

Received : 25 July 2024, Accepted: 18 September 2024
DOI: <https://doi.org/10.47059/rr.vx9i2.80>

Digital Finance Transformation, ESG Integration, and Risk Governance: Impact on Financial Performance of Food Sector Firms in Saudi Arabia

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Abstract:

This study investigates the impact of digital finance transformation, ESG integration, and risk governance on the financial performance of food sector firms in Saudi Arabia. In response to the increasing global emphasis on technological innovation, sustainability, and corporate governance, this research aims to provide empirical evidence from an underexplored sector and region. A quantitative research design was adopted, and data were collected through a structured survey questionnaire distributed among finance, sustainability, and risk management professionals across leading food firms in Saudi Arabia. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed for data analysis to test the proposed hypotheses and evaluate the measurement and structural models. The findings reveal that digital finance transformation, ESG integration, and risk governance each have a significant and positive effect on financial performance. Moreover, risk governance mediates the relationships between both digital finance transformation and ESG integration with financial performance, highlighting the interconnected nature of these strategic initiatives. The results suggest that firms that align technological innovation, sustainability practices, and risk management into a coherent strategy

are better positioned to achieve superior financial outcomes. This study contributes to the growing body of knowledge on corporate performance drivers in emerging economies and offers valuable insights for managers, investors, and policymakers aiming to enhance corporate resilience and sustainability.

Introduction:

For several decades the worldwide financial system developed under strong tech-industry impact with rising environmental rules and market regulations. Dynamic conditions surrounding food businesses create both new problems and new opportunities. Digital finance now allows businesses to transform their financial operations through advanced technology and data usage making their operations clearer and fast at the same time increasing their response speed (Challoumis, 2024). Hispanic and Middle Eastern countries now expect companies to include ESG principles in their strategic framework. To achieve superior results firms, need to develop strong risk controls for unpredictable market risks while meeting strict rules. The food sector stands as a fundamental driver of Saudi Arabia's economic plans to reach Vision 2030 and researchers must examine how digital finance change plus ESG integration affect company performance to support academic work and guide business decisions in Saudi Arabia (Ali et al., 2025).

Saudi Arabia's food sector changes fast thanks to national programs that help food security and promotion of domestic farming with foreign capital investments. Firms should upgrade their financial systems while adopting international ESG rules and building advanced risk control systems because of industry changes. When modern businesses use blockchain AI and big data technologies to develop better financial operations they perform digital finance transformation (Литвин et al., 2024). A company includes environmental care, social responsibility, and ethical management as regular business practices to protect its long-term operation. Companies use risk governance methods to find and control the possible risks they face in their business operations. Digital finance transformation helps organizations spot ESG risks better to create effective reporting while proper risk management helps companies launch

digital and ESG projects. These features together influence financial outcomes shown by asset and equity return ratios plus total revenue numbers (UWASE, 2024).

This research draws its base theory from Resource-Based View (RBV) and Stakeholder theory. The RBV shows that companies succeed by using their one-of-a-kind business assets including technology strength and strong management systems. The gathering of digital finance resources plus ESG practices and risk governance methods serves as strategic tools that raise effective business performance. Stakeholder theory demands businesses to act in favor of all stakeholders including customers, investors, government agencies and society members in order to remain successful (Bansal et al., 2023). By integrating ESG standards with its business model the company reacts to stakeholder expectations while making the company more reputable and less vulnerable to reputation damage. Control systems help organizations stay safe from operations and regulatory threats which builds stronger ties with their stakeholders. The latest digital technology enables us to handle ESG data effectively while running risk analysis. The combination of Resource-Based View and Stakeholder theory builds a strong framework to analyze the connections between digital finance changes, ESG incorporation, risk management and financial success (Alkaraan et al., 2024).

Scholars have grown interested in digital finance and sustainability but researchers still need to explore various gaps for emerging economies and target industries. Previous research mainly studied advanced economies without considering how different economic and cultural features shape Saudi Arabian markets. Studies about digital finance and ESG do not explore how various governance risk practices impact firm success altogether (Xiang et al., 2024). The food industry deals with many different risks that all interact with each other particularly strongly in this sector. Research usually views ESG actions and risk management as compliance requirements rather than performance drivers. The analysis fails to recognize that combining ESG and risk management with digital technology generates intrinsic value. Companies should study these factors together to know their joint impact on financial performance in Saudi Arabia's food sector (Herab et al., 2022).

This research looks at why food sector companies in Saudi Arabia need to know more about how digital finance transformation and risk governance impact their financial performance through ESG integration. Businesses operating today face more complex conditions due to technology shifts and environmental regulations plus climate challenges so the normal ways to track financial results need upgrading. Our research is essential because companies need factual results about digital and ESG controls working with risk management to improve their business decisions. The missing knowledge damages corporate performance yet also limits government initiatives to build strong and various economic sectors. This research investigates how important factors impact each other to fill the existing understanding gaps about business success and contribute to both research and practical business planning.

This research has multiple important purposes. Our study builds new academic understanding by combining digital finance, ESG principles and risk controls into one evaluation system which describes how companies perform today. The study examines how companies in Saudi Arabia's food sector make decisions compared to Western business models by filling a gap in research about emerging markets. The research helps business leaders create strategies that increase their earnings by making sustainable and reliable choices. Management teams use the results to pick digital finance technologies wisely and make investments that build ESG programs and improve their risk management system. The research findings help officials in creating digital ecosystem support and sustainability programs that handle business risks effectively. Current financial research shows how investors can evaluate companies better and see business risks developing in digital and technological markets.

Businesses across all industries need to combine digital transformation in finance with ESG and risk controls because of today's high VUCA conditions. Food sector firms in Saudi Arabia must use digital tools while embracing sustainability while managing risks well or they cannot succeed in its future economic development plans. Our research shows the impacts of these business needs on financial performance at the right moment. The study produces useful guidance for businesses to successfully face modernization and sustainability difficulties as they navigate through the economic transformation.

Through its organized research this study aims to add knowledge about digital transformation impacts combined with corporate sustainability and governance in emerging markets. The research aims to guide new studies about specific business areas and extended market observations. The food sector needs a combined strategy that links how technology and ethics work together with good business management practices to build sustainable financial results. Our research investigates all these components to help Saudi Arabia's food sector evolution as part of its large-scale future development.

Literature Review:

The study bases its foundation on how digital finance affects ESG, risk governance, and financial results through Resource-Based View (RBV) and Stakeholder Theory. The RBV suggests companies gain lasting business benefits when they use valuable resources that are rare, hard to duplicate, and cannot be replaced (Barney 1991). The combination of digital finance competencies ESG practices and solid risk governance serves as important business assets to generate better financial results in this study (Akhtar et al., 2025). Companies that combine digital finance practices with sustainability-based strategies while taking preventive measures against risks stand above their market competition. Stakeholder Theory from Freeman (1984) supports this view by recommending organizations to manage stakeholder groups such as shareholders, employees, clients, regulators, and neighbors in pursuit of lasting business success. Firms use ESG integration to fulfill stakeholder expectations better strengthen their reputation and win community trust. Risk governance helps organizations take actions that serve stakeholders by following ethical rules and safety requirements plus preparing for threats. Our merged theory offers a solid foundation for studying how digital finance operations relate to ESG standards and organizational risk control in financial results (Khalid et al., 2024).

Scientists have conducted numerous research studies about digital finance transformation since 2009 because new tech impacts how companies manage their finances. The implementation of digital finance tools boosts financial report comprehensiveness operations productivity and strategic planning choices in businesses. Digital instruments like real-time analytics help firms detect financial data which lets them make better decisions to enhance their success according to

(Ngcobo et al., 2024). According to the digital transformation process helps finance functions transition from basic transaction support into strategic partners who add business worth. Technology-based finance solutions bring better access to funds and lower costs which creates stronger market advantages for companies in emerging nations. According to platform sped up digital transformation in all business areas with food companies using fintech platforms to improve their performance. Research into digitalization effects needs more thorough study within the food sector even though overall results show potential benefits (Ngcobo et al., 2024).

Scholars widely examine ESG integration to study its effects on financial results at the same time as they study digital finance development. Research find that most studies link good environmental social governance performance to better financial performance which demonstrates sustainable practices make money. Demonstrated through their research that companies with strong sustainability performances produce better accounting results and gain higher market value in the long term (De Silva et al., 2025). The evaluation of sustainability practices through ESG disclosure leads to better company value and stronger investor support across emerging market companies. Research shows that GCC region companies which voluntarily report on their ESG practices receive better results both in finance and money market performance. Discovered that ESG criteria determine company success in Saudi Arabia particularly for food companies which encounter substantial environmental and social risks. Companies should treat ESG integration as an essential strategy because it produces real financial advantages (Chen, 2024).

Companies use risk governance systems to control multiple business risks and these controls strongly impact how well firms perform. Companies that maintain strong risk governance systems achieve decreased market swings and optimal budget adjustments as well as superior financial outcomes. Research showed that banks which had separate risk management team performed better than other banks during the worldwide economic crisis. Effective risk governance in food and agriculture industries helps businesses build stronger supply chains and operate faster while competing better in their markets (Belhadi et al., 2024). The necessity of strong risk governance becomes more critical because Saudi Arabian companies face intense regulatory oversight and market changes. According to firms that consistently manage risks

before problems occur achieve better alignment with Saudi Arabian regulations and economic shifts to protect their financial stability. Multiple research studies confirm risk governance's individual value but we need more understanding about its combined impact on digital finance and ESG practices and financial outcomes for this study (Alqudah et al., 2024).

Studies about the digital finance-ESG-risk governance relationship have recently emerged but make up a small body of research. According to digital systems help companies monitor ESG activities better which improves their risk handling and makes them more transparent. Ciobanu et al. (2024) showed that companies that develop digital financial systems monitor ESG risks better which makes them more trusted by their stakeholders and produces superior profits. The food industry gains substantial benefits when digital finance tools combine with ESG practices and risk governance systems as specified. Research on how digital and ESG factors affect risk management in specific sectors of emerging markets remains scarce due to studies mostly focusing on developed markets or individual elements (Nandhana et al., 2024). Analyzing all these aspects of the Saudi food sector today would help researchers develop valuable insights into this topic.

Based on existing theory and research findings this study proposes several tests to explore digital, ESG and risk factors in the Saudi food industry. The research starts with the assumption that digital finance improvement boosts corporate financial performance:

H1: Digital finance transformation positively influences the financial performance of food sector firms in Saudi Arabia.

Second, based on the extensive evidence linking ESG practices to enhanced firm value and financial outcomes, it is posited that:

H2: ESG integration positively influences the financial performance of food sector firms in Saudi Arabia.

Third, considering the role of robust risk governance in promoting operational stability and financial resilience, the following hypothesis is proposed:

H3: Risk governance positively influences the financial performance of food sector firms in Saudi Arabia.

Recognizing the potential for synergies among these dimensions, it is further hypothesized that:

H4: Risk governance mediates the relationship between ESG integration and financial performance.

H5: Risk governance mediates the relationship between digital finance transformation and financial performance.

The research ideas present how different elements of digital transformation and ESG integration influence how companies manage risk while producing good results. The research tests these relationships in Saudi Arabia's food industry to enhance business practice knowledge and guide policy decisions for investors. Research findings will expand current knowledge about company changes in both digital and sustainable fields by providing insights on multiple financial success drivers during global transformation.

Methodology:

Our research design uses statistical methods to check how digital finance transformation affects food sector firms in Saudi Arabia. The research took a positivist view by believing that true facts can be observed and studied using data measurement and statistical tools. This approach worked because our study needed to test numerical data about defined variables in specific relationships. We conducted a cross-sectional survey to collect data at one point in time about how the population currently thinks about the research topics.

The research included workers from finance, compliance, sustainability, and risk management departments in Saudi Arabian food sector companies. Our choice of this human resource population made sense because they actively handle digital finance projects plus ESG

work and risk protocols so they know the most about our research needs. Our research used purposive sampling to find respondents who hold professional experience in their industry. Because the research focused on a specific group, we could not use random sampling methods hence we chose purposive sampling to involve people active in the field. The researcher used PLS-SEM standards to choose 300 respondents by multiplying the greatest number of formative indicators by ten.

We designed a standardized survey to gather data from respondents that accurately measures our research variables. The survey questions came from tested measurement scales in earlier research projects to show valid content. Measures for digital finance transformation took items from Buschmann (2017) and Gomber et al. (2018) while ESG integration indicators followed Eccles et al. (2014) and Friede et al. (2015). Risk governance scales originated from Beasley et al. (2005) and Aebi et al. (2012). Financial performance was assessed through questions about profitability and return on assets and return on equity following Fatemi et al. (2018). The study used a 5-point Likert scale across 1 (strongly disagree) to 5 (strongly agree) to understand the intensity of participant agreement. We sent out questionnaires via email and professional networks to reach more participants since they have busy schedules.

The study used PLS-SEM with SmartPLS to analyze the data. Because of its exploratory research design and capacity to handle complex models this approach fit best while handling non-normal data well. PLS-SEM analyzed measurement and structural models together to test variable relationships and determine whether the proposed constructs were valid and reliable. The study tested reliability using Cronbach's alpha and composite reliability along with verifying validity through AVE and HTMT correlation assessments. To solve the multicollinearity, issue the researcher monitored Variance Inflation Factor (VIF) scores. The model needs good fit indices to proceed with interpretation. We tested the Standardized Root Mean Square Residual (SRMR) and Normed Fit Index (NFI) values to validate the model's suitability before moving forward.

The study followed strict ethical rules during every step of its research work. All participants joined the study freely while knowing their personal information would stay

confidential. Before starting the survey, all participants received the informed consent statement that detailed the project reasons why they should participate along with protection details. The research team had sole access to protected data used only for educational research purposes. The study met international academic ethical principles when organizing research that respected the rights and safety of everyone involved.

Results:

4.1 Reliability Analysis Table

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Digital Finance Transformation	0.876	0.912	0.676
ESG Integration	0.861	0.901	0.652
Risk Governance	0.889	0.924	0.709
Financial Performance	0.845	0.890	0.620

The reliability analysis indicated that all constructs exceeded the recommended thresholds for Cronbach's Alpha (≥ 0.7) and Composite Reliability (≥ 0.7), confirming high internal consistency. Furthermore, the Average Variance Extracted (AVE) values were above 0.5 for each construct, indicating satisfactory convergent validity (Hair et al., 2019). These results validate that the measurement scales used were reliable and accurately captured the intended latent variables.

4.2 Validity Analysis (HTMT Ratio Table)

Constructs	D	I		I		G-FP
	FT-ESG	FT-RG	FT-FP	SG-RG	SG-FP	
Digital Finance Transformation - ESG Integration	0.662	0				

Constructs	D		I		I	
	FT-ESG	FT-RG	FT-FP	SG-RG	SG-FP	G-FP
Digital Finance Transformation - Risk Governance		.654				
Digital Finance Transformation - Financial Performance			.601			
ESG Integration - Risk Governance				.698		
ESG Integration - Financial Performance					.682	
Risk Governance - Financial Performance						.723

The HTMT ratio results were all below the recommended threshold of 0.85, demonstrating good discriminant validity (Henseler, Ringle, & Sarstedt, 2015). This confirmed that each construct was distinct from the others, thereby supporting the appropriateness of the measurement model for the subsequent structural analysis.

4.3 VIF Table

Construct	VIF Values
Digital Finance Transformation	2.132
ESG Integration	2.276
Risk Governance	2.341

All Variance Inflation Factor (VIF) values were below the critical value of 5, indicating the absence of multicollinearity issues among the predictor variables (Hair et al., 2019). This suggests that the structural model did not suffer from redundancy among constructs, ensuring that the path coefficients could be interpreted reliably.

4.4 Model Fit Indices Table

Fit Index	Value	Recommended Threshold
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Fit Index	Value	Recommended Threshold
SRMR	0.052	< 0.08
NFI	0.912	> 0.90
R ² (Financial Performance)	0.587	-

The model fit indices revealed that the Standardized Root Mean Square Residual (SRMR) value was 0.052, which is below the threshold of 0.08, indicating an acceptable model fit (Hu & Bentler, 1999). The Normed Fit Index (NFI) was 0.912, exceeding the recommended cutoff of 0.90, further confirming the good fit of the model. Additionally, the R² value for financial performance was 0.587, suggesting that the predictors collectively explained 58.7% of the variance in financial performance, reflecting a moderate to strong explanatory power.

5.1 Structural Equation Modeling (Path Coefficients Table)

Path	Beta Coefficient	value	value	Result
Digital Finance Transformation → Financial Performance	0.284	.721	.000	Supported
ESG Integration → Financial Performance	0.298	.998	.000	Supported
Risk Governance → Financial Performance	0.321	.432	.000	Supported
ESG Integration → Risk Governance → Financial Performance	0.119	.562	.000	Supported (Mediation)
Digital Finance Transformation → Risk Governance → Financial Performance	0.102	.144	.002	Supported (Mediation)

The structural model results demonstrated that digital finance transformation had a positive and statistically significant impact on financial performance, supporting Hypothesis H1. Similarly, ESG integration showed a significant positive effect on financial performance, confirming Hypothesis H2. Risk governance also significantly improved financial performance,

validating Hypothesis H3. Additionally, risk governance mediated the relationships between ESG integration and financial performance, and between digital finance transformation and financial performance, thus supporting Hypotheses H4 and H5. The path coefficients were all significant at the $p < 0.05$ level, highlighting the critical role of each independent variable and the mediating variable in driving financial outcomes.

Discussion & Conclusion:

The findings of this study provide compelling evidence that digital finance transformation, ESG integration, and risk governance are significant predictors of financial performance in the food sector firms of Saudi Arabia. The positive impact of digital finance transformation on financial performance suggests that firms embracing technological advancements in financial processes experience notable improvements in operational efficiency, decision-making, and ultimately, profitability. This aligns with the assertions of Buschmann (2017) and Gomber et al. (2018), who indicated that digital finance tools, such as real-time analytics and automated reporting, serve as catalysts for enhancing firm agility and financial outcomes. In the Saudi context, where Vision 2030 has accelerated digitalization efforts across industries, the results affirm that firms actively investing in digital finance capabilities are reaping substantial financial rewards. This not only underscores the importance of technological readiness but also points towards the strategic necessity of embedding digital transformation within the core financial architecture of firms to sustain competitiveness.

Similarly, the positive relationship between ESG integration and financial performance confirms that sustainability practices are not merely ethical imperatives but also drivers of economic value. Firms that prioritize environmental stewardship, social responsibility, and strong governance frameworks are able to build stronger reputations, attract socially-conscious investors, and mitigate regulatory and operational risks, which in turn enhance profitability. The findings corroborate earlier studies by Eccles et al. (2014) and Friede et al. (2015), extending the evidence to the under-researched food sector in Saudi Arabia. In a region increasingly attuned to global sustainability standards and facing environmental challenges such as water scarcity and

climate change, ESG adoption appears to serve not only as a compliance mechanism but also as a source of strategic differentiation and financial strength.

The role of risk governance emerged as particularly critical in this study, both as a direct predictor of financial performance and as a mediating mechanism. Firms with effective risk governance structures—characterized by independent risk committees, clear accountability systems, and proactive risk identification and mitigation strategies—were shown to outperform their counterparts financially. This finding is consistent with Aebi, Sabato, and Schmid (2012) and Beasley et al. (2005), who emphasized the protective and performance-enhancing effects of robust risk management practices. Moreover, the mediation results revealed that risk governance strengthens the pathways through which digital finance transformation and ESG integration influence financial performance. This suggests that without effective risk governance, the benefits of digital and ESG initiatives may not be fully realized, highlighting the interconnectedness of strategic digitalization, sustainability, and risk oversight.

The conclusion of this study is that digital finance transformation, ESG integration, and risk governance individually and collectively enhance the financial performance of food sector firms in Saudi Arabia. The synergy among these variables illustrates that modern corporate success is not driven by isolated strategies but by the integration of technology, sustainability, and governance into a coherent and comprehensive framework. Firms that strategically align digital finance initiatives with ESG priorities and embed them within a strong risk governance structure are better positioned to deliver superior financial outcomes. This integrated approach reflects the evolving business environment, where technological capability, ethical conduct, and risk resilience are increasingly inseparable from financial success.

Based on the findings, several recommendations emerge for practitioners and policymakers. Firstly, firms should continue to invest in digital finance technologies, ensuring that these investments are strategically aligned with broader business objectives and not treated as peripheral innovations. Secondly, ESG practices should be embedded deeply within corporate strategy rather than being relegated to public relations or compliance departments; real value creation lies in authentic and holistic integration of ESG principles. Thirdly, strengthening risk

governance frameworks should be a priority, not only to comply with regulatory requirements but also to proactively manage emerging risks associated with digital disruption and sustainability challenges. Board compositions should include risk management expertise, and firms should regularly review and update their risk management policies to reflect changing internal and external environments.

The implications of this study are multifaceted. For managers, the findings highlight the need to view digitalization, sustainability, and governance as interconnected levers of financial performance rather than as siloed initiatives. Investments in one area should complement and reinforce efforts in the others. For investors, the study offers insights into key indicators of firm quality and resilience; firms demonstrating strong performance across these dimensions may present more attractive investment opportunities. For policymakers, particularly in Saudi Arabia's rapidly transforming economy, the results suggest that regulatory frameworks encouraging digital adoption, ESG reporting, and enhanced risk governance could collectively foster a more competitive, resilient, and sustainable corporate sector. Finally, for academics, the study contributes to filling gaps in the emerging literature on the food sector and the Middle Eastern context, offering a basis for future research exploring sectoral and regional variations in the relationships examined.

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