complicated by uncertainties around how leadership approaches shape organizational capabilities and sustainability outcomes in dynamic, tech-driven environments. This study enters this complex debate by exploring the synergistic

relationships among leadership ethics, innovation capability, and sustainable performance within the broader framework of technological change, with a focus on FinTech-driven transformation.

Recent literature highlights that technology adoption, especially in the financial sector, is a catalyst for innovation and process optimization (Satar & Alarifi, 2024; Marimuthu et al., 2023). Studies have also emphasized the role of innovation capabilities as a conduit through which digital technologies translate into competitive advantage and improved organizational performance (Nguyen et al., 2023). Parallel research in leadership studies indicates that ethical leadership positively influences employee behavior, strategic alignment, and stakeholder trust factors critical for long-term sustainability (Chen et al., 2023). Furthermore, ethical leadership has been shown to foster a culture conducive to innovation, particularly when navigating technological transitions (Yasir et al., 2022). While individual relationships among these constructs have been studied in isolation, integrated models that simultaneously examine the influence of ethical leadership, technology adoption, and innovation capabilities on sustainable outcomes remain underdeveloped. This gap necessitates an empirical investigation that considers these variables collectively to uncover deeper insights into their interdependencies.

Financial technologies (FinTech) integration has become a feature of modern enterprises, striving to optimize the way they conduct their businesses, increase transparency and produce an effect of the customer-focused solutions. The World Economic Forum (2024) estimates that in 2023, investors invested more than 200 billion USD in FinTech all over the world, which signifies that the world is rapidly shifting to digitalization of all sectors. But the sustainability impact of FinTech implementation is unclear both in general and in relation to the emerging economies where legal and ethical regulations have not yet been developed entirely. At the same time, there is an emphasis on innovation as an organizational asset when it comes to fulfilling United Nations Sustainable Development Goals (SDGs) and SDG 9 (industry, innovation and infrastructure) and SDG 12 (responsible consumption and production) specifically. Nevertheless, outcomes of innovation would mainly depend on ethical atmosphere in organizations which would be defined by the behavior of leaders. An unethical leadership might easily disrupt the most auspicious innovation initiatives resulting in personal reputation harm and stakeholder de-motivation. The question of leadership ethics, innovation policy and uptake of technology apply especially in economically transitioning countries, many in South Asia, Latin America, and Sub-Saharan Africa. Such regions are forced to play a two-fold game of catching up the technology and building sustainable and ethical procedures. It is opportune and necessary to have an insight into how ethical leadership can moderate or enhance the impacts of FinTech and innovation resourcefulness on sustainability.

Despite a growing body of literature on FinTech adoption, innovation, and leadership ethics, several gaps persist. Firstly, most existing studies focus on FinTech's operational benefits or its effect on financial inclusion but rarely explore its strategic role in promoting sustainable performance. Secondly, while innovation capability is acknowledged as a mediator between technology and performance, few models

incorporate leadership variables that could influence this pathway. Thirdly, research often isolates the impact of ethical leadership on organizational culture or behavior without extending the analysis to sustainability performance metrics. There is a critical need to conceptualize and empirically validate integrated frameworks that situate ethical leadership at the intersection of digital transformation and sustainability. While studies from developed economies offer insights into advanced FinTech ecosystems, limited research exists in the context of developing nations where leadership challenges and institutional voids create additional complexity. Particularly lacking are studies that empirically assess how ethical leadership can serve as a strategic enabler moderating the relationship between innovation capability and sustainable outcomes in FinTech-enabled organizations. Furthermore, many existing models do not account for the sequential process where FinTech adoption enhances innovation capability, which affects sustainability. Therefore, this study addresses these gaps by proposing and testing a moderated mediation model that positions ethical leadership as a central mechanism influencing how FinTech adoption translates into sustainable performance through innovation capabilities. The investigation responds to a significant void in interdisciplinary literature spanning technology management, leadership ethics, and sustainability science. Addressing the nexus of FinTech, ethical leadership, and innovation capability is not merely an academic exercise it holds profound implications for policy and practice. In light of mounting pressures from global sustainability agendas, firms are increasingly held accountable not just for profitability but for environmental and social stewardship. According to the Global Reporting Initiative (GRI, 2023), over 85% of Fortune 500 companies now publish sustainability reports, yet the pathways through which technological tools contribute to these outcomes remain unclear. Ethical leadership has been cited as a missing link in the effective implementation of sustainability strategies (Zhu et al., 2022). When ethical leadership leads to innovation and influences the responsible use of FinTech, the organizations can be more aligned with the shareholders and stakeholders' interests. When applied in nations with a young FinTech industry, in particular South and Southeast Asia, the idea of digital innovation that does not undermine the ethical principles is an urgent issue. Also, innovation itself is not enough without the leadership that keeps ethical concerns and sustainability in mind. The attention to the moderating effect of ethical leadership used in this study provides a sophisticated perspective on how strict requirements to be moral and strategic overlap. Through empirical confirmations of this model, the study will offer practical solutions to organizations seeking ways of improving their sustainability reputations in a technologically oriented era.

This study offers a unique contribution by integrating ethical leadership as a moderating factor within a FinTech–innovation–sustainability framework, which has been largely underexplored. It proposes a moderated mediation model that measures both the direct and indirect effects that the adoption of FinTech has on sustainable performance. The study provides input into the theory of ethical leadership and sustainability, besides providing insights on actionable intelligence to managers working in transforming digitizing conditions. It contributes to expanding the substantive knowledge base of sustainability and leadership research by paying attention to

underrepresented situations, like developing economies. This paper is based on a theory known as Resource-Based View (RBV) the premises of which are that valuable, rare inimitable, non-substitutable resources like ethical leadership and innovation capabilities are critical to sustainable competitive advantage. The model states that the adoption of FinTech can be used as a dynamic capability, although its effectiveness in the task of attaining a sustainable performance is dependent on the internally internalized ethical leadership and innovation processes. The RBV lens gives a coherent theoretical framework to chain the three dimensions of technology, organization, and ethics and a better comprehension of how firms can sustainably capitalize on digital transformation.

Theoretical Foundation

The Resource- Based View (RBV) has its intellectual roots in early contributions by Penrose (1959) and Wernerfelt (1984), but was formally articulated as a coherent strategic management theory by Jay Barney in 1991 (Barney, 1991; Komakech et al., 2025). Penrose reiterated that the pattern of growth is determined by a company in its unique combinations and deployments of resources and not the actual ownership (Komakech et al., 2025). It is upon this premise that RBV supposes that the variation in the firm performance is because of the resource heterogeneity and resource immobility, i.e., not all the resources are equally accessible or movable across firms (Komakech et al., 2025). Most important in RBV is the VRIN (or VRIO) framework: resources valuable, rare, imperfectly imitable, and non-substitutable are strategic resources (capabilities) that can provide a sustainable competitive advantage. The model has been expanded to include intangible resources of leadership, knowledge, organizational culture, and innovation routines components that are especially hard to imitate (Komakech et al., 2025). Dynamic capabilities theory has over time extended the domain of RBV regarding those aspects important to firms within dynamic and complex environments. These dimensions are associated with the determination of firms to reconfigure, recombine and renew resource base. RBV with various classes on sustainability management, supply chain network, and digital transformation to demonstrate its strengths in explaining how the changing tendencies in technologies and managerial approaches are internalized in the organization through the strategic resources of the firm.

RBV provides a powerful theoretical perspective through which it is possible to comprehend how the internal endowments of a firm in terms of ethical leadership, technological competence, and innovation processes act as strategic resources, which is underpinning strategic performance and FinTech adoption in the context of innovation capability and sustainable performance. When structured correctly, such internal resources can yield sustained benefits where environment is dynamic using digital settings. The concept of firm-specific capabilities and their identification and fostering in the given theory mixes perfectly with the suggested framework because ethical leadership and innovation capabilities are regarded as unique resource bundles defining sustainable outcomes in the context of technology-enhanced change. RBV has provided conceptual consistency throughout the model in that ethical leadership and innovation capability is framed as firm specific capabilities that would constitute VRIN resources. The adoption of FinTech is viewed as a real and metaphorical deployment approach to resources. The theory provides prediction of sustainable high performance and long-term

competitive advantage when these kinds of resources are arranged in an effective manner. RBV supports the logic of the proposed study without breaking down the relationship in variable centric approach.

Hypothesis Development

Scholarly discourse on sustainable performance increasingly examines how financial technologies reshape firms' capacity to meet environmental and social objectives alongside economic goals. Companies investing in the mechanism of FinTech like blockchain, AI-based lending platforms, and digital payment systems can ensure much more transparency, operational efficiency, and cost reduction further consolidating their strategic capability base in alignment with the concept of Resource Based View (RBV) theory (Barney, 1991; Khan et al., 2025). The experience of developing countries shows empirically that a positive correlation exists between the use of FinTech and significant increases in the indicators of sustainability. The article by Khan et al. (2025) is a PLS SEM research conducted in the Pakistani banking sector identifying a direct positive impact of FinTech implementation in terms of sustainable performance with emphasized robustness of green operations and social inclusion. A study of Chinese banks showed that the adoption of FinTech drives green finance behaviour and social responsibility to corporations through an improvement in environmental sustainability interventions (Dunbar et al., 2024; Siddik et al., 2023).

RBV perspective of the FinTech suggests that it is a firm specific resource which is valuable, rare and cannot be imitated easily by the competitors. These are technological assets that meet distinctive organizational capacities that support a long-term sustainability (Kaid Zaid et al., 2025). By using FinTech, corporations can drive internal efficiency, minimize wastage of resources, and instill stakeholder trust; becoming sustainable in fueling corporate strategy and societal demands. Based on this cumulative evidence and theoretical argument, it can be concluded that incorporating FinTech resources into their day-to-day operations involves increasing the capacity of firms in minimizing the impact they have on the environment, social, and governance goals by means of better operation, inclusivity, and transparency.

H1: FinTech adoption is positively associated with sustainable performance.

A burgeoning body of literature suggests that the pathways through which FinTech adoption impacts sustainable performance extend beyond direct effects, implicating intermediate organizational processes that transform digital resources into sustainability gains. FinTech adoption is increasingly recognized as a catalyst for innovation investments, encouraging firms to develop new products, services, and operational routines, especially in developing contexts where digital tools address resource constraints (Chen & Guo, 2024). Innovation capability serves as a critical mechanism in this process. For instance, across Chinese micro and small enterprises, empirical findings indicate that FinTech adoption substantially enhances both the intensity and outcomes of innovation, by promoting strategic incentives and investment in human capital such as R&D and technical training (Chen & Guo, 2024). Complementary research in the financial sector reveals that green innovation driven by technological adoption is a significant mediator translating FinTech adoption into sustainable performance outcomes (Alsadoun & Alrobai, 2024). These findings align with RBV tenets, wherein innovation

capability is construed as a firm- specific resource that is valuable, rare, and difficult to replicate, augmenting competitive advantage particularly when integrated with digital assets like FinTech (Barney, 1991).

The evidence found in the studies performed in the sphere of emerging economies confirms that the companies that have an adequate innovation routine have a better chance of transforming the enhanced efficiency and transparency enabled by FinTech into practices that are sustainable in the long run like green finance, CSR, and their environment friendliness enhancement implying that the capability of innovation has the role of conduit in the process (Jokhio et al., 2025; Hidayat ur Rehman & Bashir, 2024). Using theoretical reasoning (RBV approach) and a developing empirical line of argumentation, it is reasonable to indicate that the capability of innovation serves as an internal process through which the adaptation of FinTech leads to improvements of stable performance.

H2: Innovation capability mediates the positive relationship between FinTech adoption and sustainable performance.

In recent academic debate, ethical leadership has emerged as a pivotal boundary condition that shapes the effectiveness of strategic initiatives such as technology adoption for achieving sustainability objectives. Although the adoption of FinTech is advanced tools allowing firms to achieve excellence in efficiency, transparency, and engagement of the stakeholders, such technological tools do not exist within an imaginary world. Their sustainable progress is significantly conditioned by the moral parameters in which they are implemented (Zhu et al., 2024). An ethical leadership introduces an environment of trust, accountability and stakeholder sensitivity an environment where digital and financial transformation is exploited towards a wider ESG perspective (Zhu et al., 2024; Hameed et al., 2023).

Hameed et al. (2023) show that the overall effect of ethical leadership on environmental performance is intensified by a considerable margin in the event that the companies exhibiting a healthy technological orientation. In these companies, the managers drive the investments in digitalization to green innovation, which results in providing better sustainability. This falls along the lines of the RBV idea according to which intangible capabilities in leadership ordered and aligned with technology add value to resource deployments (Barney, 1991). A study in China of the banking industry showed that ethical leadership, CSR, and regulatory congruency, when combined, were able to correctly predict sustainable financial performance, indicating that ethics intertwined increases the effectiveness of technology-driven strategies (Zhu et al., 2024). Within resource-based logic, ethical leadership can be conceptualized as an internal firm-specific resource that complements FinTech adoption. Firms characterized by ethical leaders are better equipped to transform FinTech-enabled efficiencies into sustainable performance because these leaders frame technological investments within a moral and stakeholder-considerate context. This creates synergy between resource deployment and organizational purpose. On this basis, one arrives at the logical inference that ethical leadership strengthens the positive effect of FinTech adoption on sustainable performance. Therefore:

H3: Ethical leadership positively moderates the relationship between FinTech adoption and sustainable performance.
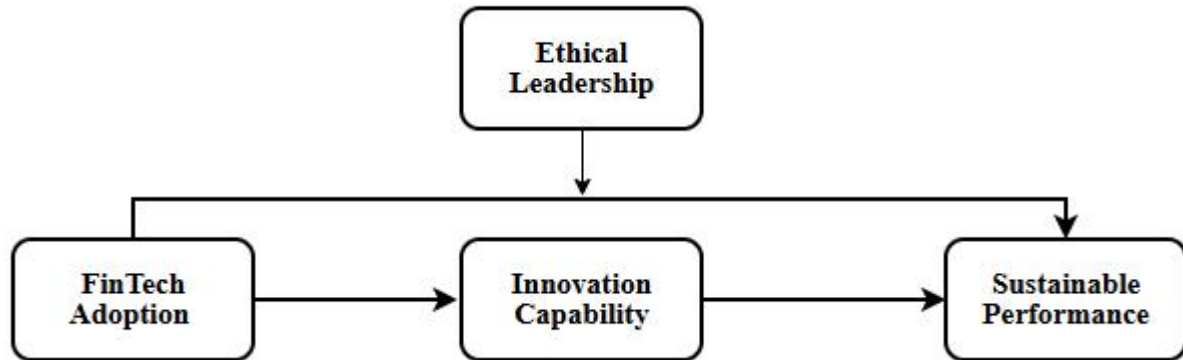

Figure 1: Research Model

Methodology

This study adopts a quantitative, cross-sectional research design, which is appropriate for examining the relationships among variables at a single point in time. Such a design enables the collection and statistical analysis of primary data to test theoretically grounded hypotheses in a time-efficient and resource-conscious manner (Creswell & Creswell, 2023). The cross-sectional approach is particularly suitable for exploring the structural relationships proposed in this study specifically, the impact of FinTech adoption on sustainable performance, and the mediating and moderating roles of innovation capability and ethical leadership. Since the primary aim is to assess statistically significant associations rather than changes over time, a cross-sectional design offers methodological coherence and empirical precision for the study objectives.

The target population for this research comprises senior- and mid-level managerial staff working in FinTech-integrated financial institutions, including commercial banks, microfinance institutions, and digital payment platforms operating in Pakistan. This population is particularly relevant as the financial sector in Pakistan has undergone rapid digital transformation in recent years, making it a fertile context for studying FinTech adoption and its organizational implications (Khan et al., 2023). Focusing on this group ensures access to informed respondents who are directly involved in strategy, technology implementation, and sustainability practices, thereby increasing the reliability and relevance of the responses (Saunders et al., 2019).

A stratified random sampling technique was employed to ensure proportional representation across different categories of financial institutions (e.g., commercial banks, Islamic banks, microfinance banks, and FinTech startups). This approach enhances the generalizability of the findings and controls for sampling bias by ensuring that all subgroups of the population are adequately represented (Etikan & Bala, 2017). The sample size was determined using Item Response Theory (IRT), a robust psychometric framework that emphasizes the quality of measurement by considering the relationship between individuals' responses and latent traits (De Ayala, 2022). IRT is particularly suitable because it allows for more accurate estimation of the required sample size based on the number and complexity of items in the measurement model. For structural equation modeling (SEM) using SmartPLS, a general rule is to have a minimum of 10

responses per item (Hair et al., 2021). Given that the current model includes approximately 45 observed items across latent constructs, a minimum sample of 450 respondents was targeted, ensuring statistical power and model reliability. Data were collected through a structured, self-administered questionnaire distributed physically. SPSS (Version 28) was used for preliminary data analysis and SmartPLS (Version 4) was used for structural equation modeling (SEM) to test the hypothesized relationships among constructs.

Measurement of Constructs

All constructs in this study were measured using previously validated scales adopted from established literature: FinTech Adoption was measured using items adapted from Khan et al. (2023). Innovation Capability was measured based on the scale by Wang and Ahmed (2004), updated and validated in recent FinTech contexts (Alsadoun & Alrobai, 2024). Ethical Leadership was assessed using items from Brown, Treviño, and Harrison (2005), as updated by recent empirical studies (Zhu et al., 2024). Sustainable Performance was measured using a multidimensional scale that captures environmental, social, and financial performance outcomes, adapted from El-Kassar and Singh (2023). All items were measured using a 7-point Likert scale, ranging from 1 = strongly disagree to 7 = strongly agree, to allow for variability in responses and improve psychometric sensitivity.

Data Analysis

Regression Weights

Table 1: Factor Loadings

Variables	Items	EL	FA	IC	SP
Ethical Leadership	EL1	0.872			
	EL2	0.907			
	EL3	0.895			
	EL4	0.879			
	EL5	0.879			
	EL6	0.919			
	EL7	0.870			
	EL8	0.912			
FinTech Adoption	FA1		0.885		
	FA2		0.867		
	FA3		0.846		
	FA4		0.824		
	FA5		0.863		
	FA6		0.892		
	FA7		0.812		
	FA8		0.906		
Innovation Capability	IC1			0.867	
	IC2			0.909	
	IC3			0.868	

	IC4	0.911	
	IC5	0.847	
	IC6	0.860	
Sustainable Performance	SP1		0.825
	SP2		0.817
	SP3		0.819
	SP4		0.869
	SP5		0.856
	SP6		0.798

In structural equation modeling, factor loadings represent the extent to which each observed item reflects the latent construct it is intended to measure. They are fundamental to establishing the convergent validity of constructs, as higher loadings indicate a stronger shared variance between the item and its underlying factor (Hair et al., 2022). According to recent methodological literature, factor loadings above 0.70 are considered ideal for confirmatory research, as they suggest that over 50% of the variance in an observed variable is explained by the latent construct (Sarstedt et al., 2023). Nonetheless, when conducting an exploratory study, loadings as low as 0.40 might be acceptable especially in the case where the construct is theoretically interesting and the indicator is theoretically significant (Kline, 2023). It is also possible to retain items having factor loadings that are between 0.70 and 0.60 provided it does not improve model fit or breach the content validity (Ringle et al., 2022). In the present research, all items of the four constructs Ethical Leadership (EL), FinTech Adoption (FA), Innovation Capability (IC), and Sustainable Performance (SP) listed could be seen exceeding the 0.80 level, which among others implies excellent reliability of their items, as well as a strong convergent validity of all constructs. To illustrate, the items on Ethical Leadership have a value of 0.870-0.919 implying high correlation between the observed variables and the underlying construct. In the same manner, FinTech Adoption, Innovation Capability and Sustainable Performance items also show greater than 0.80 loading that is strongly satisfying the empirical validity of the measurement model. Given these high loadings, all items are retained for further analysis, reinforcing the construct integrity and ensuring measurement precision in the structural model.

Table 2: Reliability Analysis

Variables	Cronbach's alpha	(rho_a)	(rho_c)	(AVE)
Ethical Leadership	0.964	0.998	0.969	0.795
FinTech Adoption	0.951	0.954	0.959	0.744
Innovation Capability	0.940	0.942	0.953	0.770
Sustainable Performance	0.910	0.911	0.930	0.691

Internal consistency reliability and convergent validity are critical in evaluating the quality of constructs within structural equation modeling. Cronbach Alpha, rho A and Composite Reliability (rho C) helps in determining the extent to which the items of a construct have shown consistency in assessing the same latent variable, whereas Average Variance Extracted (AVE) helps in determining to what extent a construct has explained variance in its indicators in comparison to measurement error. In general, reliability coefficients

(Cronbach Alpha, rho A, and rho C) ought to be above the range of 0.70 to be considered satisfactory, which shows that they have adequate internal consistency (Hair et al., 2022; Henseler et al., 2023). Also, the values of AVE should exceed 0.50, indicating that more than half of the variance can be accounted, rendering sufficient convergent validity (Fornell & Larcker, 1981; Ali et al., 2022). According to the table, the internal consistency of all constructs shows to be good. Ethical Leadership indicates the strongest degree of reliability, and FinTech Adoption, Innovation Capability, and Sustainable Performance have come at a short distance. The values are far much higher as compared to the recommended thresholds establishing a high level of reliability. Similarly, the AVE scores for all constructs ranging from 0.691 to 0.795 also meet the standard of convergent validity, further validating that the constructs are well-measured and conceptually sound.

Table 3: HTMT Ratio

Variables	EL	FA	IC	SP
Ethical Leadership				
FinTech Adoption	0.097			
Innovation Capability	0.075	0.586		
Sustainable Performance	0.043	0.650	0.611	

The discriminant validity indicates that the constructs in the structural equation model are not empirically identical and therefore establishes that each construct measures unique aspects not covered by some other constructs within the model. One of the most accepted methods of measuring the discriminant validity is the Heterotrait-Monotrait (HTMT) ratio of correlations. HTMT examines the extent to which indicators on different construct fall more diverse than those of a given construct (Henseler et al., 2015). The lower threshold of the HTMT index of 0.85 (conservative level) or 0.90 (liberal level) as envisioned in contemporary literature is probably going to suggest the adequate discriminant validity (Hair et al., 2022; Sarstedt et al., 2022). The values of HTMT between the constructs in the current study are all satisfactory: between FinTech Adoption and Innovation Capability (0.586), as well as FinTech Adoption and Sustainable Performance (0.650) and Innovation Capability and Sustainable Performance (0.611) result well below the liberal value of 0.90 and even conservative levels such as 0.85.HTMT values of Ethical Leadership and other constructs are relatively low Ethical Leadership and FinTech Adoption (0.097), Innovation Capability (0.075) and Sustainable Performance (0.043) serve as additional evidence of the uniqueness of the latter constructs. These findings collectively indicate that discriminant validity is well established within the model, suggesting that each latent variable represents a unique theoretical concept without significant overlap.

Table 4: Coefficient of Determination

	R-square	R-square adjusted
Innovation Capability	0.313	0.311
Sustainable Performance	0.450	0.443

The R-square values indicate the proportion of variance in the endogenous constructs explained by their predictors. An R-square of 0.313 for Innovation Capability suggests that FinTech Adoption and Ethical Leadership together explain approximately 31.3% of the variance in Innovation Capability. Similarly, an R-square of 0.450 for Sustainable

Performance indicates that FinTech Adoption, Innovation Capability, and Ethical Leadership account for 45% of its variance. These values reflect moderate explanatory power, aligning with the thresholds suggested by Hair et al. (2022), who consider R-square values of 0.25, 0.50, and 0.75 as weak, moderate, and substantial, respectively, in the context of social sciences.

Table 5: Model Fitness Indicators

	Saturated model	Estimated model
SRMR	0.048	0.049
d_ULS	0.953	0.962
d_G	0.789	0.790
Chi-square	1410.513	1411.039
NFI	0.849	0.848

The model fit indices indicate acceptable model fit in both the saturated and estimated models. The Standardized Root Mean Square Residual (SRMR) values are 0.048 and 0.049, both below the threshold of 0.08, indicating good model fit (Hair et al., 2022). With the Normed Fit Index (NFI) values equal to 0.849 and 0.848, there is a reasonably good fit, as the values are close to an acceptable cutoff of 0.90 (Henseler et al., 2016). Model stability is further reinforced by the fact that the small variations between the saturated and estimated model in d_ULS, d_G and Chi-square values are small. Comprehensively, the model shows some fit to the structure showing the adequacy of the theoretical model.
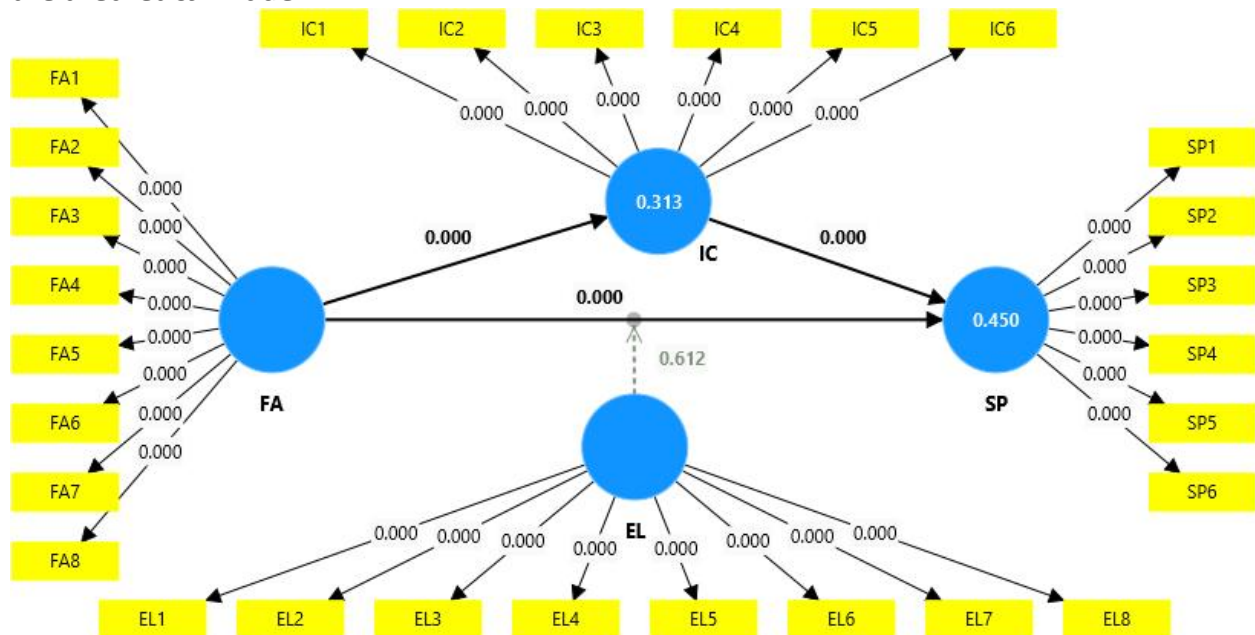

Figure 2: Structural Equation Modelling

Table 6: Findings

Hypotheses	Original sample	Sample mean	(STDEV)	T statistics	P values
FA -> SP	0.431	0.429	0.048	8.933	0.000
IC -> SP	0.329	0.330	0.055	6.028	0.000
FA -> IC -> SP	0.184	0.185	0.034	5.436	0.000
EL x FA -> SP	-0.020	-0.019	0.039	0.507	0.612

(FA); FinTech Adoption, (SP); Sustainable Performance, (IC); Innovation Capability, (EL); Ethical Leadership

The results of the hypothesis testing indicate varying levels of support across the proposed relationships. The second hypothesis (The FinTech Adoption (FA) has a direct significant influence on Sustainable Performance (SP)) as it shows a significant value (0.431) in the path coefficient (beta), t-value (8.933), and p- value (0.000). In the same manner, a direct route between Innovation Capability (IC) and SP is also justified because the correlation between the two variables is quite high (the 0.329 is a significant 1). The t-Value stands at 6.028 and the p-Value of 0.000 is significant as well. Such results indicate that FinTech Adoption and Innovation Capability significantly affect Sustainable Performance in a positive way. The mediation aspect of Innovation Capability and interactions between FinTech Adoption and Sustainable Performance is supported too. The indirect effect is significant, the value of indirect effect is 0.184, t-value 5.436, and p-value 0.000 which indicates the existence of partial mediation. This implies that FinTech Adoption enhances Innovation Capability, which contributes to improved Sustainable Performance. In contrast, the moderating effect of Ethical Leadership (EL) on the relationship between FinTech Adoption and Sustainable Performance is not supported. The interaction term (EL × FA) has a negative and statistically insignificant coefficient (β = -0.020), with a t-value of 0.507 and a p-value of 0.612, indicating the absence of a significant moderation effect.

Discussion

The empirical analysis yielded robust support for the hypothesized direct relationship between FinTech adoption and sustainable performance. The significant and positive association confirms that organizations integrating FinTech into their operations tend to achieve superior sustainability outcomes. This finding resonates with the Resource-Based View (RBV), which conceptualizes FinTech as a strategic, firm-specific resource that is valuable, rare, and not easily replicable (Barney, 1991). As earlier studies have demonstrated, FinTech facilitates enhanced transparency, efficiency, and stakeholder engagement, all of which are critical components of sustainability (Khan et al., 2025; Dunbar et al., 2024). When digital technologies are incorporated into their everyday operations, companies have a better chance of using their resources more sparingly and demonstrating environmental and social performance indicators (Satar & Alarifi, 2024). These findings are particularly important in developing countries including Pakistan where digital transformation is an important facilitator of green and inclusive development (Marimuthu et al., 2023). The reported effect can also be tracked within the discourse of global sustainability, where FinTech is currently becoming more valued as one of the tools to reach SDG targets, especially the ones touching upon responsible consumption and production.

The evidence of the mediating effect of innovation capability in the path between FinTech adoption and sustained performance. The statistically significant relationship of the indirect effect points out that FinTech adoption leads to the innovation capabilities which result in sustainable effects. This finding underscores the revolutionary role of FinTech as a driver of organization learning, creation of knowledge as well as innovation of processes in line with the focus of the RBV on dynamic capabilities (Helfat et al., 2024).

Similar to the previous studies, the investments made by companies in the FinTech tools are likely to drive innovation since they shift the resources on research and development, promote experimentation, and foster operational nimbleness in companies (Chen & Guo, 2024; Jokhio et al., 2025). Innovation capability acts as a conduit through which digital transformation translates into environmental, social, and economic sustainability. These findings corroborate recent empirical work by Alsadoun and Alrobai (2024), which identified green innovation as a significant mediator linking FinTech with sustainable performance in the financial services sector. In resource-constrained settings, such as those found in emerging economies, the capacity to innovate becomes a critical differentiator, enabling firms to exploit FinTech's full potential in ways that align with sustainability imperatives.

However, contrary to expectations and extant theoretical assumptions, the moderating role of ethical leadership in the relationship between FinTech adoption and sustainable performance was not supported. The interaction effect was negative and statistically non-significant, indicating that ethical leadership does not significantly influence the strength or direction of the FinTech–sustainability linkage. Several plausible explanations emerge for this unexpected finding. From a theoretical standpoint, while ethical leadership is often posited as a valuable intangible resource under the RBV (Barney, 1991), its impact may be more nuanced and context-dependent. It is possible that in technology-driven environments, the instrumental mechanisms of FinTech such as automation, data analytics, and real-time reporting play a more dominant role in shaping sustainability outcomes than the moral influence of leadership.

Another explanation may lie in the methodological and contextual boundaries of the study. As noted by Zhu et al. (2024), the effect of ethical leadership on sustainability becomes pronounced when coupled with strong institutional support and regulatory frameworks conditions that may be underdeveloped in the sampled context. Ethical leadership might exert a more substantial influence on internal cultural or behavioral outcomes rather than on externally measured performance metrics. Prior research by Hameed et al. (2023) suggested that the presence of ethical leadership amplifies technological impacts primarily in organizations with mature sustainability cultures. If such maturity is lacking, the moderating role may not manifest in measurable terms. The interaction term may have been affected by limited variability in leadership perceptions across the sample or by common method bias, both of which can attenuate moderation effects in structural models (Hair et al., 2022).

Limitations and Future Direction

This study offers valuable insights into the interplay between FinTech adoption, innovation capability, ethical leadership, and sustainable performance; however, several limitations must be acknowledged. First, the use of a cross-sectional research design limits the ability to infer causal relationships among the studied variables. While structural equation modeling (SEM) provides robust statistical associations, longitudinal data would offer a clearer understanding of the temporal dynamics, especially regarding how FinTech adoption and innovation capability evolve over time to influence sustainability outcomes (Creswell & Creswell, 2023). Second, the study was confined to financial institutions operating in Pakistan, which may constrain the generalizability of

the findings. The institutional, regulatory, and cultural peculiarities of this context might have had their effect on the strength and/or direction of the relationships. Since the extent of leadership behaviors and practices of digital innovation across regions and industry differ markedly, future research directed to replicating the model in a variety of geographical and industry environments should be carried out in order to boost the extent of external validity (Saunders et al., 2019).

Third, common method bias could also be a complication since the information sources are self-reported surveys instead of the God Survey, even though precautions were provided to undermine the anonymity of the respondents. The constructs that are evaluated subjectively, as ethical leadership and innovation capability, are subject to social desirability or perceptual lies. In the future research, it will be potentially beneficial to include multi-source data like archival performance measures or third-party sustainability ratings to enhance accuracy of measurement and minimize measurement bias (Podsakoff et al., 2012). Fourth, the research considered a small number of variables, missing other potential theoretical constructs capable of impacting the relationships expressed in the research. It is important to note that the effect of ethical leadership as a moderating factor did not produce significant results, which implies that we can claim the existence of other boundary conditions. In the future, one could study whether there is an influence of institutional trust, organizational culture, digital maturity, or even strategic orientation that could be viewed as potential moderates. Also, the psychological constructs like absorptive capacity, learning orientation or environmental consciousness can play the role of a mediator in the association between FinTech and sustainability, especially in the context of digital transformation of companies (Zhu et al., 2024; Alsadoun & Alrobai, 2024). Although the theory of the Resource-Based View (RBV) was used to formulate the guiding theoretical perspective, the addition of other complementary theories, including the theory of dynamic capabilities, stakeholder theory, or institutional theory, may provide a more comprehensive picture of the interaction between internal capabilities and external pressure to achieve sustainable performance. This multi-dimensional would enable the scholars to understand how firms deal with the contradictions between the speed of technological change and ethical imperatives under different institutional circumstances.

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