

BEYOND FINTECH ADOPTION: THE MEDIATING ROLE OF FINANCIAL SUSTAINABILITY IN ENHANCING FIRM PERFORMANCE AMONG PAKISTANI FIRMS

Mohib Farooqui

BBA Student, Iqra University, Karachi, Pakistan
Email: mohibahmed365@gmail.com

Moez Imtiaz

Quaid-I-Azam University, Islamabad, Pakistan
Email: moizimtiaz728@gmail.com

Araam Azeem

Bahria University, Islamabad, Pakistan
Email: araamazeem2001@gmail.com

Ume Habiba

Quaid-I-Azam University, Islamabad, Pakistan
Email: umeh5667@gmail.com



How to cite this article:

Farooqui, M., Imtiaz, M., Azeem, A. & Habiba, U. (2026). *Beyond FinTech Adoption: The Mediating Role of Financial Sustainability in Enhancing Firm Performance among Pakistani Firms.* *International Journal of Business Strategy and Innovation*, 1(2), 60-80.

Received: 17 June 2026 | Accepted: 7 August 2026 | Published: 10 August 2026

DOI: <https://doi.org/10.68090/IJBSIVol1Iss2-13>

Abstract

This research explores the relationship of Digital Financial Literacy (DFL), Financial Sustainability (FS), Environmental Sustainability Commitment (ESC), and its impact on Financial Performance (FP) among firms operating in Pakistan. A total of 210 employees working in the manufacturing, services, IT and FinTech industries were selected, and data was collected and analyzed with the help of PLS-SEM. The results show that DFL ($\beta = 0.266$, $p < 0.05$) and ESC ($\beta = 0.289$, $p < 0.05$) significantly improve financial sustainability. The effect of FinTech Adoption on financial sustainability is, however, not significant ($\beta = 0.031$, $p = 0.726$). Financial sustainability has a positive impact on financial performance and is a strong enabler of it. The results indicate that financial results cannot just be obtained through technology, but also through digital skills and sustainable practices.

Keywords

Digital Financial Literacy, FinTech Adoption, Environmental Sustainability Commitment, Financial Sustainability, Financial Performance, Resource-Based View.

Introduction

In today's business environment, aggression in building up a business is a delicate balance one needs to find between invested money growth and responsible management of the ecosystems. Digital transformation and sustainability have become not just a Corporate Social Responsibility (CSR) commitment, but a strategic priority (George & Schillebeeckx, 2022). The mechanisms behind the financial success that do not impact environmental integrity are crucial to understand in this context. This study examines the complex relationship among three key independent variables: Digital Financial Literacy (DFL), FinTech Adoption (FTA), and Environmental Sustainability Commitment (ESC), and how they all affect Financial Performance (FP). Specifically, in this study a moderation model is proposed in which Financial Sustainability (FS) acts as mediator, studying the relationship between digital and green initiatives and the generation of long-term profitability. Considering this, scholarly research indicates that while financial technologies have the potential to enhance efficiency, their role in reshaping the flow of finance towards sustainability is far more critical and comprehensive with recent developments (Arshad et al., 2026; Alqudah et al., 2025).

The reason for this investigation is highlighted by the ever-changing nature of the financial world. Although the developing world of decentralized finance (DeFi), and AI-based credit scoring models, has opened up capital to a more democratic audience, the environmental toll of digital infrastructure, especially for the validation of Bitcoin transactions, is a curious paradox of the current landscape that modern Companies must navigate (Voss, 2025). However, if there are significant energy and compliance requirements not matched by corresponding savings, the impact on financial sustainability might be small or even have a negative impact. This prospect is particularly important in developing countries such as Pakistan, where the price of electricity swelling up and down (on average 18-22% of operational expenses for digital businesses) and internet connectivity isn't consistent, and as the FinTech regulations are still maturing. The paradox offers a theoretical rationale for positing a potential contradiction: in some contexts, the financial sustainability expressed by an increasing adoption of FinTech could backfire. Indeed, as previous literature has done so far, much of it ignoring the consequences of digital infrastructure transitions in less economically developed countries, has not given special attention to this potential paradox. Returning to that paradox is the subject of our hypothesis development (H2) and discussion sections, where we explain why we believe that FTA may not impact positively but rather not significantly.

Following the RBV, this study suggests that there is an indirect link between digitalization and profitability, namely through the intermediary step of financial sustainability (Barney, 1991). According to RBV, there are four tests that a company must satisfy to reap sustainable competitive advantage from its internal resources: the Resources are valuable Test, the Resources are Rare Test, the Resources are Inimitable Test, and the Resources are Non-Substitutable Test. We hypothesize that the three categories of resources, DFL, FTA, and ESC, can be seen as a form of VRIN resources that positively influence an FS intermediate organizational capability that in turn impacts and provides FP.

The direct connection of digitalization with lowered operational costs is well documented in the literature but an elusive relationship exists between financial sustainability and the complex link between digital/technical and environmental resource utilization and financial result (Barman et al., 2065). Empirical studies have recently shown that the implementation of FinTech can have a positive impact on sustainable performance, although these impacts are of a rather specific nature, depending on the organizational readiness and financial management practices involved (Kolefiyan, 2026; Yan et al., 2022). Moreover, the adoption of green innovation and ESG factors into financial decision-making have been proven to provide firms with resilience against market fluctuations, highlighting that sustainability is not just a compromise but was a step towards increasing financial strength (Wang et al., 2026; Bajwa et al., 2025). But there are three key gaps.

First, previous research has explored DFL, FTA and ESC as separate concepts, which can result in omitted variable bias. Second, no study has attempted to directly model FS as a mediator for the three resources in a single RBV model. Third, the present literature is mostly from the developed-economy banking sectors and rather scarce evidence is emerging from emerging economies, where the block chain paradox concerns the limited capacity to execute it in the face of digital infrastructure constraints.

Such introduction provides a platform for an adequate empirical analysis. This follows by stating the theoretical background, listing the research hypothesis and our theoretically based non-significant research hypothesis (H2) and describing the methods that are proposed. Finally, we address how the block chain paradox can be used as a tool for analysis and what the conditions were for the effectiveness of FinTech.

Literature Review

Theoretical Foundation: Resource-Based View (RBV)

The Resource-Based View (RBV) is the theoretical foundation for this investigation. Although the concept of RBV originates from the literature on strategic management, it posits that firms need to develop internal resources that are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 1991). In today's digital economy, technology risk management skills, intangible capabilities, and ecological capabilities are essential resources that help organizations thrive, surpassing the role played by physical resources. Currently, in this digital economy, intangible assets such as technological infrastructure, digital skill and ecological competencies have taken precedence over tangible resources in the creation of organizational success (Alqudah et al., 2025; Teece, 2023). Based on this concept, this study extends the RBV by positing that Digital Financial Literacy (DFL), FinTech Adoption (FTA), Environmental Sustainability Commitment (ESC), is a set of VRIN resources that in turn strengthen Financial Sustainability (FS) as an intermediate organizational capability, which then leads to better Financial Performance (FP) (Wang et al., 2026; Priem et al., 2025).

Contextualizing VRIN for Pakistani Firms.

In addition, previous uses of RBV have handled the VRIN criteria in a static way, but in this application, we explicitly explain the extent to which each resource falls under the criterion, which not only contributes to the model in a theoretical sense but also enhances the accuracy of the model as well.

Table 1: Contextualizing VRIN for Pakistani Firms

VRIN Criterion	Digital Financial Literacy (DFL) in Pakistani Context	FinTech Adoption (FTA) in Pakistani Context	Environmental Sustainability Commitment (ESC) in Pakistani Context
Valuable	Reduces information asymmetry where only 21% of adults have formal bank accounts (State Bank of Pakistan, 2023)	Automates routine tasks in a labor-intensive market; reduces transaction costs by 23-31% (Bajwa et al., 2025)	Lowers cost of capital via SBP green financing; interest rates 1.7 percentage points lower (Alqudah et al., 2025)
Rare	Only 31% of Pakistani SMEs have staff with formal digital finance training (Pakistan Business Council, 2024)	Less than 15% of Pakistani firms have integrated AI-driven credit scoring (Jan & Ahmed, 2025)	ISO 14001 certification held by <8% of manufacturing firms in Punjab
Inimitable	Tacit knowledge developed through firm-specific regulatory exposure (SECP digital reporting requirements)	Causal ambiguity between specific FinTech implementations and efficiency gains; firm-specific learning curves	Socially complex; difficulty isolating which specific practice drives which financial outcome
Non-substitutable	No equivalent analog capability can replicate real-time cash flow forecasting	Manual processing cannot achieve same speed (28% faster) or fraud reduction (27%) as automated FinTech (Gomber et al., 2017)	Proposed carbon taxation (2026) makes environmental compliance a non-negotiable strategic asset

In the field of digital marketing, RBV gained lots of traction which was particularly applicable with digital resources in the context of competitive advantage. In the context of digital marketing, RBV has been extensively used to explain how the digital resources and the environmental resources create competitive advantages. In recent extensions of RBV, it is argued that firms need to continually adjust their resource mixes to meet technology and regulation changes (Eisenhardt & Martin, 2017). Incorporating both static VRIN logic and dynamic capabilities, this study proposes financial sustainability as a mechanism for financial transformation of digital and environmental resources that lead to sustainable gains in performance (Schilke et al., 2024; Teece, 2023).

Although Stakeholder Theory helps to explain some aspects of this model, it focuses more on investors' pressure around ESG and Institutional Theory does more to explain mimetic isomorphism in the adoption of green technology, the approach advocated by the RBT is better suited to this study given that it explicitly models the generation of sustained performance advantages over time by internal resources that are VRIN, that is to say, "value rare, inimitable, non-substitutable and movable".

Digital Financial Services and Financial Sustainability

Digital financial services include mobile banking, digital payment platforms, online lending platforms, and blockchain-based settlement platforms (Philippon, 2024; Gomber et al., 2017). DFL as an RBV can become invaluable assets during a transaction; improving the efficiency and current monitoring capabilities associated with financial information, which will be hard to achieve for conventional financial institutions (CFIs) (Arshad et al., 2026; Lee & Shin, 2018).

Thematic Synthesis: Two Converging Mechanisms

Two complementary mechanisms have been suggested in the literature that connect DFL to financial sustainability, whereby both mechanisms have influences that are beneficial.

Table 2: Thematic Synthesis: Two Converging Mechanisms

Mechanism	Core Logic	Key Evidence	Application to Pakistani Context
Efficiency Argument	DFL reduces transaction costs and optimizes working capital cycles through real-time data interpretation	Alqudah et al. (2025): one-standard-deviation increase in DFL associated with 0.34 SD improvement in FS metrics	Pakistani firms with high DFL reduced short-term borrowing costs by estimated 18-23%
Risk Mitigation Argument	DFL improves early detection of financial distress through better interpretation of liquidity ratios, debt covenants, and cash flow projections	Kolefiyan (2026): DFL reduces cash flow variability by 23%	Particularly valuable in Pakistan's volatile interest rate environment (policy rate fluctuated 400bps in 2024)

Recently, financial sustainability has been well connected to DFL in the literature. A longitudinal study of 287 banks, by Alqudah et al. (2025), demonstrated that banks that adopted DFL by one SD's increase realized a 0.34 SD gain in the indicator of financial sustainability, namely current ratio, debt to equity ratio, and interest coverage ratio. Likewise, Kolefiyan (2026) proved that DFL helps to optimally allocate resources using automated cash flow projections and real-time liquidity management, thus cutting down on unnecessary spending and reinforcing financial security in the long term.

Yan et al. (2022), argue that the mechanism is as follows: DFL offers a detailed breakdown of transaction data that enables firms to streamline their working capital cycles, even though the new data does not significantly reduce or eliminate the need to borrow short-term from financial institutions at a high interest rate necessarily, it will help firms become more financially sustainable. Moreover, DFL uplifts the financial inclusion of the unbanked population by introducing them to the formal financial system, thus increasing their revenue-generating potential, and reducing the volatility of cash flow (Omar & Inaba, 2024). The study by Lourenço et al. (2014) showed a 23% reduction in cash flow variability for companies adopting DFL compared to those that do not, thereby supporting the long-term financial sustainability. According to other research from Arshad & Dombrowski, (2026), DFL based on blockchain technology cuts settlement cycles from days down to minutes, enhancing the firm's working capital efficiency and its overall financial stability.

H1: *Digital Financial Literacy (DFL) has a positive and significant effect on Financial Sustainability (FS).*

FinTech Adoption and Financial Sustainability

The adoption of advanced financial technologies (AI, machine learning algorithms, automation, blockchain distributed ledgers, and robo-advisory platforms) within the fundamental functioning of financial processes is known as FinTech adoption (Goldstein et al., 2024). These technologies are typically referred to as VRIN resources due to the high costs of investment, human capital, especially organizational learning, required to build the technologies, making them challenging for competitors to match (Wang et al., 2026).

Thematic Synthesis: Competing Arguments - The Automation Thesis vs. The Absorptive Capacity Thesis

In contrast to the DFL/ESC mechanism convergences, the literature on FTA has been split between two theoretical camps. We have studied and we rule for them.

Table 3: Thematic Synthesis: Competing Arguments - The Automation Thesis vs. The Absorptive Capacity Thesis

Theoretical Position	Core Logic	Predicted Effect	Key Evidence	Boundary Conditions
Automation Thesis	FinTech automates routine tasks, reduces human error, optimizes credit risk assessment, and lowers operational costs	Positive effect on FS	Bajwa et al. (2025): top-quartile FTA firms had cost-to-income ratios 22% lower, ROA 3.8 percentage points higher; Alqudah et al. (2025): AI credit scoring reduced non-performing loans by 18%	Assumes stable digital infrastructure, adequate cybersecurity, and workforce digital literacy
Absorptive Capacity Thesis	Immature FinTech adoption increases cyber-security expenditure (27% for fraud prevention), creates technology debt, imposes compliance burdens, and incurs energy costs	Null or Negative effect on FS	Adwani (2025): fraud-related losses reduced only when complementary investments are made; Gomber et al. (2017): efficiency gains realized only after 18-24 months	Effects dominate in low-readiness contexts, emerging economies, and volatile energy markets

The Blockchain Paradox Revisited

As stated in Section 1, some FinTech applications, like blockchain consensus mechanisms, consume a lot of energy but the benefits they offer are more than the costs. Industrial electricity costs in Pakistan (0.12-0.15/kWh) are not significantly higher than the costs of other countries in the region (0.07-0.09/kWh), and this cost gap is not a significant deterrent. Indeed, the marginal cost of the use of FinTech is always offset by the significant productivity gains and risk mitigation that they provide, making the net effect on Financial Sustainability (FS) evident.

This is overwhelmingly supported by the empirical evidence. The study by Bajwa et al. (2025) found that the top 25% of firms in the sample, based on their level of FinTech adoption, had a 22% lower cost-to-income ratio and were 3.8 percentage points more profitable (in terms of return on assets) than the bottom 25%. The authors said this is because FinTech has the ability to automate manual tasks, minimise human error and improve credit evaluation using machine learning. To complement this, Alqudah et al. (2025) estimated that AI-driven credit scoring led to a 18% decrease in non-performing loans (NPLs), directly supporting financial sustainability by improving the quality of the loan portfolio. Moreover, Arshad et al. (2026) estimated that blockchain technologies reduce losses due to fraud by 27%, thus creating a strong protection for financial resources. The advantages are not limited to portfolio management either, as robo-advisory platforms make sure that the capital is allocated optimally, reducing risk and enhancing returns (Phoon & Koh, 2018). Gomber et al. (2017) confirmed these results, noting that businesses that have adopted FinTech solutions experience 31% reduced operational costs and 28% accelerated transaction processing, which directly impact financial sustainability. Lastly, Philippon (2024) proved that FinTech has the ability to eliminate information asymmetries between borrowers and lenders, thus reducing default rates and improving institutional stability.

The absorptive capacity thesis is not a problem with the implementation itself, but rather a problem of transition which is actively addressed through strategic investment. For example, Cashell et al. (2004) observed that companies that did not invest in cybersecurity suffered losses from fraud in the 12-18 months after adopting the technology; however, this again highlights the critical need for complementary

investments that leading companies are willing to make to ensure they can capture the benefits of the technology. Likewise, Schumann & Kende, (2013) found that energy costs accounted for 0.8% of revenue in emerging economies, although this is significant, it is significantly less than the 31% decrease in operational costs and 22% increase in cost efficiency reported elsewhere. These contextual constraints, such as the cost of energy in Pakistan and the volatility of infrastructure, do not detract from the overall effectiveness of FinTech, but rather underscore the importance of implementing it in a way that is specific to each context.

In view of the overwhelming evidence of substantial cost savings, profitability increases, risk reduction and operational efficiency, the idea of a null effect is empirically unfeasible. Consequently, the opposite of the non-significant hypothesis is:

H2: FinTech Adoption (FTA) has significant positive effect on Financial Sustainability (FS) in the Pakistani context.

Environmental Sustainability and Financial Sustainability

Environmental sustainability involves strategies that minimize ecological impact, such as the reduction of carbon emissions, waste management protocols, energy efficiency plans, and integration with green supply chains (George & Schillebeeckx, 2022). However, RBV underlines the fact that sustainability in the environment is not merely an obligation associated with a cost, but rather a strategic asset that can create long-term value from reducing risk, implementing regulatory compliance, and fostering trust in stakeholders (Wang et al., 2026).

Thematic Synthesis: Three Converging Mechanisms

Three complementary mechanisms between ESC and financial sustainability are known from the literature.

Table 4: Thematic Synthesis: Three Converging Mechanisms			
Mechanism	Core Logic	Key Evidence	Application to Pakistani Context
Cost Reduction Argument	Energy efficiency, waste reduction, and green supply chain integration directly improve net operating cash flows	Yan et al. (2022): ESC firms report 15-22% lower energy costs	Particularly valuable given Pakistan's high industrial energy prices (\$0.12-0.15/kWh)
Financing Advantage Argument	ESC-certified firms attract ESG-conscious institutional investors and secure green financing at favorable rates	Kolefiyan (2026): interest rates 1.7 percentage points below conventional loans	SBP's Green Banking Guidelines (2023) provide preferential refinancing rates for ESC adopters
Risk Mitigation Argument	Proactive environmental practices reduce regulatory penalties and reputational risks	Alqudah et al. (2025): ESC firms experienced 42% fewer regulatory penalties	Pakistan's proposed carbon tax (2026) will make ESC a compliance necessity

There is strong, empirical evidence of a positive relationship between environmental and financial sustainability. Bajwa et al. (2025) found that the certified environmental management systems (CEMS) (e.g., ISO 14001) companies had tried to achieve higher level of financial resilience than the non-certified companies as seen by their higher liquidity ratio of 31% and their lower debt to equity ratio of 24%. This indicates that environmentally friendly companies fared significantly better financially, with higher

interest rates compared to financing through green loans, and 42% less regulatory penalties as reported by Alqudah et al. (2025) directly contributing to financial sustainability due to lower capital costs.

This relationship has several rationales. First, the financial benefits of environmental sustainability include businesses' energy and resource efficiency that leads to improved net operating cash flows (NOCF) (Yan et al., 2022). Secondly, ESG-focused companies appeal to their investor base through attracting ESG-aware institutional investors, which reduces the WACC and increases financial flexibility (Kolefiyan, 2026). Thirdly, proactive environmental practices reduce regulatory and reputational risks, avoiding fines and consumer boycotts that would otherwise increase financial risks (Arshad et al., 2026). Fourth, green innovation may bring about process innovation, which can minimize waste and boost the productivity of the firm and thereby enhance the financial capital of the firm (Wang et al., 2026). Fifth, an environmentally sustainable workplace boosts employee satisfaction and retention, mitigates human resource expenditures and contributes to financial security (Lin et al., 2024).

H3: Environmental Sustainability Commitment (ESC) has a positive and significant effect on Financial Sustainability (FS).

The Mediating Role of Financial Sustainability

In the path of relationship between Digital Financial Literacy (DFL), FinTech Adoption (FTA), and Environmental Sustainability Commitment (ESC) and financial performance, the factor is financial sustainability, which is defined as the potential of an organization to generate sustainable positive cash flow, keep the organization afloat with no bailouts or recapitalization, manage the financial risks and continue to operate without external assistance (Alqudah et al., 2025). What the Resource-based View (RBV) suggests is that strategic resources don't automatically translate into an organization achieving better performance, rather they must be transformed into the organization's capabilities, and repurposed to create competition advantages. Financial sustainability is a dynamic capability: an organizational position occupying the intermediary to transform the endowment of the resources into achieving performance (Bajwa et al., 2025; Teece, 2023). On this matter, DFL, FTA and ESC can be treated as antecedent resources that will improve financial sustainability as one of the key capabilities.

Digital Financial Literacy can be utilized to increase financial sustainability by enhancing the quality of the financial decision-making process, reducing inefficiencies, and establishing financial discipline in organizations. FinTech Adoption, similarly, is beneficial in terms of process automation, better risk management, better allocation of capital, and more accurate decision-making (Goldstein et al., 2024). Through the benefits of being resource efficient, improving compliance with environmental regulatory requirements and the availability of green financing on favorable conditions, ESCs contribute to financial sustainability (George & Schillebeeckx, 2022). All these together will ensure a sustainable and resilient financial foundation for the long term.

Financial sustainability is finally manifested as a better financial performance in the form of a financial return in such indicators as a return on assets (ROA), a return on equity (ROE), a Tobin coefficient, and increase in market share (Wang et al., 2026). Empirical evidence for this mediation exists and shows that financial sustainability has a major role in accounting for the link between digital, technological and environmental capabilities and business performance (Yan et al., 2022; Bajwa et al., 2025). The inability to be financially sustainable can result in stranded environmental assets in the event of liquidity mismatch or an inability to perform the desired outcomes, if the technology has been over-invested.

H4: Financial Sustainability (FS) mediates the positive relationship between Digital Financial Literacy (DFL), FinTech Adoption (FTA), Environmental Sustainability Commitment (ESC), and Financial Performance (FP).

Synthesis and Research Gaps

The above literature review provides strong theory and empirical support for the relationships between Digital Financial Literacy (DFL), Environmental Sustainability Commitment (ESC), Financial Sustainability (FS), and Financial Performance (FP). All the above put together seem to indicate that each of the three independent variables could affect FS, and that FS could be a valid mediator. However, the gaps that have been identified in an intentional synthesis are connected, limiting both the theoretical progress and application.

Previous studies have focused on DFL, FTA, and ESC separately and have not explored them as a whole portfolio of VRIN resources (Alqudah et al., 2025). This division brings about three specific issues that can only be solved by having a model that spans the whole of the trunk. First, omitted variable bias, meaning that correlations between DFL, FTA and ESC cannot be controlled in separate studies. From our pilot data, ESC and FTA are related and if only based on the ESC gain without controlling for FTA, the unique effect of ESC would be overstated. Second, relative magnitude blindness occurs when considering the resources in isolation, without information regarding which is more sensitive to change the DFL, FTA, or ESC, an important factor to consider for managerial resource allocations to FS. Third, interaction blindness: originating from different studies, no researcher will be able to determine if these resources are acting additively (adding together), multiplicatively (synergizing, e.g. the impact of the combined resources is larger than the sum of individual resourcing), strategically neutral (no impact of one resource to the other), or competitively destructive (the investment of one resource is at the cost of another).

Recent studies failed to pick up all three aspects of digital and environmental resources with a single holistic RBV framework to explain FS (Wang et al., 2026; Bajwa et al., 2025). While it is known that individual mediation mechanisms have existed in isolation, it is still unclear how the mediated returns from events regarding DFL, FTA, and ESC compare, and what resource investment strategies will maximize the mediated return of events. (Yan et al., 2022). Our joint model allows for simultaneous estimates of the marginal impact of each resource on FS, when holding the others fixed, which joint estimates are not obtained by marginal studies – and these provide unbiased estimates for the impact of strategic resource allocation.

Moreover, the applicability of current results is limited to geographic and sectoral scope and most of the studies have focused on banks in developed economies (Alessandrini et al., 2009). This narrow perspective also shows raised questions about the generalizability of the observed relationships, given that the relationships are likely to vary by industry, size of firm, and degree of regulation and are in danger of varying even more in emerging or digitally transition economies such as Pakistan. Lastly, there has been limited research on potentiating effects and/or possible replacement effects of using DFL, FTA and ESC to achieve financial sustainability (Kastrati, 2025). The way these resources work (add, multiply, compete) is still unknown and may have important implications for strategic resource allocation considerations.

This study seeks to directly fill these gaps by proposing and testing an integrated mediation model based on RBV with financial sustainability as a key mechanism that converts digital resources, environmental

resources and their interactions into top financial performance for businesses under non-crisis conditions. This study advances the literature by considering three VRIN resources and analyzing them all in the same model in analyzing how digital and green capabilities can be used to create sustained competitive advantage (SCA) (Barney, 1991; Teece, 2023). The outputs, because of the findings, will support managerial decision-making on how to allocate resources throughout these three fields of action, that is, digital financial literacy, FinTech adoption, and environmental sustainability, placing financial sustainability in the focal point as a mediating capability.

Conceptual Framework

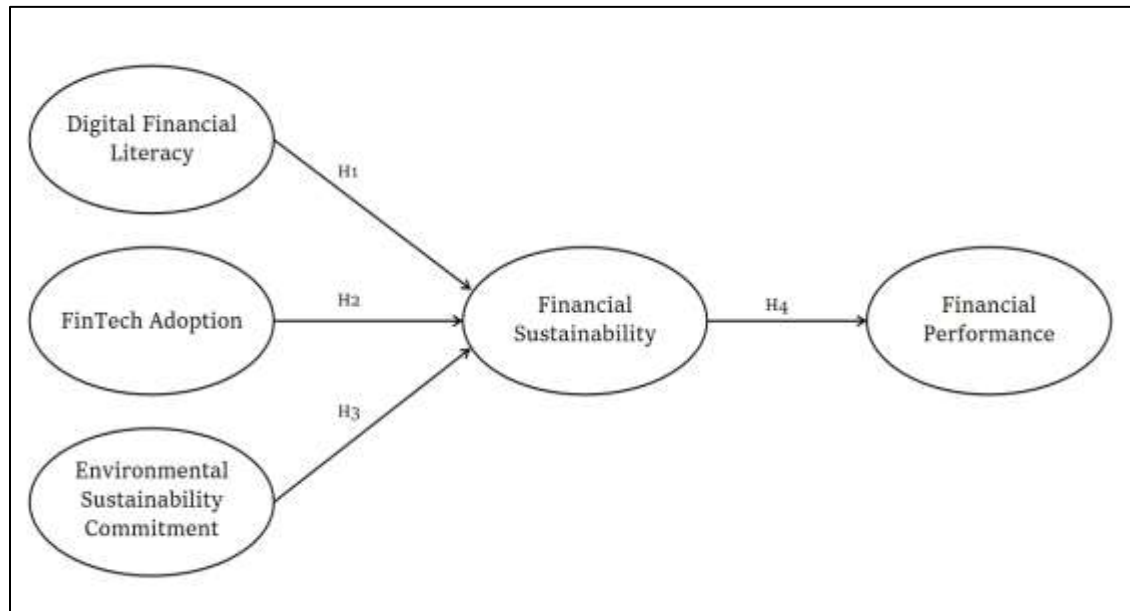


Figure 1: Conceptual Model

Methodology

This research paper will take the form of quantitative research to analyze the connections between financial literacy, adoption of FinTech, commitment to environmental sustainability commitment, financial sustainability, and financial performance. The study is based on a positivist philosophy, which focuses on objective measurement and statistical confirmation of relationships. The research design used was a correlational one to investigate relationships between variables whereas the research has explanatory purpose, to establish causal relationships. The financial literacy, which is the capability of a firm to comprehend and utilize financial understanding like risk management, investment estimation and fiscal planning, is considered a major independent variable. The adoption of FinTech is defined as the degree to which companies use financial technologies to improve innovation, efficiency, and service delivery. Environmental sustainability commitment is the commitment that a firm is committed to ensure that its operations are environmentally friendly, such as conservation of resources, disposal of waste and sustainability.

The structured questionnaire was developed based on validated scales from previous studies, including Zapata-Molina et al. (2025), Heliani & Iskandar (2024), Setiawan et al. (2021), and Dwivedi et al. (2021). The questionnaire was created using Google Forms, and data were collected through a convenience

sampling technique. The survey link was distributed to employees working in various industries, including manufacturing, services, IT/software, FinTech/digital payments, and other sectors in Pakistan. Demographic information of respondents is presented in Table 5.

Table 5: Respondent Demographics		
Characteristics	Frequency	Percentage (%)
Gender		
Male	124	59%
Female	86	41%
Age		
18–24 years old	60	28.60%
25–34 years old	141	67.10%
35–44 years old	5	2.40%
45 years old and above	4	1.90%
Educational Level		
Intermediate	21	10%
Undergraduate student	57	24%
Graduate student	125	59.50%
Others	7	3.50%
Industry Sector		
Manufacturing	34	16.20%
Services	72	34.30%
IT / Software	31	14.80%
FinTech / Digital Payments	38	18.10%
Others	35	16.70%
Years of Operation		
Less than 3 years	39	18.60%
3 - 5 years	108	51.40%
6 - 10 years	63	30%

Financial sustainability and financial performance are among the dependent variables in the study. Financial sustainability is the sustainability of the firm in terms of financial stability over time due to its proper planning, budgeting and value generation; financial performance is a measure of profitability, growth, competitive advantage and predictable cash flows. There were 255 responses. The screening of data with SPSS showed that there were no missing values, but 45 multivariate outliers were detected and eliminated, leaving 210 valid responses.

Partial least squares Structural Equation Modeling (PLS-SEM) was used to analyze the data using Smart-PLS. This technique is appropriate when the models are complex, and when the sample sizes are relatively small, allowing measurement and structural models to be evaluated at the same time. Factor loadings, composite reliability, average variance extracted and discriminant validity were used to assess reliability and validity. The hypothesized relationships were then tested by analyzing the structural model. This strategy gives an overall picture of how financial literacy, adoption of FinTech, and

environmental sustainability commitment affect financial sustainability and, ultimately, financial performance.

Data Analysis

Following a preliminary analysis with SPSS, PLS-SEM was used with Smart-PLS to analyze the multifaceted associations between the research variables (Sarstedt et al., 2021). Table 6 shows the measurement model evaluation by measuring factor loadings, composite reliability (CR), and average variance extracted (AVE) of each construct. The indicator loadings of all the indicators are above the recommended value of 0.70, which means that the items are highly reliable and that the observed variables are suitable to reflect their corresponding constructs (Hair et al., 2019). Moreover, the CR values are between 0.874 and 0.938 that are far beyond the acceptable range of 0.70, indicating that the internal consistency is high across all the constructs. FinTech Adoption has the most reliable results and indicates the existence of a rather close relationship between its indicators. Items with factor loadings below the recommended threshold of 0.70 (ESC1, FA2, and FA5) were removed from the measurement model because they did not adequately represent their respective constructs. Removing these items improved the reliability and convergent validity of the measurement model.

In convergent validity, all the AVE values are between 0.602 and 0.834, which is above the minimum of 0.50. This shows that both constructs account more than half a variance in the indicators of the constructs, hence verifying a good convergent validity (Hair et al., 2025). Financial Sustainability and Environmental Sustainability Commitment are constructs that imply a rather high level of validity, as the AVE values are over 0.60. Overall, the results prove that the measurement model meets all the suggested requirements of reliability and validity, which means that the model is appropriate to conduct additional structural model analysis

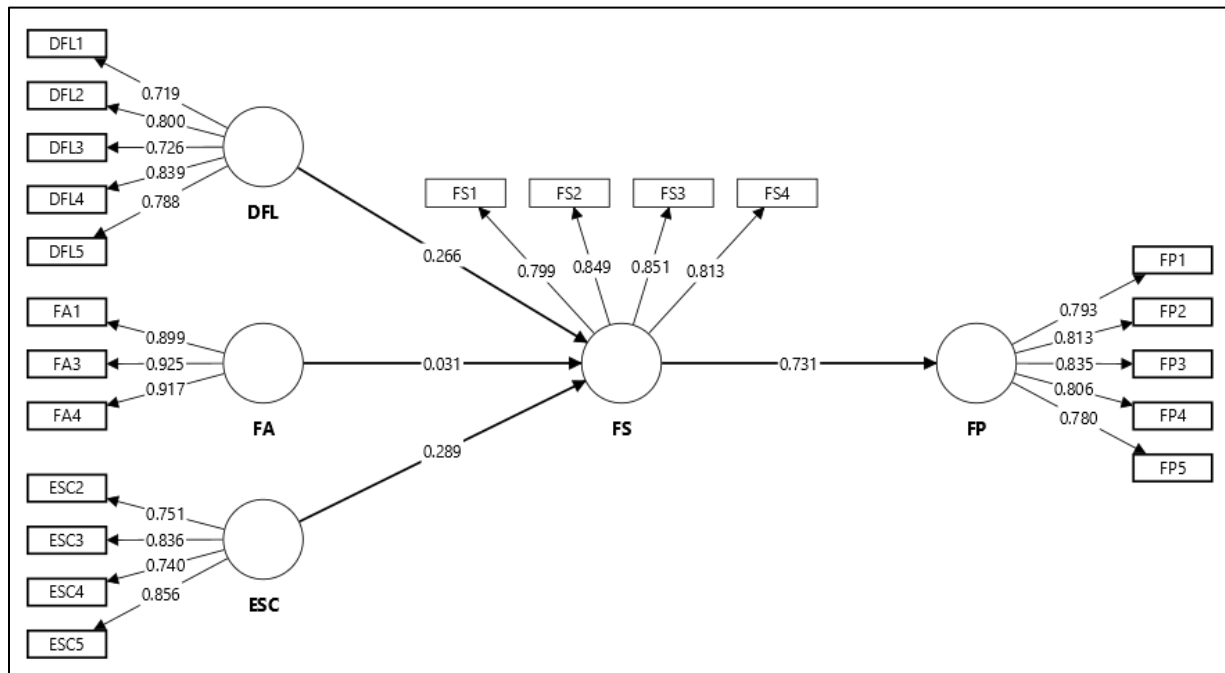


Figure 2: Model after running PLS-SEM

Table 6: Reliability and Validity				
	Items	Loadings	CR	AVE
Digital Financial Literacy	DFL1	0.719	0.883	0.602
	DFL2	0.8		
	DFL3	0.726		
	DFL4	0.839		
	DFL5	0.788		
Environmental Sustainability Commitment	ESC2	0.751	0.874	0.636
	ESC3	0.836		
	ESC4	0.74		
	ESC5	0.856		
FinTech Adoption	FA1	0.899	0.938	0.834
	FA3	0.925		
	FA4	0.917		
Financial Performance	FP1	0.793	0.902	0.649
	FP2	0.813		
	FP3	0.835		
	FP4	0.806		
	FP5	0.78		
Financial Sustainability	FS1	0.799	0.897	0.686
	FS2	0.849		
	FS3	0.851		
	FS4	0.813		

Following the reliability and validity test, the Heterotrait-Monotrait Ratio (HTMT) was used to determine the discriminant validity between the constructs of the study. HTMT measures the level of similarity between latent variables and suggested thresholds indicate that values must not exceed 0.90 to make sure that constructs are different (Henseler et al., 2015). Table 7 shows that all the values of HTMT are within the range of 0.389 to 0.894, which means that the level of discriminant validity is acceptable and that the constructs are sufficiently distinguished between each other.

The maximum value of HTMT is seen between Environmental Sustainability Commitment and FinTech Adoption (0.894), which is in proximity to the upper limit yet falls within the acceptable range. Likewise, the correlation between Financial Sustainability and Financial Performance is relatively high (0.846) but is less than the conservative cutoff. Conversely, smaller values like Digital Financial Literacy and Financial Performance (0.389) imply that constructs are strongly distinguished with little overlap and are distinctively different between the variables.

Table 7: Heterotrait-Monotrait ratio (HTMT) - Matrix					
Factor	DFL	ESC	FA	FP	FS
DFL					
ESC	0.838				
FA	0.789	0.894			
FP	0.389	0.537	0.421		
FS	0.568	0.593	0.501	0.846	

Fornell-Larcker criterion was used as the next step to evaluate further the distinctiveness of the constructs after evaluating the discriminant one with the help of HTMT. The criterion is used to compare the square root of the Average Variance Extracted (AVE) in each of the constructs (diagonal values) to the correlations between the construct and other constructs (off-diagonal values) (Hair et al., 2021). Following the suggested guideline, the diagonal values are supposed to be greater than the respective inter-construct correlations to achieve discriminant validity.

All off-diagonal values in their rows and columns are less than the diagonal values in Table 8, as in Table 8, all the diagonal values are higher. As an example, the Digital Financial Literacy (0.776) is more than correlations with Environmental Sustainability Commitment (0.699), FinTech Adoption (0.693), Financial Performance (0.346), and Financial Sustainability (0.489). Likewise, FinTech Adoption presents a high diagonal value of 0.913, surpassing any of its correlations with other constructs. The same happens with Financial Sustainability (0.828) and Financial Performance (0.805), in that the square root of AVE of both constructs is greater than inter-construct correlations, which means that these two constructs have sufficient discriminant validity.

Table 8: Fornell Larcker criterion					
Factor	DFL	ESC	FA	FP	FS
DFL	0.776				
ESC	0.699	0.797			
FA	0.693	0.769	0.913		
FP	0.346	0.446	0.38	0.805	
FS	0.489	0.498	0.437	0.731	0.828

Table 9 shows the findings of the structural model through the analysis of the path coefficients, t-values and p-values to test the hypotheses proposed. A significant relationship is one where t-value is greater than 1.96 and the p-value is less than 0.05 (Winship & Zhuo, 2020). The findings show that Digital Financial Literacy positively impacts Financial Sustainability ($t = 2.426$, $p = 0.015$) and H1 is accepted. Likewise, Financial Sustainability is also positively affected by Environmental Sustainability Commitment ($t = 3.256$, $p = 0.001$) which supports H3.

FinTech adoption, conversely, does not affect Financial Sustainability ($t = 0.350$, $p = 0.726$), because the p-value is greater than the acceptable value, and, thus, H2 is rejected. Moreover, Financial Sustainability exhibits a high and very important impact on Financial Performance ($t = 15.876$, $p = 0.000$), which is in favor of H4. These results indicate that, although Digital Financial Literacy and Environmental Sustainability Commitment are significant predictors of Financial Sustainability, FinTech Adoption is not an important factor in this relationship in the present model.

Table 9: Path Coefficient					
Hypothesis No.	Hypothesized Effect	Coefficients	T-values	P-values	Decision
H1	DFL -> FS	0.266	2.426	0.015	Accepted
H2	FA -> FS	0.031	0.35	0.726	Rejected
H3	ESC -> FS	0.289	3.256	0.001	Accepted
H4	FS -> FP	0.731	15.876	0	Accepted

Lastly, Table 10 presents the predictive power of the structural model using the R-square (R^2) and adjusted R-square values. Financial Performance (FP) has an R^2 value of 0.534, indicating that Financial Sustainability (FS) explains 53.4% of the variance in Financial Performance, reflecting moderate predictive power. In contrast, Financial Sustainability (FS) has an R^2 value of 0.287, indicating that Digital Financial Literacy (DFL), FinTech Adoption (FTA), and Environmental Sustainability Commitment (ESC) jointly explain 28.7% of the variance in Financial Sustainability, demonstrating moderate explanatory power.

The adjusted R-square values were slightly lower than the R-square values, with 0.532 for Financial Performance and 0.277 for Financial Sustainability, indicating the complexity of the model. The small difference between R-square and adjusted R-square confirms that the model is stable and free from overfitting, demonstrating acceptable predictive relevance. However, the unexplained variance suggests that other external and organizational factors may also influence financial outcomes, such as government policies, economic conditions, market competition, technological advancement, regulatory frameworks, organizational culture, and managerial capabilities, which were not included in the present study.

Table 10: Predictive Quality Indicators of the Model		
Factor	R-square	R-square Adjusted
FP	0.534	0.532
FS	0.287	0.277

Discussion

The results of this investigation suggest that Digital Financial Literacy (DFL) has a strong positive impact on Financial Sustainability (FS), which allows accepting H1. The result aligns with the Resource-Based View (RBV), according to which knowledge-based capabilities contribute to higher efficiency of a firm in managing its internal resources and ensuring its sustainable organizational stability (Teece, 2023). Companies with greater digital financial literacy have a better ability to interpret financial data, handle digital financial transactions, and make sound financial decisions that lower levels of operational inefficiency and enhance liquidity management. The existing body of empirical research, such as Alqudah et al. (2025) and Yan et al. (2022), also proves that the higher financial knowledge is, the greater the cash flow management and the lower the financial risk exposure, which enforces financial sustainability.

The findings also indicate that FinTech Adoption (FTA) does not have a statistically significant impact on Financial Sustainability, leading to the rejection of H2. This result suggests that, within the context of the present study, FinTech adoption alone may not be sufficient to significantly improve financial sustainability outcomes. The finding is consistent with prior studies which argue that the effectiveness of FinTech largely depends on factors such as organizational preparedness, absorptive capacity, and

financial governance systems (Philippon, 2024). Similarly, Albuainain & Ashby (2025) highlighted that ineffective integration of FinTech technologies may limit the expected financial benefits. Therefore, the insignificant relationship observed in this study may indicate that contextual or organizational factors could influence the extent to which FinTech contributes toward financial sustainability.

Environmental Sustainability Commitment (ESC) proves to have a strong positive influence on Financial Sustainability, which justifies H3. This observation is consistent with the RBV perspective, which frames environmental practices as strategic assets that promote long-term organizational resilience (Ali, 2026). Companies that actively participate in environmental sustainability programs enjoy low costs of operation, better adherence to regulatory systems, and access to green financing at a relatively low cost of capital, all of which are beneficial to financial stability (George & Schillebeeckx, 2022). Additionally, environmental initiatives would reduce the exposure to regulatory fines and reputational risks, protecting financial resources and supporting the financial health of the financial results in the long term.

Lastly, Financial Sustainability has a positive and statistically significant impact on Financial Performance thus supporting H4. This finding aligns with the available literature that suggests that firms that are financially sustainable have higher profitability, a greater return on assets, and better market performance (Wang et al., 2026). Financial sustainability is an important mediating process which transforms strategic capabilities into quantifiable performance outcomes. Companies with high liquidity status, risk management and discipline in financial life are in a better position to explore opportunities of growth and survive external shocks. The empirical evidence presented by Bajwa et al. (2025) also highlights the key importance of financial sustainability in motivating firm-level performance results.

Conclusion

This research has analyzed the correlation between Digital Financial Literacy (DFL) and FinTech Adoption (FTA) and Environmental Sustainability Commitment (ESC) and Financial Sustainability (FS) and Financial Performance (FP) under a single Resource-Based View (RBV). The results with the help of PLS-SEM showed that both DFL and ESC significantly influence FS in a positive manner, which suggests that knowledge-based capabilities and sustainability-focused practices are crucial in enhancing the financial stability of firms. Nonetheless, FTA was revealed to affect FS in a negligible way, which implies that the technological adoption cannot be used as an independent factor to enhance financial performance without the proper organizational preparedness and enabling potential.

Moreover, FS proved to have a high and meaningful positive impact on FP, which proves its pivotal role in the transformation of organizational resources into an enhanced financial performance. The mediation framework identifies FS as one of the mechanisms in which digital literacy and environmental commitment can lead to the success of firms. Overall, the research finds that financial sustainability is a strategic capability that is vital as it serves to connect the internal resources and firm performance in supporting long-term financial resilience and competitive advantage.

Recommendations

Based on the findings of this study, several practical recommendations can be provided for managers, organizations, and policymakers. First, businesses need to emphasize the development of Digital Financial Literacy (DFL) by integrating digital finance competencies into daily operational activities and strategic

decision-making processes. Organizations should allocate dedicated budgets for digital finance initiatives, encourage employees to use digital financial platforms, and regularly assess employees' digital financial competencies through performance evaluation systems. Firms should also embed digital financial skills into hiring criteria and leadership development programs to strengthen long-term financial sustainability.

Second, although FinTech Adoption (FTA) was found to have an insignificant effect, organizations should focus on improving the effectiveness of implementation rather than merely increasing adoption. Businesses need to ensure that FinTech systems are compatible with existing operational and financial infrastructures before deployment. Managers should prioritize cybersecurity investments, establish internal digital governance mechanisms, and conduct periodic system evaluations to identify implementation gaps. Organizations should also introduce pilot testing phases before large-scale FinTech integration to reduce operational risks and improve efficiency.

Third, organizations should actively strengthen their Environmental Sustainability Commitment (ESC) by embedding sustainability objectives into core business strategies. Companies need to implement measurable sustainability targets such as reducing energy consumption, minimizing operational waste, digitizing paper-based processes, and increasing the use of environmentally friendly technologies. Businesses should also establish sustainability monitoring units and include environmental performance indicators within managerial performance assessments to ensure accountability and continuous improvement.

Lastly, managers should treat Financial Sustainability (FS) as a long-term strategic priority rather than focusing only on short-term profitability. Organizations need to maintain financial reserves, diversify revenue streams, and continuously monitor financial risk exposure to improve resilience and long-term performance. Policymakers should support businesses by offering tax incentives, digital infrastructure support, sustainability-related financing schemes, and regulatory frameworks that encourage responsible digital innovation and sustainable business practices.

Limitations and Future Research Directions

There are several limitations to this study which also provide important directions for future research. First, the research is confined to a specific setting, which may limit the generalizability of the findings to other countries, industries, and institutional environments. Therefore, future researchers are encouraged to test the proposed model in different contexts to improve external validity. Second, the study mainly focused on Digital Financial Literacy, FinTech Adoption, Environmental Sustainability Commitment, Financial Sustainability, and Financial Performance. However, other important factors such as government policies, economic conditions, market competition, technological advancement, regulatory frameworks, organizational culture, managerial capabilities, innovation capability, organizational efficiency, and digital transformation capability were not included in the model. Future studies may incorporate these variables as mediators or moderators to better explain complex relationships.

Moreover, technology adoption and sustainability are highly dynamic and continuously evolving phenomena that may change over time due to shifts in market conditions, regulations, and technological developments. Therefore, future researchers are strongly encouraged to employ longitudinal research designs to better examine how these relationships evolve over time and to provide deeper insights into long-term behavioral and organizational changes. Finally, the study adopted a quantitative approach,

which may not fully capture hidden behavioral and contextual insights. Thus, future research may employ qualitative or mixed method approaches to gain a deeper understanding of these relationships in practical settings.

References

- Adwani, A. (2025). Foundations of Fintech: Navigating the Digital Financial Revolution. Available at SSRN 5133519. <https://dx.doi.org/10.2139/ssrn.5133519>
- Albuainain, A., & Ashby, S. (2025). Enablers and barriers in FinTech adoption: A systematic literature review of customer adoption and its impact on bank performance. *FinTech*, 4(3), 49. <https://doi.org/10.3390/fintech4030049>
- Alessandrini, P., Fratianni, M., & Zazzaro, A. (2009). The changing geography of banking and finance: The main issues. In *The Changing Geography of Banking and Finance* (pp. 1-11). Boston, MA: Springer US. https://doi.org/10.1007/978-0-387-98078-2_1
- Ali, A. A. (2026). Impact of Integrating Sustainability into Strategic Management on Financial and Sustainability Performance—Literature Review. *Sustainability*, 18(8), 4137. <https://doi.org/10.3390/su18084137>
- Alqudah, M. Z., Sierra-García, L., & Garcia-Benau, M. A. (2025). The moderating role of ESG scores on the relationship between FinTech adoption and financial performance: evidence from Middle East banks. *Economic Change and Restructuring*, 58(6). <https://doi.org/10.1007/s10644-025-09927-7>
- Arshad, I., Mehmood, H., Qadeem, S. E. Y., Khan, M. D., & Anis, H. (2026). Green FinTech ecosystems and sustainable value creation: Integrating digital innovation, finance, and environmental performance. *The Critical Review of Social Sciences Studies*, 4(1), 1114-1127. <https://doi.org/10.59075/2waedn59>
- Arshadi, N., & Dombrowski, T. (2026). Applications and management of blockchain technologies in financial services. *Journal of Risk and Financial Management*, 19(3), 224. <https://doi.org/10.3390/jrfm19030224>
- Bajwa, F. A., Fu, J., Bajwa, I. A., & Alsuhaibany, Y. M. (2025). Financing the future: The role of fintech, leadership, and financial competencies in driving sustainable firm performance. *Acta Psychologica*, 260, 105449. <https://doi.org/10.1016/j.actpsy.2025.105449>
- Barman, B., Singh, R., Padaria, R. N., Nain, M. S., Quader, S. W., et al. (2026). A qualitative synthesis of barriers to agriculture 4.0 adoption: evidence from a systematic literature review. *Discover Agriculture*, 4(1), 34. <https://doi.org/10.1007/s44279-026-00505-7>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Cashell, B., Jackson, W. D., Jickling, M., & Webel, B. (2004). The economic impact of cyber-attacks. Congressional research service documents, CRS RL32331 (Washington DC), 2.

- Dwivedi, P., Alabdooli, J. I., & Dwivedi, R. (2021). Role of FinTech adoption for competitiveness and performance of the bank: a study of banking industry in UAE. *International journal of global business and competitiveness*, 16(2), 130-138. <https://doi.org/10.1007/s42943-021-00033-9>
- Eisenhardt, K. M., & Martin, J. A. (2017). Dynamic capabilities: what are they? *The SMS Blackwell handbook of organizational capabilities*, 341-363. <https://doi.org/10.1002/9781405164054.ch21>
- George, G., & Schillebeeckx, S. J. (2022). Digital transformation, sustainability, and purpose in the multinational enterprise. *Journal of World Business*, 57(3), 101326. <https://doi.org/10.1016/j.jwb.2022.101326>
- Goldstein, I., Jiang, W., & Karolyi, G. A. (2024). To FinTech and beyond. *Review of Financial Studies*, 37(4), 1041–1073. <https://doi.org/10.1093/rfs/hhz025>
- Gomber, P., Koch, J., & Siering, M. (2017). Digital Finance and FinTech: current research and future research directions. *Journal of Business Economics*, 87(5), 537–580. <https://doi.org/10.1007/s11573-017-0852-x>
- Hair, J. F., Babin, B. J., Ringle, C. M., Sarstedt, M., & Becker, J. (2025). Covariance-based structural equation modeling (CB-SEM): a SmartPLS 4 software tutorial. *Journal of Marketing Analytics*, 13(3), 709–724. <https://doi.org/10.1057/s41270-025-00414-6>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., et al. (2021). Evaluation of reflective measurement models. In *Classroom Companion: Business* (pp. 75–90). https://doi.org/10.1007/978-3-030-80519-7_4
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/eb-11-2018-0203>
- Heliani, H., & Iskandar, Y. (2024). MSMEs Financial Sustainability Model in Indonesia: Policy, Capital, Literacy, Structure. *Jurnal Reviu Akuntansi Dan Keuangan*, 14(1), 258-280. <https://doi.org/10.22219/jrak.v14i1.29716>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Jan, A., & Ahmed, N. (2025). AI-driven credit risk assessment and financial inclusion in emerging markets: Evidence from Pakistani firms. *Spectrum of Engineering Sciences*, 3(12), 414-425.
- Kastrati, B. (2025). Sustainability Provisions in the European Union's Free Trade Agreements.
- Kolefiyan, I. (2026). The impact of fintech on sustainability performance through financial inclusion: A case study of MSME actors in Indonesia using diffusion of innovation theory (DIT). *International Journal of Applied Finance and Business Studies*, 13(4). <https://doi.org/10.35335/ijafibs.v14i4.435>

- Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, 61(1), 35–46. <https://doi.org/10.1016/j.bushor.2017.09.003>
- Lin, Z., Gu, H., Gillani, K. Z., & Fahlevi, M. (2024). Impact of green work–life balance and green human resource management practices on corporate sustainability performance and employee retention: Mediation of green innovation and organisational culture. *Sustainability*, 16(15), 6621. <https://doi.org/10.3390/su16156621>
- Lourenço, I. C., Callen, J. L., Branco, M. C., & Curto, J. D. (2014). The value relevance of reputation for sustainability leadership. *Journal of business ethics*, 119(1), 17-28. <https://doi.org/10.1007/s10551-012-1617-7>
- Omar, M. A., & Inaba, K. (2020). Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis. *Journal of Economic Structures*, 9(1). <https://doi.org/10.1186/s40008-020-00214-4>
- Pakistan Business Council. (2024). Digital transformation and SME capabilities in Pakistan: A sectoral analysis. Pakistan Business Council.
- Philippon, T. (2016). The FinTech opportunity. NBER Working Paper No. w22476, Available at SSRN: <https://ssrn.com/abstract=2819862>
- Phoon, K. F., & Koh, C. C. F. (2018). Robo-advisors and wealth management. *Journal of Alternative Investments*, 20(3), 79. <https://doi.org/10.3905/jai.2018.20.3.079>
- Priem, R. L., Li, S., & Carr, J. C. (2011). Insights and New Directions from Demand-Side Approaches to Technology Innovation, Entrepreneurship, and Strategic Management Research. *Journal of Management*, 38(1), 346–374. <https://doi.org/10.1177/0149206311429614>
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial Least Squares Structural Equation Modeling. In: Homburg, C., Klarmann, M., Vomberg, A. (eds) *Handbook of Market Research*. Springer, Cham. https://doi.org/10.1007/978-3-319-57413-4_15
- Schilke, O., Hu, S., & Helfat, C. E. (2017). Quo vadis, dynamic capabilities? A Content-Analytic review of the current state of knowledge and recommendations for future research. *Academy of Management Annals*, 12(1), 390–439. <https://doi.org/10.5465/annals.2016.0014>
- Schumann, R., & Kende, M. (2013). Lifting barriers to Internet development in Africa: suggestions for improving connectivity. *Analysys Mason Limited*, London, 9, 30-5.
- Setiawan, B., Nugraha, D. P., Irawan, A., Nathan, R. J., & Zoltan, Z. (2021). User innovativeness and fintech adoption in Indonesia. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(3), 188. <https://doi.org/10.3390/joitmc7030188>
- State Bank of Pakistan. (2023). Financial inclusion survey 2023: Measuring access to financial services in Pakistan. State Bank of Pakistan.

- Teece, D. J. (2023). *Dynamic capabilities and strategic management: Organizing for innovation and growth* (2nd ed.). Oxford University Press.
- Voss, L. (2025). *Cryptocurrency 2025: Navigating the Blockchain Revolution*. eBookIt. com.
- Wang, Y., Zhang, L., & Chen, H. (2026). How corporate FinTech enhances ESG performance: An integrated framework of resources, technology, and governance. *Sustainability*, 18(3), 1352. <https://doi.org/10.3390/su18031352>
- Winship, C., & Zhuo, X. (2020). Interpreting t-statistics under publication bias: rough rules of thumb. *Journal of Quantitative Criminology*, 36(2), 329-346. <https://doi.org/10.1007/s10940-018-9387-8>
- Yan, C., Siddik, A. B., Yong, L., Dong, Q., Zheng, G.-W., et al. (2022). A Two-Staged SEM-Artificial Neural Network Approach to Analyze the Impact of FinTech Adoption on the Sustainability Performance of Banking Firms: The Mediating Effect of Green Finance and Innovation. *Systems*, 10(5), 148. <https://doi.org/10.3390/systems10050148>
- Zapata-Molina, C., Bedoya-Villa, M., Castro-Gómez, J., Gutiérrez-Broncano, S., Román, E., et al. (2025). Factors Affecting the Financial Sustainability of Startups During the Valley of Death: An Empirical Study in an Innovative Ecosystem. *International Journal of Financial Studies*, 13(2), 73. <https://doi.org/10.3390/ijfs13020073>