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[FinTech Adoption as a Driver of Sustainable Performance: Exploring the Mediating Role of Innovation Capability and Digital Transformation, and the Moderating Role of Ethical Leadership]

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ABSTRACT

The accelerating digital transformation of global business environments has underscored the strategic importance of financial technologies (FinTech) in driving sustainable organizational performance. In emerging markets, characterized by institutional voids and resource constraints, firms increasingly depend on technological innovation to align their operations with broader environmental, social, and governance (ESG) objectives. However, despite the growing integration of FinTech solutions, there remains a limited understanding of how such technologies contribute to sustainability, especially when interacting with internal capabilities and leadership practices. This study fills the gap by investigating the influence of FinTech adoption on sustainable performance, with the mediating role of innovation capability and digital transformation, and the moderating effect of ethical leadership. Guided by the Resource-Based View (RBV) theory, this research employs a quantitative, cross-sectional design using data collected from 329 middle and senior managers working in FinTech-integrated banking institutions across Pakistan. A structured questionnaire was administered, and data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the hypothesized relationships. The findings reveal that FinTech adoption significantly enhances sustainable performance both directly and indirectly through innovation capability and digital transformation. Innovation capability emerged as a stronger mediator, suggesting that the ability to reconfigure digital tools into strategic innovations plays a more critical role in achieving sustainability outcomes than digital infrastructure alone. However, the moderating effect of ethical leadership was not statistically significant, indicating that leadership ethics may not significantly alter the FinTech–performance relationship within this specific context.

Keywords: ***FinTech Adoption, Innovation Capability, Sustainable Performance, Digital Transformation and Ethical Leadership***

Introduction

The accelerating pace of technological evolution has triggered unprecedented transformations in global business ecosystems. With digitalization reshaping every aspect of organizational behavior, the discourse around sustainable performance and ethical value creation has taken center stage. Organizations are challenged to not only perform financially but also to adapt responsibly to emerging technologies while ensuring long-term value for stakeholders. The convergence of financial technology (FinTech), digital transformation, and innovation has established novel methods for discussing corporate sustainability (Hidayat-ur-Rehman & Hossain, 2024). These technological advancements are not merely tools for operational efficiency; they are enablers of organizational resilience, strategic renewal, and ethical conduct. Amid growing calls for environmental, social, and governance (ESG) accountability, there is renewed scholarly interest in understanding how technological integration aligns with sustainability goals (Yuan, 2025). This evolving landscape calls for a more nuanced exploration of how firms can embed innovation and ethical leadership into their technology-driven strategies to foster

sustainable outcomes. As
businesses strive to remain competitive, the imperative now lies in decoding how transformative technologies and leadership models can reinforce sustainable performance.
Research (Khan et al., 2022; Akhtar et al., 2025) has highlighted the dynamic role of FinTech in redefining business models and enhancing transparency, security, and accessibility in the financial services sector. Studies (Cennamo et al., 2020; Zhou & Wang, 2023) also suggest that digital transformation is more than technological deployment; it represents a fundamental shift in organizational logic and structure, often improving efficiency (Zhang et al., 2022), customer engagement (Yadav & Seranmadevi, 2024), and value co-creation (Hauke-Lopes et al., 2023). Concurrently, innovation capability has been recognized as a strategic asset that facilitates adaptation and competitiveness in volatile markets (Rahman et al., 2022; Zada et al., 2023). Moreover, ethical leadership has gained prominence as a key enabler of trust, accountability, and responsible decision-making in digital enterprises (Lee & Kim, 2023; Warsi et al., 2025). However, the interplay of these elements in enhancing sustainable performance remains complex and underexplored, particularly in the context of emerging economies where digital maturity and regulatory frameworks vary significantly (Mohsin et al., 2025). The present study responds to this evolving dialogue by examining how these constructs jointly influence sustainability outcomes.

The global shift toward sustainable development, underpinned by the UN's Sustainable Development Goals (SDGs), has intensified the need for organizations to recalibrate their strategies in line with environmental, social, and governance imperatives (Ruhana et al., 2024; Wakeel et al., 2025). Businesses in both developed and emerging economies face increasing scrutiny over their carbon footprint, ethical governance, and innovation readiness (Zhang et al., 2024). According to the World Economic Forum (2023), nearly 70% of corporate leaders report that digital transformation is essential for meeting sustainability targets, yet only a minority report successful integration. This discrepancy is critical in emerging markets where regulatory uncertainties, resource constraints, and limited innovation ecosystems pose considerable challenges (Tarczynska-Luniewska et al., 2024). In Pakistan, for instance, a report by the State Bank (2023) highlighted that while FinTech adoption is accelerating, most firms struggle to convert this adoption into sustained performance gains due to leadership inefficiencies and underutilized innovation potential (Taneja et al., 2023). Moreover, ethical issues and weak governance in the financial sector seem to have eroded public trust, further complicating the sustainability discourse. In this context, the present study addresses the dual challenge of technology integration and its ethical alignment within the framework of sustainable organizational performance as highlighted by previous research (Taneja et al., 2023). By focusing on the strategic interplay between FinTech, innovation, digital transformation, and ethical leadership, the study aims to offer empirical insight into a timely and globally relevant issue.

Despite the growing academic and practical emphasis on sustainable development, existing literature falls short of offering a holistic understanding of how emerging technologies, such as FinTech, drive sustainable organizational outcomes aligned with innovation, digital transformation, and ethical leadership. Previous studies often adopt a fragmented view, analyzing these constructs in isolation or limited dyadic relationships (e.g., FinTech and innovation, or ethical leadership and performance). This piecemeal approach overlooks the systemic and interactive nature of sustainability-oriented transformation (Bornemann et al., 2025). While much of the research has focused on developed economies with mature digital infrastructures, there is a
relative paucity of empirical evidence from emerging markets where the stakes of digital innovation and ethical missteps are often higher. As noted by Ahmed and Khan (2022), firms in such contexts operate under resource constraints, regulatory ambiguity, and volatile market dynamics, making sustainable performance particularly dependent on strategic coherence across multiple organizational domains. The need to understand the integrated impact of digital technologies, innovation capacity, and leadership ethics on sustainability is further amplified by increasing global pressures for accountability and inclusive growth (Zada et al., 2025). This study aims to bridge this gap by developing and empirically testing a comprehensive model that examines how FinTech adoption influences sustainable performance through the mediating pathways of innovation capability and digital transformation, and under the shaping influence of ethical leadership. By doing so, the study not only extends theoretical frameworks but also provides actionable insights to business leaders and policymakers navigating the complexities of sustainable transformation.

Overlooking the link between digital innovation and sustainability can have serious consequences. Firms that adopt FinTech without aligning it with ethical governance risk falling into the 'technology-performance paradox' (Porter & Heppelmann, 2022). Particularly in markets prone to volatility, such as South Asia, the imperative for firms to align technological adoption with sustainability objectives has intensified. As stated in the Global Innovation Index (2024), the volatility in performance, mistrust among stakeholders, and regulatory pushback are frequently observed in cases of innovation that lacks ethical alignment. According to Tariq et al. (2023), companies are experiencing stagnation (or worse, deceleration) of sustainable performance in the event of high digital investment and low ethical and innovation capacity. The resultant misalignment poses a risk to the profitability, as well as environmental and social legitimacy. Given that this challenge concerns both individual firms and national governments, particularly in the context of policymaking and nation-building, analyzing the multidimensional impacts of FinTech adoption through innovation, transformation, and leadership offers a critical lens for evaluating firms aiming to thrive in the era of stakeholder capitalism.

This study contributes to the growing body of knowledge by proposing and testing an integrated model that examines the impact of FinTech adoption on sustainable performance through innovation capability, digital transformation, and ethical leadership. This research also has a systems-level view of these dimensions in contrast to previous

work, which has studied them independently. The results are especially valuable for firms in emerging markets, where resource constraints heighten the need for strategic alignment to achieve both performance and legitimacy.

This research draws on Resource-Based View (RBV) theory, which posits that firm-specific assets, such as innovation, ethical leadership, and technological resources, can generate sustainable competitive advantage. RBV offers a coherent framework for understanding how the alignment of internal resources drives sustainable performance. This perspective enables the study to position FinTech adoption not merely as a technological input but as a strategic asset influenced by dynamic capabilities and ethical governance. The findings offer implications for refining RBV theory, informing corporate strategy, and guiding policy-making in the digital era.

1.1 Theoretical Foundation

The Resource-Based View (RBV) of the firm provides a robust theoretical lens for understanding how internal capabilities and resources shape sustainable organizational outcomes. According to RBV, the common tenet of RBV is that the ability of organizations to gain a sustained competitive advantage or performance does not depend so much on external positioning as it does on the strategic deployment of valuable, rare, inimitable, and non-substitutable resources otherwise known as VRIN. This view made a paradigm shift in the previous approaches of thinking that basing the thought on the existence of market structures and competitive forces, but now on the internal heterogeneity of firms represented the substantial platforms of enhanced performance. RBV has also formed a balance with dynamic capabilities, especially where the environment that organizations operate in requires constant reconfiguration and innovation of resources due to the rate of technological advancements. According to more contemporary readings of RBV, it is the intangible resources like the organizational knowledge, innovation culture, and ethical leadership, which come more to the forefront as the pivotal determiners of the long-term success (Peteraf and Barney 2022). These are assets that are usually so ingrained into the practices and procedures of a firm that they are hard to imitate, and thus, this may be a beneficial advantage. These internal strengths are particularly important in the environment, as external competitive advantages can be swallowed easily in this environment.

In emerging economies, where market imperfections and institutional gaps are prevalent, RBV offers a particularly relevant framework. Companies tend to be more dependent on their internal strengths to survive the challenges that exist in an environment marked by uncertainty and resource scarcity (Nwachukwu & Chladkova, 2023). It is even more the case that as digital technologies further undermine old-fashioned business models, we focus even more on firm-specific resources, which may include the agility of innovation, leadership integrity, and preparedness to transform. These intangible assets not only make operations effective but also give the organization a foundation of legitimacy in a time of growing stakeholder demand. Recent research also confirms the usefulness of RBV to study the congruence between the technology, strategy, and sustainability. Mahmood et al. (2022) mention that technological resources cannot be enough to achieve long-term success when not combined with strategic capabilities and value-

based leadership. This is in accordance with modern RBV extensions, which integrate ethical governance, social capital as extensions into the resource portfolio of the firm.

The combination of RBV with sustainability discourse can reflect the fact that organizations are not only expected to make their economic performance sustainable but also be responsive to social and environmental demands, with their goals becoming increasingly viewed as strategic as opposed to peripheral (Tariq & Su, 2023). RBV is a theory with a logical backing behind the integrated model of this study. It presents the importance of the strategic addressing of the internal resources, technological, innovative, and ethical that can help firms attain sustainable performance in an environment of constrained resources and undergoing digitalization. The question of enduring success in the digital era is answered not by having the available resources but by the ability of the firm to strategically leverage and combine them in the creation of the long-term value quantum it has at its disposal.

Hypothesis Development

In today's fast-evolving digital landscape, sustainable performance increasingly depends on a firm's ability to leverage technological innovation. The adoption of financial technologies (FinTech) has emerged as a transformative force that redefines financial processes, enhances transparency, and facilitates inclusive access to capital and services. Although the application of FinTech was originally limited to transactional efficiency, discourses now focus on its usage for economic, social, and environmental sustainability (Hossain et al., 2022). FinTech offers an alternative means to emerging economies with ineffectively structured financial systems (Kamble et al., 2023). Based on the Resource-Based View (RBV), FinTech is a strategic asset for prolonged competitive advantages and sustainable value (Mahmood et al., 2022). When internalized, these digital capabilities improve firms' knowledge base and routine operations, creating resilience and adaptive capacity to environmental uncertainties.

RBV reinforces that technology alone is insufficient without being integrated into the strategic fabric of firms, and as reported by Tariq and Su (2023), organizations with advanced FinTech capabilities demonstrate superior performance across all three dimensions of sustainability: economic efficiency, environmental responsiveness, and social inclusivity. The embeddedness of FinTech tools allows firms to monitor sustainability metrics in real time, enhancing transparency and stakeholder engagement. Given these theoretical and empirical foundations, it is reasonable to posit that FinTech adoption, when integrated as a core capability, contributes positively to the sustainable performance of firms.

1.2 H1: FinTech adoption is positively associated with firms' sustainable performance.

In the context of digital transformation, innovation capability has emerged as a cornerstone of organizational success, particularly for firms seeking to convert technological investments into sustainable performance outcomes. Innovation capability defines an organization's capacity to create, absorb, and execute new ideas, processes, and technologies into observable value (Liu et al., 2022). Although FinTech adoption means new tools, platforms, and processes in firms, what matters is how the new

technologies are leveraged to improve efficiency, differentiation, and stakeholder fulfillment. The Resource-Based View (RBV) explains that resources must not only be valuable and rare but also embedded in firm-specific capabilities to generate sustained benefits (Peteraf & Barney, 2022).

Empirical evidence portrays innovation as a critical bridge between technological adoption and sustainable outcomes (Allam & Cheshmehzangi, 2024; Bautista & Arias-Aranda, 2025). Innovation capacity has been found to enhance organizations' alignment with digital solutions for sustainability objectives such as energy efficiency, inclusive delivery of services, and stakeholder engagement (Alshamrani & Ndubisi, 2023). FinTech application tools with high innovative capacity help organizations personalize financial products, optimize capital allocation, and achieve agility in terms of regulatory and environmental requirements. When faced with limitations in emerging economies, including infrastructure inadequacies and regulatory volatility, the innovation capability of technology-to-performance pathways creates adaptive solutions, linking FinTech and organizational sustainability (Rahman et al., 2022). Innovation can not only be viewed as an operational improvement but also as a strategic facilitator that mediates the role of digital technologies on sustainable performance. It can be assumed that the mediating factor in this
relationship is innovation capability. Based on this theoretical implication and the empirical findings, it can be stated that innovation capability plays a mediating role in this relationship.

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

The digitalization of organizational processes has redefined how firms create, deliver, and sustain value in an increasingly competitive and resource-constrained environment. While the adoption of FinTech solutions marks a significant step toward modernization, the broader transformation of an organization's digital infrastructure and mindset, known as digital transformation, plays a more critical role in leveraging technological potential into meaningful strategic outcomes (Wakeel et al., 2025). Digital transformation involves the integration of digital technologies into all aspects of the business, enabling data-driven decision-making, operational efficiency, enhanced customer experience, and adaptability to evolving market demands (Nguyen et al., 2023). This transformation is not solely about technological integration but also entails a fundamental cultural and strategic shift that realigns organizational capabilities with long-term sustainability objectives. The Resource-Based View (RBV) highlights that digital transformation, when deeply embedded as a firm-specific capability, can act as a valuable and inimitable resource that enables organizations to achieve sustainable performance (Peteraf & Barney, 2022).
Empirical evidence suggests that digital transformation provides the necessary architecture through which FinTech tools can influence sustainability outcomes (Sayari et al., 2025; Zaid et al., 2025). For instance, firms that adopt FinTech without complementary digital readiness often struggle to derive long-term value or align technological changes

with ESG goals (Al-Maroof et al., 2022). In contrast, organizations that actively transform their digital structures are more agile, transparent, and capable of aligning their innovation efforts with environmental and social imperatives. Recent research by Singh et al. (2023) found that digital transformation significantly enhances firms' ability to monitor sustainability indicators, reduce operational waste, and foster digital ecosystems that support inclusive and responsible growth. Particularly in emerging economies, digital transformation bridges the institutional and infrastructural gaps that may limit the effectiveness of standalone technological tools. From the RBV perspective, digital transformation becomes the dynamic capability that absorbs and channels FinTech adoption into high-value outcomes. Therefore, the strategic role of digital transformation is not ancillary but central to converting technological investments into sustainable organizational performance. In light of this theoretical reasoning and empirical support, the following hypothesis is proposed:

1.4 H3: Digital transformation mediates the relationship between FinTech adoption and sustainable performance.

Integrating advanced financial technologies into organizational processes holds strong potential to enhance efficiency, transparency, and inclusivity. The outcomes of FinTech adoption, particularly for sustainable performance, often depend on the broader organizational context in which these technologies are deployed. One critical contextual factor is ethical leadership. Ethical leadership, defined as the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, serves as a guiding force for aligning technological adoption with broader ethical and sustainability objectives (Brown & Treviño, 2022). Leaders who emphasize ethics foster a culture of accountability, stakeholder responsibility, and long-term thinking traits essential for ensuring that FinTech tools are used not merely for-profit maximization but for achieving sustainable organizational outcomes. From the Resource-Based View (RBV) perspective, ethical leadership functions as an intangible resource that shapes how other resources, such as FinTech, are utilized and directed (Peteraf & Barney, 2022).

Ethical leadership has a stabilizing and value-aligning role in environments characterized by rapid technological change and high uncertainty. It helps prevent the misuse of digital financial tools for exploitative purposes and encourages technology alignment with environmental, social, and governance (ESG) standards. Zhao and Wang (2023) discovered that companies with high ethical leadership translated their digital investments into responsible innovation and stakeholder engagement. Likewise, Asif et al. (2022) demonstrate that leadership ethics is an important moderator of the effectiveness of the digital initiative implementation path toward sustainability. Ethical leadership is crucial for emerging markets where regulatory enforcement is inconsistent or non-existent to offer guidance on the use and application of FinTech towards legitimate and sustainable goals. Ethical leadership exhibits transparency in technological initiatives and their implementation, takes risks with care, and considers the interests of stakeholders. Therefore, it would be valid to theorize that ethical leadership enhances

the connections between FinTech adoption and sustainable performance by influencing the intent, direction, and influence of the implementation of technology. Based on this, the following hypothesis is proposed:

1.5 **H4: Ethical leadership moderates the relationship between FinTech adoption and sustainable performance.**

The research model in Figure 1 shows how adopting FinTech can have both direct and indirect implications on an organization's long-term performance, with digital transformation and innovation skills acting as a bridge. Additionally, ethical leadership is suggested as a moderating variable linking sustainable performance and innovative potential.

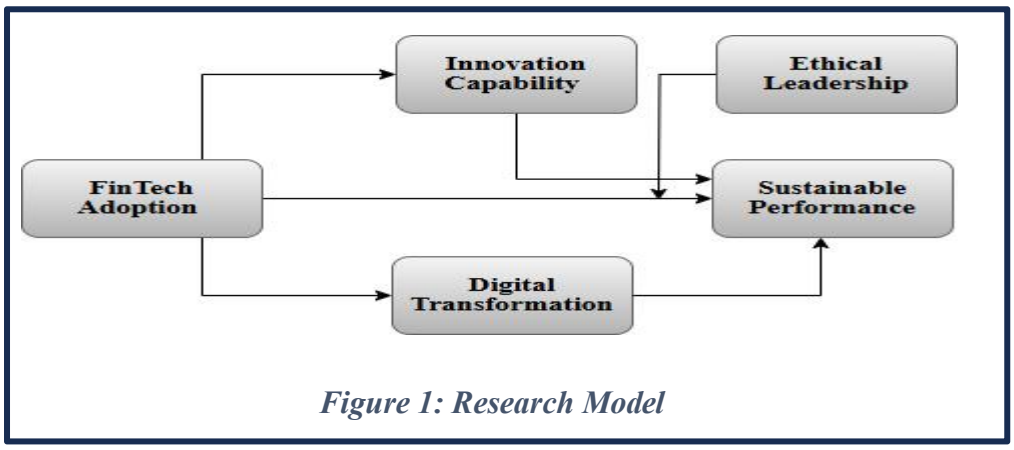


Figure 1: Research Model

Methodology

This study employs a quantitative, cross-sectional research design to investigate the relationships among FinTech adoption, innovation capability, digital transformation, ethical leadership, and sustainable performance. The cross-sectional method implies the gathering of information at aspecific point in time, which is suitable to examine more structural connections or relation ideas without observing them over a long-term duration (Creswell & Creswell, 2018). This can be done through quantitative methods that provide the capacity to use statistical means to test hypotheses, and in measuring the latent constructs, which makes the findings more objective and broadly generalizable. Since the target population in the study will be the organizational actors and the study will focus on validation of a theorized model of perception and behavior in the organization through empirical research, a study design that will be appropriate to capture the perception and behavior of the targeted population within a specific time frame will be the mixed-method research design.

The target population for this study comprises middle and senior management employees working in FinTech-integrated banking institutions in Pakistan, including both public and private sector banks. Such a population is suitable because of the direct connection to the financial technologies and the strategic decision-making processes concerning the ability to innovate, leadership, and sustainability. The State Bank of Pakistan states that

the integration of FinTech in the banking industry has witnessed a very high rise, in particular, the usage of digital wallets, branchless banking, and risk-assessment via AI has risen (2023). These institutions have their managers strategically placed to give valid explanations as to how FinTech use is ingrained within the wider process of organizations, and whether it is usable in the sustainable performance of such organizations. They are a good group of participants in answering questions based on the constructs of this study due to their knowledge and exposure.

The purpose of the study is to sample out the respondents with knowledge and experience as far as the putative phenomena examined are concerned, because a purposive sampling technique is used. Although any sample can be collected using probability sampling to be statistically representative, only purposive sampling can guarantee the quality of the data and its context-driven relevance when investigating phenomena at a strategic level (Etikan et al., 2016). Item Response Theory (IRT) was configured as a guiding statistical approach to ascertain the sample size. IRT takes into account the difficulty of items and respondent ability in determining the level of sampling sufficiency. It is applicable in the context of latent variable models, which have several indicators. Based on IRT guidelines, it is generally recommended that a sample size of any given item should be at least 10 to provide reliable estimates (De Ayala, 2022). Given that the final instrument comprises 36 items, the minimum sample size was set at 360 respondents. The researcher received 329 responses by distributing 400 questionnaires, and 329 questionnaires were used for data analysis. The data were gathered with the help of a structured questionnaire, which was disseminated physically. To test the hypothesis and evaluate the structural model, we have used SmartPLS (version 4), which can be applied when it comes to Partial Least Squares Structural Equation Modeling (PLS-SEM). SmartPLS is more appropriate in a study where there is a multifaceted model, latent constructs, and non-normal distribution of data (Hair et al., 2022).

1.6 Measurement of Constructs

All variables in this study were measured using validated scales from recent literature. Each construct was operationalized through multiple items, with responses captured on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). FinTech Adoption was measured using items adapted from Kamble et al. (2023), while Innovation Capability was assessed using
the scale developed by Liu et al. (2022). Items for Digital Transformation were adapted from Nguyen et al. (2023). Ethical Leadership was measured following the framework proposed by Brown and Treviño (2022). Finally, Sustainable Performance was evaluated using a multidimensional scale encompassing economic, environmental, and social dimensions, based on the work of Tariq and Su (2023).

Data analysis:
Regression Weights
Table 1: Factor loadings

		DT	EL	FA	IC	SP
Digital Transformation	DT2	0.799				
	DT3	0.779				
	DT4	0.796				
	DT5	0.876				
	DT6	0.781				
	DT7	0.830				
Ethical Leadership	EL1		0.873			
	EL2		0.910			
	EL3		0.897			
	EL4		0.878			
	EL5		0.877			
	EL6		0.920			
	EL7		0.871			
	EL8		0.913			
FinTech Adoption	FA1			0.888		
	FA2			0.866		
	FA3			0.850		
	FA4			0.829		
	FA5			0.866		
	FA6			0.890		
	FA7			0.813		
	FA8			0.909		
Innovation Capability	IC1				0.868	
	IC2				0.910	
	IC3				0.870	
	IC4				0.913	
	IC5				0.850	
	IC6				0.862	
Sustainable Performance	SP1					0.828
	SP2					0.820
	SP3					0.820
	SP4					0.867
	SP5					0.853
	SP6					0.795

Factor loadings are critical statistical indicators used to assess the degree to which observed
variables (items) represent their underlying latent constructs in a structural model. A loading of more than 0.70, in the case of confirmatory factor analysis, is often considered to be good evidence of both indicator reliability and convergent validity because it indicates that most of the differences between the observed values of the item in question can be attributed to the latent construct to which it is supposed to refer (Hair et al., 2022). On the other hand, lower loadings can be indicators of dilute links and also items that are troublesome, especially in a confirmatory environment where measurement accuracy is essential. These are standard values that researchers tend to use when conducting modern structural equation modeling, as they are applied as a reference to measure the strength of measurement models (Sarstedt et al., 2022). Ave Proportion of Variance (AVE) and Composite reliability (CR) are also enhanced through high factor loading, and this provides greater strength to the validity of the construct. The reported measurement model showed that all the constructs were extremely high in factor loading, which was more than 0.70, the standard mark. The construct representation of Digital Transformation (DT) items varied in the interval 0.779- 0.876, which represents a good construct representation. The corresponding values of items of Ethical Leadership (EL) only ranged between 0.871 and 0.920, showing that the scale is highly cohesive. FinTech Adoption (FA) and Innovation Capability (IC) exhibited high levels of loadings that are consistent with each other, as well as in the range of 0.813 and 0.913, which affirms the reliability of measurement. The indicators of the Sustainable Performance (SP) were between 0.795 and 0.867, showing more evidence of the sufficiency of the scale. Since all items had a value higher than the threshold of confirmation, they all show an adequate empirical basis to maintain them in the model, which posits strong validity of measurement as per the theory. These results affirm that the latent constructs are accurately operationalized, contributing to the integrity of the structural model.

1.7 Validity Statistics

Table 2: Reliability values

	Cronbach's alpha	(rho_c)	(AVE)
Digital Transformation	0.895	0.920	0.657
Ethical Leadership	0.964	0.969	0.797
FinTech Adoption	0.952	0.959	0.747
Innovation Capability	0.941	0.953	0.773
Sustainable Performance	0.910	0.930	0.691

Cronbach's Alpha, rho_A, Composite Reliability (rho_C), and Average Variance Extracted (AVE) assess reliability and convergent validity in SEM. Internal consistency is deemed to be good once Cronbach's Alpha, rho A, and rho C reach a score greater than 0.70 and reflects the reason that the indicators unite, measuring the same latent construct (Hair et al., 2022). Convergent validity is confirmed when its values exceed 0.50, which value

implies that more variance of the construct is shared with its indicators (Sarstedt et al., 2022). All constructs exceed acceptability levels in the presented model. Internal consistency based on the Cronbach Alpha values ranges between 0.964 (Ethical Leadership) and 0.895 (Digital Transformation), which is a high value of internal consistency. The rho_C values, 0.920-0.969, also reinforce this reliability, and the rho_A values are close together too. The values of AVE vary between 0.657 and 0.797, which is above the value of 0.50, proving convergent validity. These results confirm that each construct in the model is measured with high precision and theoretical integrity.

1.8 Discriminant Validity

Table 3: HTMT Ratio

	DT	EL	FA	IC	SP
Digital Transformation					
Ethical Leadership	0.117				
FinTech Adoption	0.434	0.101			
Innovation Capability	0.468	0.076	0.581		
Sustainable Performance	0.488	0.040	0.639	0.617	

Discriminant validity ensures that constructs in a model are conceptually distinct and not excessively correlated, allowing for meaningful interpretation of structural relationships. Heterotrait-Monotrait ratio (HTMT) is a powerful way to measure the discriminant validity of constructs by calculating the actual correlation between constructs. The conservative value of such a threshold is 0.85. Whereas, the more liberal value is 0.90; figures above that indicate absence of discriminant validity (Henseler et al., 2015; Hair et al., 2022). In the provided HTMT matrix, all results below the rigid mark of 0.85 imply that discriminant validity is appropriately observed in all pairs of constructs. The largest value of HTMT lies between the Consumer Adoption and the Sustainable Performance (0.639), which is well acceptable, followed by the value of 0.617 between the Innovation Capability and the Sustainable Performance. The lower degree of relationship between Ethical Leadership and concepts such as Sustainable Performance (0.040) or Innovation Capability (0.076) also signals conceptual differentiation. These results support the model's discriminant validity.

1.9 Model Fitness Indicators:

Table 4: Indicators

	Saturated model	Estimated model
SRMR	0.053	0.066
d_ULS	1.664	2.562
d_G	1.033	1.049
Chi-square	1898.393	1909.446
NFI	0.830	0.829

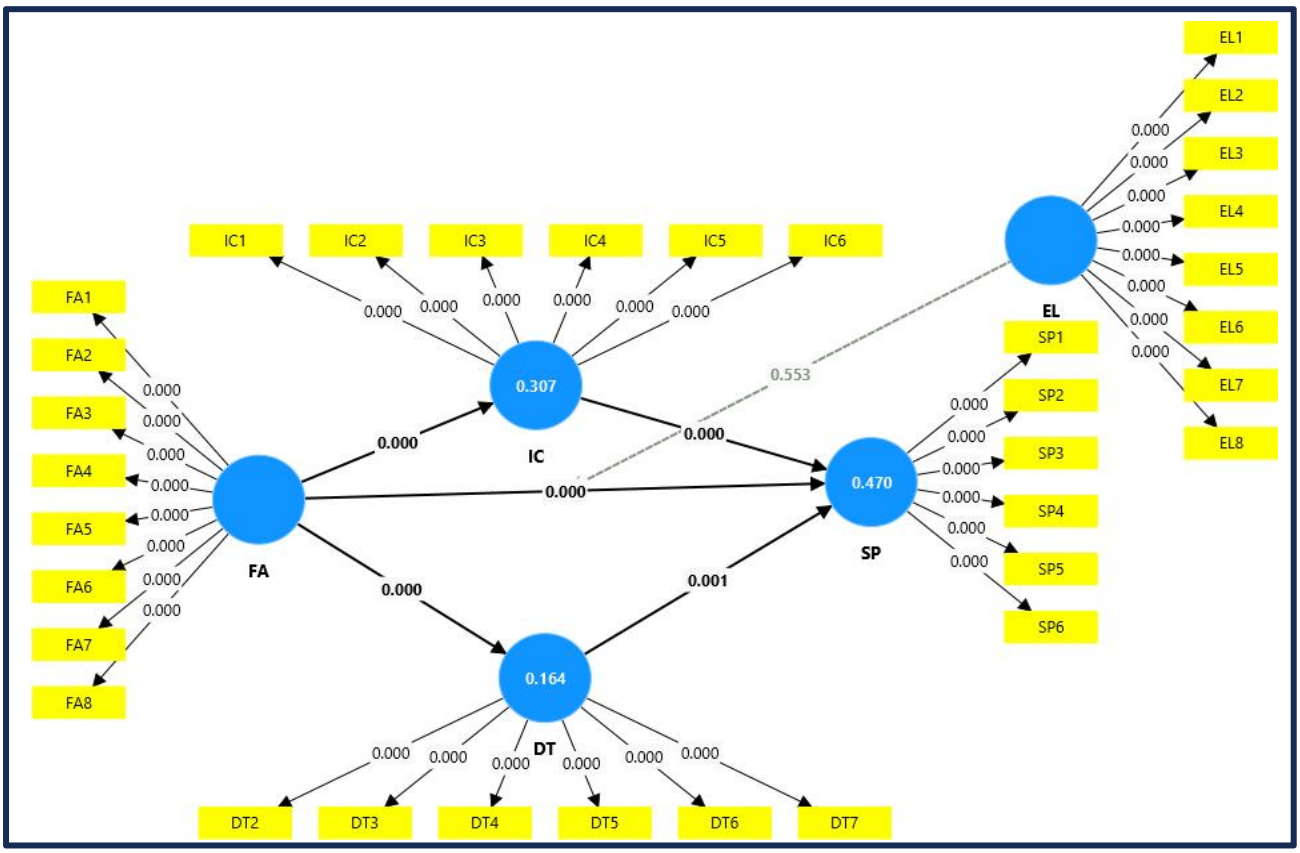
Model fit indices are critical in evaluating how well the proposed structural model aligns with the observed data in Partial Least Squares Structural Equation Modeling (PLS-SEM). Among these indices, the Standardized Root Mean Square Residual (SRMR) is widely used, with values less than 0.08 indicating a good fit (Hair et al., 2022). The SRMR for both the saturated (0.053) and estimated (0.066) models falls below the acceptable threshold, reflecting adequate model fit. The discrepancy represents the squared Euclidean and geodesic distances, respectively, between the empirical and model-implied correlation matrices. Although no fixed thresholds exist, smaller values indicate a better fit. Both 2.562 and 1.049 remain within acceptable limits, with only minor deviations from the saturated model. The Normed Fit Index (NFI) values of 0.830 and 0.829 slightly fall below the ideal (0.90) threshold, suggesting room for improvement but representing an acceptable fit (Sarstedt et al., 2022).

1.10 Coefficient of determination

Table 5: R-squared

	R-square	R-square adjusted
Digital Transformation	0.164	0.161
Innovation Capability	0.307	0.305
Sustainable Performance	0.470	0.462

The R-square values reflect the explanatory power of the model for each endogenous construct. According to Hair et al. (2022), values of 0.25, 0.50, and 0.75 indicate weak, moderate, and substantial levels of predictive accuracy, respectively. In this study, the R-square for Sustainable Performance (0.470) indicates a moderate explanatory power, while Innovation Capability (0.307) and Digital Transformation (0.164) demonstrate low to moderate levels. The adjusted R-square values are slightly lower but consistent, confirming the model's robustness by accounting for model complexity. These results suggest that while FinTech adoption and related constructs contribute meaningfully, other unexplored variables may influence the outcomes.



1.11 Table 6: Results

	Original sample	Sample mean	Standard deviation	T statistics	P values
FA -> SP	0.373	0.370	0.048	7.739	0.000
FA -> IC -> SP	0.164	0.164	0.033	4.899	0.000
FA -> DT -> SP	0.070	0.071	0.024	2.883	0.004
EL x FA -> SP	-0.023	-0.020	0.038	0.593	0.553

FA; FinTech Adoption, SP; Sustainable Performance, IC; Innovation Capability, DT; Digital Transformation, EL; Ethical Leadership

The hypothesis testing results reveal important insights into the direct, indirect, and moderating relationships among the constructs. The path from FinTech Adoption to Sustainable Performance (β = 0.373, t = 7.739, p < 0.001) is statistically significant, indicating strong support for the hypothesis that FinTech adoption positively contributes to sustainable performance. This is consistent with prior research, suggesting that digital financial solutions enhance operational efficiency and sustainability outcomes in organizations (Aslam et al., 2023). The mediation effect of Innovation Capability in the relationship between FinTech Adoption and Sustainable Performance (β = 0.164, t = 4.899, p < 0.001) is significant, implying that FinTech enhances innovation, which supports sustainability. Digital Transformation also mediates this relationship with a smaller but statistically significant effect (β = 0.070, t = 2.883, p = 0.004), suggesting that transformation of digital processes partially explains how FinTech influences

sustainability (Lee et al., 2022). The moderating effect of Ethical Leadership on the relationship between FinTech Adoption and Sustainable Performance is not supported as the result is statistically insignificant (β = -0.023, t = 0.593, p = 0.553), which indicates that ethical leadership does not significantly alter the strength or direction of the relationship.

1.12 Discussion:

The significant positive relationship between FinTech adoption and sustainable performance confirms the study's first hypothesis and is aligned with prior research, indicating that digital financial tools can enhance operational efficiency, improve financial transparency, and facilitate inclusive service delivery (Aslam et al., 2023; Kamble et al., 2023). The finding supports the theoretical premise of the Resource-Based View (RBV), which argues that firm-specific resources such as advanced digital capabilities become valuable and inimitable assets when embedded within organizational processes (Peteraf & Barney, 2022). In the context of emerging markets like Pakistan, where financial infrastructures are still maturing, FinTech provides alternative solutions that overcome institutional voids and increase stakeholder trust (Hossain et al., 2022). This finding is corroborated by Mahmood et al. (2022), who emphasized the effectiveness of digital tools in alignment with internal strategic objectives.

The second hypothesis, which proposed that innovation capability mediates the relationship between FinTech adoption and sustainable performance, is also supported. This indicates that FinTech, on its own, is insufficient to generate performance outcomes unless it is paired with a firm's ability to assimilate and implement innovative ideas. An innovation capability becomes a dynamic resource that mediates the value of digital tools by putting them purposefully into the creation of value (Liu et al., 2022; Alshamrani & Ndubisi, 2023). The mediation effect is especially critical in resource-deficient settings in which flexibility and inventiveness are out the achievement of the use of systems (Rahman et al., 2022). Innovation gives organizations the ability to make digital solutions relevant in their local context to address the demands of the local market, differentiate their services, and be responsive to the changing expectations of sustainability. In this way, this outcome confirms the claim in RBV that sustained advantage arises due to the ability to exploit and combine the resources strategically through the internal ability to utilize them.

The third hypothesis also states that digital transformation is an intermediate variable, linking the adoption of FinTech to sustainable performance; it is also statistically insignificant, but its impact is also weaker. It can be indicated that although digital transformation plays a significant role in transforming FinTech investments into sustainability results, it is not as strong as compared to innovation capability. This could be attributed to the fact that digital transformation is often a slower, more infrastructural process that requires significant organizational and cultural change (Nguyen et al., 2023). Nevertheless, its significance aligns with the RBV framework by illustrating that transformation readiness, when developed as a firm-level capability, enables the integration of digital tools with business objectives (Al-Maroof et al., 2022). In emerging markets, where structural digital maturity is uneven, even incremental transformation efforts can facilitate transparency, waste reduction, and stakeholder

inclusion (Singh et al., 2023). The relatively moderate strength of this mediation suggests that transformation alone may not suffice without a simultaneous innovation strategy, supporting a holistic interpretation of technological integration.

The fourth hypothesis, which anticipated a moderating effect of ethical leadership on the relationship between FinTech adoption and sustainable performance, is not supported. The statistically insignificant result indicated that ethical leadership did not alter the strength or direction of the relationship. While this finding contrasts with theoretical propositions that identify ethical leadership as a crucial contextual variable (Brown & Treviño, 2022; Zhao & Wang, 2023), it may reflect contextual or methodological limitations. In emerging economies such as Pakistan, ethical leadership may still be perceived as a normative ideal rather than a tangible influence on digital strategy. Additionally, the disconnect could arise from a mismatch between leadership rhetoric and practice, or from weak regulatory enforcement that limits the actual impact of ethical directives. Asif et al. (2022) pointed out, in environments lacking institutional support, leadership ethics may fail to translate into measurable organizational outcomes. Methodologically, it is also possible that the moderating role of leadership requires longitudinal data to manifest, given that cultural and ethical changes often influence organizations gradually over time.

1.13 Limitations and future directions:

Despite the valuable insights offered by this study, several limitations must be acknowledged to contextualize the findings and inform future research. First, the use of a cross-sectional design restricts the ability to infer causal relationships among the variables, as data were collected at a single point in time, limiting temporal insights into how FinTech adoption influences sustainable performance over time. Longitudinal studies would be better suited to capture the dynamic evolution of these relationships. Second, the study relied on self-reported data from middle and senior managers in Pakistani banking institutions, which may be subject to social desirability bias and limit the generalizability of results beyond this specific sector and geographic context. Future research could adopt a multi-source or multi-sectoral approach to enhance external validity. Third, while the study integrated innovation capability and digital transformation as mediators and ethical leadership as a moderator, other potentially influential constructs such as organizational learning, digital readiness, regulatory environment, or cultural values were not considered. These factors may further explain variations in sustainable performance and should be explored in subsequent studies. For example, the inclusion of digital maturity or ESG-oriented culture as moderating variables could enrich the understanding of how firms strategically leverage FinTech for sustainability outcomes (Nguyen et al., 2023; Zhao & Wang, 2023). Additionally, expanding the
conceptual model to include sustainability-oriented innovation as a distinct construct or exploring the role of institutional pressures through the lens of institutional theory could offer deeper theoretical contributions. By addressing these limitations, future research can build a more comprehensive and contextually grounded understanding of the pathways linking financial technology to sustainable organizational transformation.

1.14 References

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