Journal of Management Science Research Review
https://jmsrr.com/index.php/Journal/about

Volume. 4 Issue No. 3 (2025)
https://doi.org/10.5281/zenodo.16541275

Online ISSN: 3006-2047
Print ISSN: 3006-2039

# THE ROLE OF FINTECH ADOPTION IN ACHIEVING SUSTAINABLE PERFORMANCE: MEDIATING EFFECT OF DIGITAL TRANSFORMATION AND MODERATING ROLE OF TRANSFORMATIONAL LEADERSHIP

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**Abstract**

Organizations particularly in emerging economies are under increasing pressure to align technological innovation with long-term environmental and social goals. This study investigates how FinTech adoption influences sustainable performance, examining the mediating role of digital transformation and the moderating influence of transformational leadership within the context of mid-to-large-scale firms in Pakistan. Grounded in Dynamic Capabilities Theory (DCT), the study conceptualizes FinTech adoption and digital transformation as higher-order capabilities that enable firms to sense, seize, and transform in response to dynamic environmental conditions. A quantitative, cross-sectional research design was employed, with data collected through structured questionnaires from 315 managers across financial services and technology sectors. Partial Least Squares Structural

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Volume. 4 Issue No. 3 (2025)
https://doi.org/10.5281/zenodo.16541275

Online ISSN: 3006-2047
Print ISSN: 3006-2039

Equation Modeling (PLS-SEM) was used to test the hypothesized relationships. The results reveal a significant and positive direct relationship between FinTech adoption and sustainable performance, indicating that firms leveraging digital financial tools are better positioned to achieve environmental, social, and economic objectives. Furthermore, digital transformation significantly mediates this relationship, suggesting that FinTech's contribution to sustainability is most effective when embedded within broader organizational transformation strategies. However, the hypothesized moderating effect of transformational leadership on the link between FinTech adoption and digital transformation was not supported, implying that leadership style may not universally enhance technology-driven change. These findings contribute to the growing body of literature on digital sustainability by offering empirical evidence from a developing country context and highlight the importance of integrating technological capabilities with systemic transformation efforts to drive sustainable outcomes.

**Keywords:** FinTech Adoption, Sustainable Performance, Digital Transformation, Transformational Leadership

## Introduction

Organizations face increasing pressure to align business strategies with technological advancement, sustainability imperatives, and changing stakeholder expectations. Global discourse on digital disruption emphasizes that innovation is no longer confined to product development but extends into how firms operate, compete, and sustain themselves in volatile environments. As economies digitize and environmental crises intensify, there is a growing consensus that long-term value creation hinges not only on financial outcomes but also on the ability to integrate social and environmental priorities

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(Hidayat-ur-Rehman & Hossain, 2024). Scholars and practitioners have increasingly turned their attention to the confluence of digital innovation and sustainability, recognizing that firms must rethink their operational models to survive and thrive in this landscape (Hossain et al., 2025). Consequently, conversations around leadership agility, digital transformation, and strategic technology adoption are dominating both academic and corporate arenas. The shift toward sustainability requires more than incremental change it demands a strategic overhaul supported by visionary leadership and enabled by emerging technologies (Yan et al., 2022). Within this discourse, financial technologies (FinTech) have emerged as a key enabler of innovation and value creation, particularly when leveraged under strong leadership and aligned with long-term performance objectives. This growing complexity calls for an integrated understanding of how digital tools, leadership styles, and transformation strategies coalesce to enhance sustainable organizational performance (Siddik et al., 2023).

Recent research has recognized FinTech as a critical driver of innovation and operational efficiency in organizations, offering tools for automation, transparency, and financial inclusivity (Khan et al., 2023; Udeagha & Muchapondwa, 2023). Digital transformation, meanwhile, is seen as a strategic imperative that reshapes value chains, business models, and stakeholder engagement (Vial, 2022). Leadership, particularly transformational leadership, has been identified as a determinant in fostering innovation readiness and sustaining organizational change (Yasir et al., 2023). These streams of research collectively highlight the importance of aligning technology adoption, leadership style, and transformation capabilities to achieve strategic objectives. However, many studies have examined these concepts in isolation or focused solely on financial performance, without

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sufficiently addressing their collective influence on sustainability outcomes. Moreover, while FinTech and digital transformation are often cited as catalysts for business agility, their roles in fostering sustainable performance, particularly in developing economies, remain underexplored.

The urgency of climate change, resource scarcity, and social inequality has prompted organizations globally to prioritize sustainability as a strategic goal. In 2023, the World Economic Forum reaffirmed that digital innovation, if deployed responsibly, can accelerate progress toward the United Nations Sustainable Development Goals (SDGs). Yet, realizing this potential depends on how firms leverage technologies such as FinTech to streamline processes, reduce environmental footprints, and engage diverse stakeholders. In Pakistan and other emerging economies, organizations face structural barriers including regulatory constraints, digital illiteracy, and infrastructural deficits that complicate sustainability transitions. According to the Pakistan Economic Survey (2023), only 15% of small-to-medium enterprises (SMEs) report formal digital integration, and even fewer align these efforts with sustainability metrics. Furthermore, while FinTech adoption is gaining momentum in sectors such as banking and retail, its strategic utility for sustainability has not been adequately studied. At the same time, leadership deficiencies particularly in change management continue to hinder digital maturity. Without strong visionary leadership, technological investments risk becoming fragmented, short-term, or disconnected from organizational goals. These concerns highlight the importance of understanding how digital and leadership capacities can be aligned to not just enhance efficiency but also embed sustainability into organizational DNA.

While literature increasingly acknowledges the potential of FinTech and digital transformation to enhance firm performance, there is limited

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empirical evidence on how these factors interact to influence sustainable performance, particularly in emerging market contexts. Existing studies have predominantly focused on financial outcomes (Al-Omoush et al., 2023), ignoring the broader environmental and social dimensions that define sustainability. Moreover, the role of transformational leadership in catalyzing digital initiatives remains under-theorized in the context of sustainability. Transformational leaders, known for inspiring change, fostering innovation, and aligning teams around long-term goals, may serve as a critical bridge between FinTech adoption and sustainable transformation. However, few studies have empirically examined whether such leadership styles enhance digital transformation efforts or mediate their impact on sustainability outcomes. Furthermore, current models often fail to capture the integrative nature of these dynamics treating FinTech, leadership, and digital transformation as siloed initiatives rather than interdependent mechanisms. There is also a geographical research gap: most empirical evidence comes from developed economies, where digital infrastructures and leadership practices differ significantly from those in developing regions like South Asia. Consequently, the mechanisms through which FinTech adoption, digital transformation, and transformational leadership converge to drive sustainable performance remain poorly understood. This study seeks to address this critical gap by developing a comprehensive model that explores these interrelationships, using empirical data from firms operating in Pakistan where digital maturity is evolving, but the sustainability imperative is increasingly salient.

Understanding the synergy between FinTech, digital transformation, and leadership is crucial for organizations aiming to remain competitive while also responding to environmental and social responsibilities. According to the

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International Finance Corporation (IFC, 2022), companies that integrate digital innovation with sustainability principles report stronger stakeholder trust and long-term profitability. This is particularly applicable in growing economies, where the results of sustainability have high connections with economic durability and social prosperity. A case in point is in Pakistan where businesses are being forced to make an adjustment towards standards of environmental conservation as well as modernized their business practices. Nonetheless, a lot of them do not have a strategic approach to the use of digital tools to become sustainable. One area that is crucial in driving the transformation of these organizations through this two-fold transformation is that of leadership. Improved knowledge of how FinTech and transformational leadership can be used to achieve digital transformation could provide strategic means through which the firm can adopt to improve its performance in various aspects. This information can flow into digital financing policies, leadership training paths, and sustainability platforms at the policy level. On the organizational level, it can guide the organizational structure of change management strategies, which align technological innovation with sustainability objectives. Placing this question into the Pakistani context, this study also addresses the need of increased local knowledge regarding the sustainable digital shifts.

This study offers a novel conceptual model that integrates FinTech adoption, transformational leadership, and digital transformation to explain sustainable performance. The simultaneous analysis of these variables provides the research with a more comprehensive perspective of sustainable organizational practices as opposed to analyzing these variables in isolation. Having its data empirically validated in the context of Pakistan will be a localized research gap, and will have practical implications to practitioners

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working in the same socio-economic contexts. The study therefore has implications both in research and practice since it establishes leadership and digital strategy within the context of the wider sustainability debate. This paper will specify the conceptualization of dynamic capabilities based on the Dynamic Capabilities Theory (DCT), where FinTech adoption and digital transformation: The capacity of firms to recombine internal and external competencies to achieve a sustained advantage is thereby conceptualized as dynamic capabilities. In this context, transformational leadership is centered as one of the core managerial skills which support learning, innovation and commitment to sustainability goals. DCT gives a logical theoretical framework to describe the interaction between these capabilities and their development to improve sustainable performance. The suggested model adds value to our understanding of the intersection of the leadership and technology to create organizational value in dynamic environments over the long term.

**Theoretical Foundation**

Dynamic Capabilities Theory (DCT) emerged from strategic management and evolutionary economics as a framework to explain how firms achieve competitive advantage in highly turbulent environments. Based on the contribution of Teece, Pisano, and Shuen (1997), DCT refers to dynamic capabilities as the ability of an organization to combine, create, and re-assemble internal and external competences in response to the fast-changing circumstances and opportunities. It was initially conceptualized as the continuation of the Resource-Based View (RBV) and emphasizes that sustainable advantage is based not only on the possession of firm-specific resources that are stable in their nature, but also on their constant renewal and update. DCT is all about three incredibly important managerial processes namely, sensing new opportunities and threats, taking advantage of

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opportunities under the umbrella of strategic investments, and making the firm transform by recombining assets and routines. Such capabilities at a higher order help DCT rise above standard operation routines and shows off the business nimbleness in a changing market. According to the definition given by Teece (2007), DCT is focused on assets orchestration, strategic learning, and organizational renewal amidst uncertainty.

Since its inception, the theory has evolved across multiple scholarly traditions. Contemporary reviews highlight debates around micro foundations, entrepreneurial decision-making, and evolutionary dynamics that shape capability development over time. A meta review, represented in Rodic et al. (2023) presents the allows framing the evolution of dynamic capabilities through a spiral model of adapting, innovating, and responding to highlight how routines, entrepreneurial behavior, and improvisational agility all strengthen the other within firms. An additional branch augments DCT to those industries that are being disrupted by the digital technology, highlighting that DT is the demonstration of dynamic capabilities in action. DCT has relevance in the current digital and emerging market environment as affirmed by recent studies. The dynamic capabilities can result in both digital leadership and digital culture that will be both the emergent and instrumental elements of transformation within SMEs functioning in the environment of change intensive conditions. Researchers point out that the ability of companies to successfully reorganize and transform digital platforms and partnerships is founded in dynamic capabilities, as those processes also lead to strategic adoption and implementation of FinTech, digital transformation, and sustainable performance in turbulent settings.

Given a model's integration of FinTech adoption, transformational leadership, and digital transformation toward sustainable performance, DCT

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offers a unifying theoretical lens. It does not view such constructs as polarized forces but as co-constructive abilities inside a developing system. Transformational inspired leadership might represent a managerial capability that facilitates sensing and sense making activities; fintech adaptation and digitalization are manifestations of the ability of firms to capture opportunities and rearrange resources; sustainable performance when such capability of dynamic capabilities becomes successfully implemented over time. DCT is logically consistent with model because this approach indicates the evolutionary and systemic process underlying the synergy of leadership, readiness and the use of technologies, and organizational change as the contributors of sustainable value in the organization.

**Hypotheses Development**

The global shift toward sustainability has reshaped the strategic imperatives of firms across sectors. Organizations are progressively under pressure to exceed their short-term profitability and to consider their economic, environmental and social goals in the long term. It is against this background that the digital financial technologies, also known as FinTech, have become vital instruments in transforming the way companies perform and empowering innovation. FinTech is a very broad term covering the use of mobile payments, blockchain, smart contracts, peer-to-peer lending, and financial analytics using artificial intelligence. Not only are these technologies transforming the delivery of financial services, but they are changing how firms direct their efforts in regard to resource allocation, tracking of sustainability indicators and stakeholder engagement (Udeagha & Muchapondwa, 2023). Dynamic Capabilities Theory (DCT) offers a robust conceptual lens through which the relationship between FinTech adoption and sustainable performance can be understood. Basing their assumptions on

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the creation and deployment of higher order capabilities, DCT sees the need of organizations to be able to aggregate, integrate and reconfigure internal and external capabilities that have high degrees in quick change environments (Teece et al., 1997). In this context, the embracement of FinTech is not just a regular operational enhancement activity but rather one of the most crucial dynamic capabilities, which help companies to identify emerging opportunities, such as unmet demand in green financing or ESG compliance, and leverage the hiring using technologies-enabled financial services along with transforming the internal procedures to align with the sustainability agenda objectives (Teece, 2023; Ansong et al., 2024).

Khan et al. (2025) determined that companies using FinTech platforms also witnessed an improvement in, among others, transparency, stakeholder trust and energy efficiency, all riding on high-quality sustainability outcomes. In the same line of argument, Jokhio et al. (2025) report that the employment of FinTech enable businesses to automate the accounting and carbon monoxide measurement process, track the impact indicators that relate to the social aspect of conducting business and reduce the cost of the environment that comes with business finances. These trends show that an opportunity of a triple bottom-line outcome may be more promising in the company when a strategically positioned FinTech is in business operations. Moreover, in case of the new potential markets like Pakistan, where the regulations and market apparatus are at the stage of development, the application of FinTech could be viewed as the gear of inclusivity, resources optimization, and resilience against socio-economic and environmental challenges (Raza et al., 2024). FinTech is strategically valuable, hence, not only in terms of efficiency or cost minimization. FinTech is used to support digital transformation as a holistic initiative, and in such cases, it enables the company to build sustainability into

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business operations, either by using green financing instruments, investment portfolios focused on ESG or enhanced stakeholder engagement processes. Through this, FinTech adoption is in line with the principles of DCT, which indicates that an organization can adapt to external change, constantly innovate and reorganize operations in a bid to achieve sustainable value creation. Based on this theoretical and empirical rationale, the following hypothesis is proposed:

***H1:*** *Firms that adopt FinTech technologies are more likely to achieve higher levels of sustainable performance.*

Digital transformation has increasingly become a strategic imperative for organizations aiming to navigate the complexities of today's volatile, uncertain, complex, and ambiguous (VUCA) environment. It entails the incorporation of digital technologies into every sector of a business and transforms the way organizations are functioning and creating value to stakeholders in a fundamental manner. As opposed to the adoption of technology in isolation, digital transformation is a comprehensive and processual procedure that restructures the organizational culture, capabilities and performance measures (Vial, 2022). When companies decide to undertake such change, they acquire some new competencies that enable them to be more agile, innovative, and sensitive to sustainability needs. In this environment, the implementation of FinTech is one of the motors of the more comprehensive transformation program. When companies implement the use of FinTech products, including blockchain to support transparent supply chains, AI-driven financial analysis, mobile payment networks, and so on, there is a necessity to update their legacy systems, train their workers, and reorganize their processes in response to the new technologies. It has the potential to trigger or enhance digital transformation through integrating digital logic and

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the framework in the organizational framework (Zhao et al., 2023). The adoption of FinTech in itself is not enough unless it is accompanied by a broader change which would allow integration, scalability and congruence with long-term strategic objectives. It is upon the digital transformation that the potential of the FinTech adoption can be achieved to be realized and converted into sustainable outcomes.

Dynamic Capabilities Theory (Teece, 2023) offers a compelling framework to explain this mediating process. By DCT, digital transformation measures the ability of a firm to re-engineer the resources and capabilities depending on new emerging environmental and technological imperatives. Within this framework, it is possible to interpret the use of FinTech as part of the sense and seize activities and digital transformation can be interpreted to refer to the ability to transform represented by the re-aligning of structures, routines and resources that allows firms to adjust in ways that improve their responsiveness and long-term viability. Consequently, the implementation of digital transformation is the drive mechanism whereby the FinTech adoption has contributed to the environmental, social, and economic performance. The recent empirical research fortifies this opinion. Al-Omoush et al. (2023) discovered that digital innovation regarding its effect on sustainability becomes much more powerful when it is included in a higher-level digital transformation approach. According to Bhuiyan et al. (2024), FinTech solutions enhanced sustainable performance by internal capacity building of digitalization and process digitalization only. These results indicate that digital transformation mediates the relationship between FinTech and sustainability through its induction of structural and cultural outfits to facilitate the use of technology to improve performance with respect to technology. Accordingly, the following hypothesis is proposed:

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***H2:*** *Digital transformation mediates the relationship between FinTech adoption and sustainable performance.*

FinTech tools requires more than technological infrastructure, it demands visionary leadership that can guide, motivate, and align the organization around change-oriented goals. Transformational leadership has attracted widespread attention as far as its potential in instigating digital readiness and change in firms is concerned. Transformation leaders motivate and mentally stimulate their staff members, build a captivating image of the future, and enable employees to participate actively in innovation (Yasir et al., 2023). Such strengths are especially important through the discontinuous changes that accompany the use of FinTech and other aspects of the digital revolution. According to the Dynamic Capabilities Theory (Teece, 2023), the effectiveness of how a given organization can sense opportunities, acquire innovations, and modify the processes taking place within it lies in the structural processes as well as the leadership capacity of the organization. Although FinTech adoption can help to enter the sensing and seizing stages, the transforming component, in which the digital tools should be built into functional and cultural streams, needs people and a leadership community. Transformation leadership, in this regard, will be used as a meta-capability to allow firms to reorganize routines, eliminate cultural resistance, and develop the kind of mindset to support enterprise-wide digital transformation.

Empirical evidence reinforces the pivotal role of leadership in digital transitions. According to a Nguyen et al. (2024), the existence of transformational leadership showed that the effect of technology adoption strategies in SMEs was significant. In like fashion, Zhao et al. (2023) proved that transformational leaders act as agents of technological convergence, especially in companies using advanced technical and business digital

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solutions. In environment where there is high rate of technological change and environmental volatility like in the emerging economies, leadership that places innovation, building trust and strategic alignment is the key towards ensuring that not only do organizations embrace digital tools but ensure they are totally integrated into the systems. Devoid of such leadership, the adoption of FinTech can be disjointed or even underperformed and it cannot catalyze the shift of an organization in general to digital transformation. By comparison, in a robust transformational leadership, there is greater possibility of firms internalizing digital values, re-engineering operations and progressing to become digitally mature enterprises. The effect of FinTech adoption on digital transformation cannot be considered equal among all firms as it depends on the existence of leaders capable to stimulate and maintain change. Based on this theoretical and empirical reasoning, the following hypothesis is proposed:

***H3:*** *Transformational leadership moderates the relationship between FinTech adoption and digital transformation.*

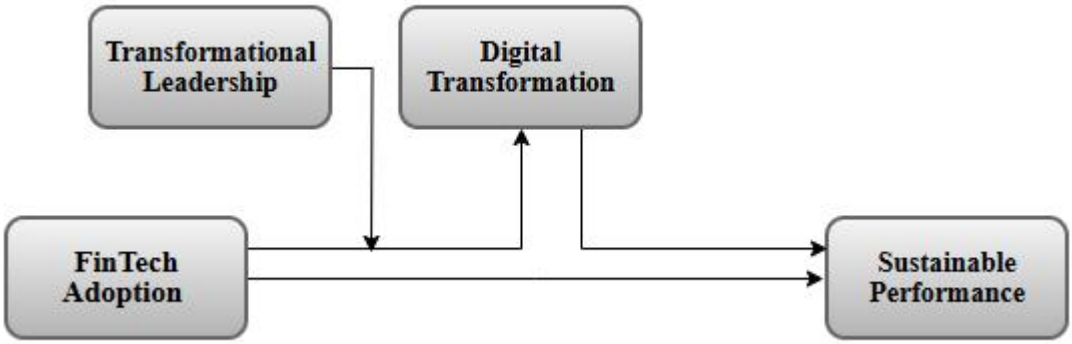


**Figure 1: Research Model**

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**Methodology**

This study adopts a quantitative, cross-sectional research design, which enables the collection of numerical data at a single point in time to examine the relationships among variables. The proposed structural model will be adequately tested using a cross-sectional design that can open the way to the empirical confirmation of the hypothesized relationships among constructs including FinTech adoption, digital transformation, transformational leadership, and sustainable performance (Creswell & Creswell, 2018). The design is appropriate in organizational research whose intentions are to investigate the causal associations by modeling the findings statistically but without controlling any variable.

The target population for this study comprises mid-to-large-scale firms operating in the financial services and technology sectors in Pakistan, specifically those engaged in digital financial solutions, including FinTech service providers, commercial banks, and technology firms integrating financial technologies. This is of direct significance to the research topic since these bodies are on the frontline in terms of digital innovation as well as integration of sustainability in emerging economies. The choice of this population is based on the fact that there is growing application of FinTech in financial and business industries in Pakistan due to the regulatory changes and the need of digital inclusion of finances in the market (State Bank of Pakistan, 2023). As highlighted by previous studies, the study of such organizations is essential towards deriving the connection between technology adoption and performance out come in a highly dynamic economy (Khan et al., 2023). This was done using a stratified random sampling method to have an equal representation in the various parts of the industry space in the FinTech ecosystem (e.g., commercial banks, digital wallets, payment service providers,

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and financial tech startups). This strategy will increase the generalizability of the results and reduce any bias caused by sampling because it considers the heterogeneity of firms.

The sample determination was calculated via Item Response Theory (IRT) which is an advance measure of psychometric method that focuses on the correlation between the latent aspects and reaction to the items especially in the case of Likert scales measures (Embretson & Reise, 2013). IRT is apposite here because it considered different aptitude or interest levels of respondents and which is important in managerial surveys where each organizational role may have a varying tendency of providing consistent responses. The model complexity and the amount of the observed indicators have allowed estimating a minimum of 400 respondents, based on the advice that in Partial Least Squares Structural Equation Modeling 10-15 respondents per indicator should be observed at least (Hair et al., 2021). Ultimately, 315 valid responses were obtained from a distributed pool of 624 questionnaires, yielding a response rate of approximately 50.48%.

Primary data were collected through a structured questionnaire administered to middle and senior managers, as they are key informants for assessing strategic issues such as leadership, technology integration, and organizational performance. To analyze the data, SPSS (Version 26) was used in the analysis of preliminary descriptive statistics, reliability and correlation. One of the most well-known functions of SPSS is its ability to manage the survey-based data and to cause evaluation of data distribution, missing data, and the internal consistency of goods (Field, 2018). In order to employ hypothesis testing and structural modeling SmartPLS 4.0 (Partial Least Squares Structural Equation Modeling, PLS-SEM) was utilized. The latter is suitable because this model is predictively oriented, there are latent constructs, and

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the mediation and moderation path are relatively complicated (Hair et al., 2021). PLS-SEM is particularly suited to studies with non-normal data distributions and smaller to medium sample sizes, making it ideal for this empirical context.

**Measurements**

All constructs were measured using previously validated scales, with slight contextual adaptations to suit the Pakistani organizational environment. Items for FinTech adoption were adapted from Al-Omoush et al. (2023), covering digital payment infrastructure, usage of blockchain, and financial analytics. Digital transformation items were adapted from Vial (2022), focusing on the digitalization of internal processes, innovation practices, and system integration. Transformational leadership was measured using items from Yasir et al. (2023), capturing inspirational motivation, intellectual stimulation, and individualized consideration. Sustainable performance was assessed through a multidimensional scale adopted from Bhuiyan et al. (2024), reflecting economic, environmental, and social performance indicators. Each construct was measured using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), ensuring consistency and comparability across responses.

**Data Analysis**

**Regression Weights**

**Table 1: Factor Loadings**

| | | DT | FA | SP | TL |
|---|---|---|---|---|---|
| **Digital Transformation** | **DT2** | 0.794 | | | |
| | **DT3** | 0.767 | | | |
| | **DT4** | 0.804 | | | |

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| | | | | | |
|---|---|---|---|---|---|
| | **DT5** | 0.867 | | | |
| | **DT6** | 0.809 | | | |
| | **DT7** | 0.821 | | | |
| **Fintech Adoption** | **FA1** | | 0.884 | | |
| | **FA2** | | 0.868 | | |
| | **FA3** | | 0.846 | | |
| | **FA4** | | 0.826 | | |
| | **FA5** | | 0.862 | | |
| | **FA6** | | 0.892 | | |
| | **FA7** | | 0.808 | | |
| | **FA8** | | 0.905 | | |
| **Sustainable Performance** | **SP1** | | | 0.865 | |
| | **SP2** | | | 0.907 | |
| | **SP3** | | | 0.870 | |
| | **SP4** | | | 0.911 | |
| | **SP5** | | | 0.845 | |
| | **SP6** | | | 0.864 | |
| **Transformational Leadership** | **TL1** | | | | 0.832 |
| | **TL2** | | | | 0.823 |
| | **TL3** | | | | 0.822 |
| | **TL4** | | | | 0.864 |
| | **TL5** | | | | 0.850 |
| | **TL6** | | | | 0.794 |

Factor loadings are critical indicators of how well observed variables (items)

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represent their respective latent constructs within a structural equation model. When factor loadings are high, then such construct reliability and validity are confirmed since the observed item highly correlates with the latent variable it is designed to estimate. By SEM analysis, a factor loading of 0.70 and above would be regarded as healthy and good convergent validity, especially when it comes to confirmatory factor analysis (CFA) (Hair et al., 2022). The rule of thumb regarding non-negative factor loadings may be a value above 0.40 in exploratory models even though lower values should be treated cautiously as they have to be theoretically justifiable (Sarstedt et al., 2022). Loadings that are lower than 0.40 are usually viewed as poor and are not likely to serve properly in the measurement process of the construct compromising the validity of the model. Within the framework of the present study, the factor loadings are greater than 0.70, which is the acceptable measure of confirmatory. There is a strong connection between each identified item and the latent construct of DT showcasing a load within 0.767 and 0.867. Equally, the items that represent items of the Fintech Adoption (FA) also demonstrate great loading (0.808, 0.905) and represent excellent internal consistency. High loading values also range between 0.845 and 0.911 of the Sustainable Performance (SP) indicators proving the fact of being consistent with the underlying latent construct. Transformational Leadership (TL) indicators range between 0.794 to 0.864 again going beyond the desirable level. Since there is no item that is less than minimum requirement, one can be assured that all the observed variables can be comfortably kept in the model. These findings establish the soundness of the measurement model and possible presence of the indicators illustrating the construct.

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**Validity Statistics**

**Table 2: Reliability Statistics**

| Variables | Cronbach's alpha | (rho_a) | (rho_c) | (AVE) |
|---|---|---|---|---|
| Digital Transformation | 0.896 | 0.899 | 0.920 | 0.657 |
| Fintech Adoption | 0.950 | 0.953 | 0.958 | 0.743 |
| Sustainable Performance | 0.940 | 0.941 | 0.952 | 0.769 |
| Transformational Leadership | 0.910 | 0.913 | 0.930 | 0.690 |

Reliability and validity indicators such as Cronbach's Alpha, rho_A, Composite Reliability (rho_C), and Average Variance Extracted (AVE) are foundational in assessing the psychometric robustness of constructs in a structural model. The internal consistency reliability is assessed by means of Cronbach Alpha, rho_A and rho_C. Values greater than 0.70 are acceptable, and any values greater than this number point to a high degree of convergence in the items in a construct (Hair et al., 2022). AVE measures convergent validity and gives the extent to which the items of a construct describe the variance in the given construct. The value of 0.50 and above indicates that at least 50 percent of the variance of a latent variable is explained by indicators (Sarstedt et al., 2022). Overall, in the present model, every construct exceeds the necessary limits of internal consistency. The acceptable reliability of Digital Transformation (DT) is identified as Cronbachs Alpha of 0.896, rho_A equal to 0.899, and rho C equals 0.920, with AVE also showing 0.657-proper convergent validity. There is exceptionally high reliability (alpha = 0.950, rho alpha = 0.953, rho gamma = 0.958) and high convergent validity (AVE = 0.743) of Fintech Adoption (FA). Sustainable Performance (SP) and Transformational Leadership (TL) exhibit a very good internal consistency

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and AVE scores that meet the requirement of 0.50. These results collectively affirm that the constructs are measured reliably and possess satisfactory convergent validity within the model.

**Discriminant Validity**

**Table 3: HTMT Ratio**

| Variables | DT | FA | SP | TL |
|---|---|---|---|---|
| Digital Transformation | | | | |
| Fintech Adoption | 0.431 | | | |
| Sustainable Performance | 0.488 | 0.581 | | |
| Transformational Leadership | 0.517 | 0.645 | 0.607 | |

Discriminant validity ensures that conceptually distinct constructs in a structural equation model are empirically distinguishable. Another viable approach to evaluating discriminant validity is the Heterotrait-Monotrait Ratio (HTMT) that compute the level of the relationship between two latent variables by their item correlations. Although HTMT degree smaller than 0.85 can be viewed as strict evidence of discriminant validity, within less conservative reasoning, a threshold of 0.90 is admissible (Henseler et al., 2015; Hair et al., 2022). Values larger than these thresholds imply that no discriminant validity is demonstrated, hence, some concepts might overlap. The outcome of HTMT results given is indicative of the fact that each inter-construct correlations is well within the acceptable range. The largest HTMT value (0.645) occurs between Fintech Adoption (FA) and Transformational Leadership (TL), and figuratively speaking is well within the looser limit of 0.85. In the same way, the HTMT value between DT and FA (0.431), DT and SP (0.488), DT and TL (0.517), FA and SP (0.581), and SP and TL (0.607) meet the requirement of discriminant validity. These results confirm that each construct is empirically distinct, supporting the model's conceptual structure

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and indicating that multicollinearity is not a concern within the measurement model.

**Model Fitness Indicators**

**Table 4: Fitness Values**

| | Saturated model | Estimated model |
|---|---|---|
| **SRMR** | 0.059 | 0.070 |
| **d_ULS** | 1.218 | 1.717 |
| **d_G** | 0.764 | 0.780 |
| **Chi-square** | 1358.067 | 1378.695 |
| **NFI** | 0.819 | 0.816 |

Model fit indices in PLS-SEM assess how well the proposed model aligns with observed data. The SRMR values for the saturated (0.059) and estimated model (0.070) are both below the 0.08 threshold, indicating good model fit (Hair et al., 2022). Additionally, d_ULS (1.218, 1.717) and d_G (0.764, 0.780) values are low, supporting model adequacy by showing minimal discrepancy between the empirical and model-implied correlation matrices (Dijkstra & Henseler, 2015). The Normed Fit Index (NFI) values of 0.819 and 0.816 are above the acceptable 0.80 cutoff, further confirming model fit (Hair et al., 2022). Although Chi-square values are high, this statistic is sensitive to large sample sizes and less reliable in PLS-SEM. Overall, the combined indicators suggest that the structural model demonstrates an acceptable fit to the data.

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**Hypotheses Results**

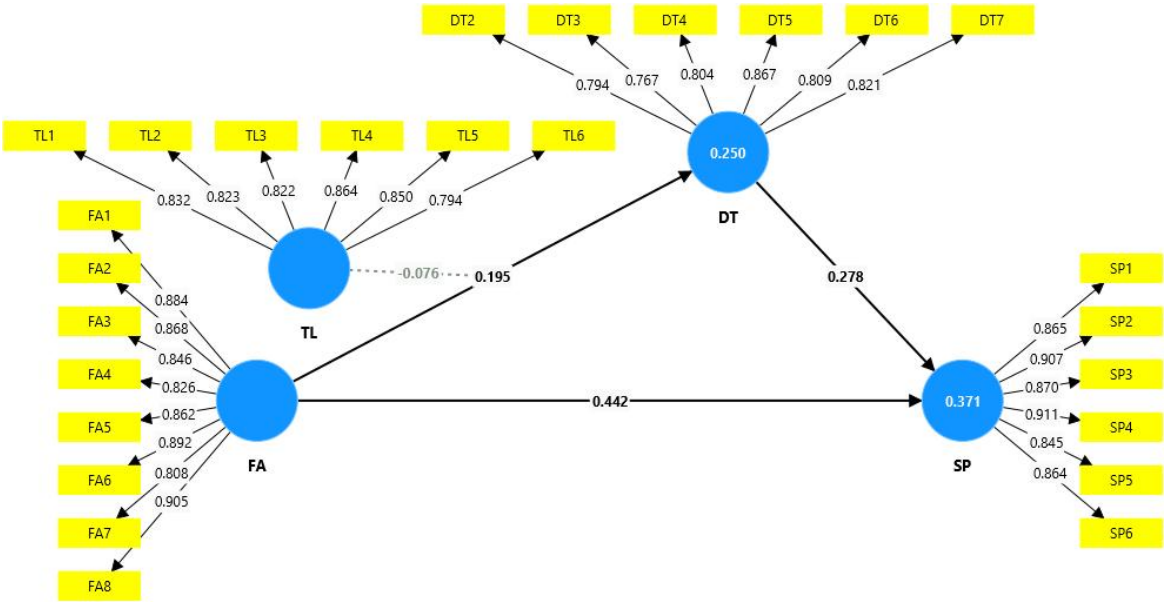


**Figure 2: Structural Equation Modelling**

**Table 5: Findings**

| | Sample | (M) | Std | T statistics | P values |
|---|---|---|---|---|---|
| **FA -> SP** | 0.442 | 0.443 | 0.048 | 9.208 | 0.000 |
| **FA -> DT -> SP** | 0.054 | 0.054 | 0.021 | 2.571 | 0.010 |
| **TL x FA -> DT** | -0.076 | -0.071 | 0.052 | 1.464 | 0.143 |

**FA; Fintech Adoption, SP; Sustainable Performance, DT; Digital Transformation, TL; Transformational Leadership**

The results of the hypotheses testing indicate varying levels of statistical support for the proposed relationships. The direct effect of FinTech adoption (FA) on sustainable performance (SP) is statistically significant, as evidenced by a path coefficient (β) of 0.442, a t-value of 9.208, and a p-value of 0.000.

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These results exceed the conventional significance threshold ($p < 0.05$), confirming strong empirical support for the hypothesis that FinTech adoption positively influences sustainable performance.

The mediating role of digital transformation (DT) in the relationship between FinTech adoption and sustainable performance is also supported. The indirect path coefficient ($\beta = 0.054$), accompanied by a t-value of 2.571 and a p-value of 0.010, falls within acceptable significance levels, indicating a statistically meaningful mediation effect. This finding suggests that FinTech adoption contributes to sustainable performance not only directly but also indirectly through its influence on digital transformation processes. The moderating role of transformational leadership (TL) in the relationship between FinTech adoption and digital transformation is not statistically supported. The interaction term (TL × FA → DT) yields a negative path coefficient ($\beta = -0.076$), a relatively low t-value of 1.464, and a p-value of 0.143, which exceeds the 0.05 significance level. This implies that transformational leadership does not significantly strengthen or weaken the impact of FinTech adoption on digital transformation within the context of this study.

**Discussion**

The study's findings offer empirical support for two of the three proposed hypotheses providing valuable insights into how FinTech adoption, digital transformation, and transformational leadership interact to influence sustainable performance. Each hypothesis result is discussed in detail below, contextualized within relevant theoretical frameworks and prior literature.

The positive and statistically significant relationship between FinTech adoption and sustainable performance validates the first hypothesis. Path coefficient (beta = 0.442, $p < .001$) indicates that the organization using FinTech solutions are in better position to realize sustainability outcomes.

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Such finding can be explained adequately by the Dynamic Capabilities Theory (DCT), who would consider FinTech as a capability of the higher-order that enables firms to sense, but also to grasp significant opportunities, like those of green financing and ESG compliance, via technology-based strategies (Teece, 2023). This connection is reinforced by previous empirical researches. Khan et al. (2025) identified that the application of FinTech in the Pakistani financial market contributed to better transparency and environmental management, whereas Jokhio et al. (2025) stated that it led to increased stakeholder interactions and better efficiency of resources. These technologies put on autopilot the previously manual processes in the sphere of finances, enabling firms to track the environmental and social indicators more closely and make their ecological footprint smaller (Udeagha & Muchapondwa, 2023). Moreover, when it comes to emerging economies where inefficiencies in infrastructures and fragmentation in regulation hinder the way towards sustainable growth, FinTech not only allows companies to access comprehensive and scalable financial services, but it also allows them to cut through the red tape (Raza et al., 2024). Therefore, the result does not only signify one of a wider tendency of the adoption of FinTech, as something that acts in a cross-dimensional sense as an enabler of financial efficiency, but also as a driver of sustainable value creation transcending dimensions of performance.

The second hypothesis, which proposed that digital transformation mediates the relationship between FinTech adoption and sustainable performance, is also supported by the data. The indirect effect ($\beta = 0.054$, $p = .010$) confirms that FinTech adoption contributes to sustainability both directly and indirectly through digital transformation. This mediating effect reinforces the conceptualization of digital transformation as the operational

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mechanism that embeds FinTech tools into broader organizational systems. According to Vial (2022), digital transformation involves fundamental shifts in organizational routines and culture, which are essential to realizing the full benefits of technological adoption. FinTech tools often initiate this transformation by necessitating changes in infrastructure, processes, and employee capabilities. Yet it is the transformation itself manifested through digital integration, innovation practices, and system-wide alignment that enables sustained improvements in environmental, social, and economic performance (Al-Omoush et al., 2023; Bhuiyan et al., 2024). This view is also consistent with DCT's "transforming" dimension, where the integration of digital tools into strategic and operational routines allows the firm to reconfigure itself in response to changing sustainability imperatives (Teece et al., 1997). Therefore, the significance of this mediation effect highlights the importance of treating FinTech not as an isolated technological innovation but as part of a larger transformational strategy that realigns the firm toward long-term sustainability goals.

In contrast, the third hypothesis proposing that transformational leadership moderates the relationship between FinTech adoption and digital transformation was not supported. The negative and statistically non-significant interaction term ($\beta$ = -0.076, p = .143) suggests that transformational leadership does not significantly alter the strength or direction of the effect FinTech adoption has on digital transformation in the context studied. This result is somewhat unexpected given prior findings that emphasize the role of leadership in enabling technology-driven change. Yasir et al. (2023) and Zhao et al. (2023) emphasized that transformational leaders are instrumental in fostering digital readiness, aligning visions, and reducing resistance to change. Such a difference could affect plausible reasons could be

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that of methodological or contextual. When transitioning to technologies in emerging economies, such as in Pakistan, there is a high chance that the leadership cannot have the digital knowhow or institutional capacity to lead the change, especially when addressing solutions that are still in their nascency or have been externally mandated, aka FinTech. There is also a possibility that internal leadership may maintain less of a stimulus process in the setting of externally driven digital transformations, either by regulators or global supply chain partners, than, say, structural or institutional ones (Nguyen et al., 2024). A second reason might be a matter of measurement: perhaps the leadership measures in question did not address sufficiently the subtleties of digital-specific leadership behavior, e.g., digital visioning or agile project manager behavior, which have lately come to be recognized as rather different to the traditional transformational leadership measures (Teece, 2023).

**Limitations and Future Directions**

While this study offers valuable insights into the interplay of FinTech adoption, digital transformation, transformational leadership, and sustainable performance, several limitations warrant acknowledgment, which may influence the interpretation and generalizability of the findings. To begin with, the limitations of the cross-sectional research design as applied in this study restrict the interpretation of causative relationship among the variables. Though structural equation modeling can present us with useful information such as the strength and direction of relationships, the data were measured only once limiting the analysis of interactions as well as the longitudinal effects. A more pronounced study in the future should implement longitudinal designs to measure changing vectors in digital transformation systems and sustainability performance, which will allow a more accurate evaluation of

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causality (Hair et al., 2022). The focus population was restricted to middle-sized and large companies that operate in Pakistan FinTech and financial services sector. As much as such focus ascertains relevance of the research into specific context and empirical accuracy, it also forecloses the application of the findings to other sectors, sizes of firms and national environments. Small companies and non-financial sectors might have various catalysts and obstacles regarding the expansion of digital and durable strategies. Further comparisons in various industries and geographic areas might give a bigger picture and increase the strength of external validity. Specifically, upcoming studies might examine whether institutional variation, including regulation scheme, digital infrastructure, or cultural aspect, affects the relations established in this paper (Siddik et al., 2023). The study utilized self-reported materials that was gathered using structured questionnaires given to managerial respondents. Despite the widespread use of this method in organizational study, it implies some concerns about the common method bias and the subjectivism of assessing constructs that are variables on a firm level like leadership behaviour or sustainability performance. The use of triangulation with incorporation of objective performance variables, data archives or response at the level of employees may help reinforce the validity of further research. Besides, the use of Likert-scale tools does not always represent the complexity of such concepts as transformational leadership or digital maturity (Nguyen et al., 2024). The current findings may be supplemented by qualitative or mixed-method approaches, which would add more details about the context. The conceptual model of the study, though sufficient, might also miss out noteworthy variables that could shed some more light on the processes behind sustainable performance. The transformation leadership has an insignificant moderating role on the

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relationship between FinTech and digital transformation, which indicates the involvement of other variables with a greater influence within context and organization. In the future, researchers might want to investigate other moderators like organizational culture, absorptive capacity, or digital orientation, which might determine the nature of technology adoption and integration (Zhao et al., 2023). One can think about the incorporation of mediators, e.g. innovation capability, green human resource management, or employee digital competence that may explain how the use of FinTech could be converted into performance outcomes (Bhuiyan et al., 2024).

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