

Article

The Impact of Digital Risk Management on Innovative Islamic Banking Services: The Mediating Role of Digital Capabilities and the Moderating Role of Digital Culture

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Abstract

Purpose: This research intends to explore the relationships between digital risk management practices and the successful implementation of innovative banking services with the mediating effect of digital capabilities and the moderating effect of digital culture. **Methodology Approach:** In this study, the data was gathered using a quantitative approach and the cross-sectional survey method with responses from participants who were chosen as the unit of analysis of being investigated for the study. Islamic finance institutions in Jordan were used as the unit of analysis in this study. Responses of different Islamic finance institutions were surveyed in a structured manner to collect data with 281 valid responses. The current study then used structural equation modeling using SmartPLS3 to investigate the relationship between the variables. **Findings:** The results show that utilizing digital risk management, advanced analytics, artificial intelligence, and automated compliance systems is essential to fostering innovation while upholding Shariah compliance. The study also shows that efficient digital risk management boosts users' confidence increases service effectiveness and facilitates the launch of cutting-edge Shariah-compliant products. The findings supported a significant mediating effect of the digital capabilities but did not support a moderating effect of the digital culture between digital risk management and innovative banking services respectively. **Originality:** By investigating digital risk management in the particular context of Islamic innovative banking services, this study provides novel insight. In contrast to earlier research that focuses on innovation in Islamic finance, this paper examines how digital risk management frameworks impact the sustainability of innovative banking services that adhere to Shariah. Moreover, building institutional capacity and resilience requires training programs that emphasize emerging technologies and digital risk awareness.

Keywords: digital risk management; innovation; banking services; Islamic finance institutions



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1. Introduction

In an era characterized by rapid technological advancement and digital transformation, financial institutions worldwide are redefining their operational strategies to compete effectively in an increasingly competitive marketplace (Kotarba 2023). Islamic finance institutions, governed by principles that prohibit interest (riba) and emphasize ethical investments, are no exception to this digital shift. As Islamic finance institutions seek to enhance service delivery and customer experience, they embrace innovative digital banking services such as mobile banking platforms, automated Sharia-compliant financial products, artificial intelligence (AI)-driven advisory tools, and blockchain-based solutions (Ifedayo et al. 2025). These technologies provide significant opportunities to expand market reach, reduce operational costs, and improve financial inclusion. However, they also introduce complex forms of digital risks that can undermine the stability and trust that are central to Islamic finance (Ahmed et al. 2024).

Digital risk management has emerged as a critical discipline that enables financial institutions to identify, assess, and mitigate risks associated with digitalization. These risks include, but are not limited to, cybersecurity threats, data privacy breaches, technological failures, and compliance challenges tied to both regulatory standards and Sharia governance (Toshtemirovich Mamadiyarov 2021). For Islamic finance institutions, the management of such risks is not solely a matter of regulatory compliance or financial prudence; it also intersects with ethical imperatives intrinsic to Sharia principles. As digital banking services evolve, Islamic financial institutions must therefore navigate a dual imperative: harnessing innovation to deliver efficient and competitive services while concurrently safeguarding the integrity, confidentiality, and trust of their systems within the framework of Islamic ethical values (Muslim 2024).

Despite the increasing adoption of digital technologies in Islamic finance institutions, there remains a significant gap in the academic literature regarding how effective digital risk management strategies influence the development and performance of innovative banking services (Mishchenko et al. 2021). Traditional risk management paradigms may not fully address the unique operational and ethical considerations faced by Islamic finance institutions, making specialized research essential. Understanding the impact of digital risk management on innovation in Islamic banking holds practical importance for policymakers, industry practitioners, technology vendors, and scholars alike (Afdawaiza et al. 2024).

Despite the growing interest in digital transformation within the financial sector, several significant gaps remain in the literature regarding the intersection of digital risk management, innovative banking services, and Islamic finance institutions (Ahmad et al. 2024; Mohammad et al. 2025a). These gaps highlight areas that require deeper scholarly investigation to enhance both theoretical understanding and practical application. There is a limited focus on the Islamic finance context, with most existing studies on digital risk management and innovation being rooted in conventional banking environments which operate under different ethical, regulatory, and risk frameworks (Mandych et al. 2023). Islamic finance institutions, governed by Sharia principles that prohibit interest (riba) and emphasize risk-sharing and ethical conduct, present unique risk profiles. However, there is scant research examining how digital risk management practices specifically align with the ethical and operational intricacies of Islamic finance, particularly in relation to innovative service delivery (Mohamed 2021).

There has been insufficient analysis of digital risks in innovative services. While several studies acknowledge the existence of digital risks in finance industry (e.g., cybersecurity threats, data breaches), few have systematically analyzed how these risks impact the adoption and performance of innovative Islamic banking services such as AI-enhanced products, and Sharia compliance automation tools (Andarwati et al. 2025). There is a

need for empirical evidence that links specific categories of digital risks to the successful implementation and sustainability of such innovations. In addition, the lack of integrated frameworks in existing research means that digital risk management and service innovation often treated as separate domains, with limited integration into comprehensive frameworks that capture their dynamic interplay (Eckert and Hüsigg 2022).

Digital risk management has been thoroughly studied in relation to cybersecurity, operational resilience, organizational performance, and innovation outcomes in traditional financial institutions (Mohammad et al. 2025b). Similar to this, studies on Islamic banking have looked at service innovation, fintech applications, and technology adoption. Nonetheless there are still a number of gaps in the current literature. The specific contribution of digital risk management to innovative Islamic banking services has received little attention. Despite being acknowledged as crucial organizational resources, digital capabilities mediating function in elucidating the connection between innovative Islamic banking services and digital risk management have not received enough attention. There is mounting evidence that organizational culture affects the results of capabilities; however, little empirical research has been done on how digital culture modifies this relationship especially in Islamic banking settings. In order to close this gap, a comprehensive framework that examines the direct impact of digital risk management on cutting-edge Islamic banking services, the mediating effect of digital capabilities, and the moderating effect of digital culture in Islamic banks, is proposed and empirically tested.

2. Literature Review

The rapid changes in the global financial sector have significantly reshaped risk management practices, service delivery models, and innovation capabilities within banking institutions. Islamic finance institutions, which operate under Shariah principles prohibiting interest (riba), excessive uncertainty (gharar), and speculative activities (maysir), face unique challenges and opportunities in adopting digital technologies (Saha et al. 2025). Digital risk management has emerged as a critical strategic function enabling banks to manage operational, financial, cyber, and Shariah-related risks while supporting innovation in banking services. Innovative banking services—such as digital Islamic banking platforms, fintech-based Shariah-compliant products, mobile banking, and AI-driven credit assessment—require robust risk management frameworks to ensure sustainability, compliance, and customer trust (Hassan et al. 2022).

This literature review synthesizes prior studies on digital risk management, innovation in banking services, and Islamic finance, and develops hypotheses linking digital risk management to innovative banking services in Islamic finance institutions (Mohd Haridan et al. 2023). Digital risk management refers to the use of digital technologies, data analytics, artificial intelligence (AI), blockchain, and automated systems to identify, assess, monitor, and mitigate risks in financial institutions (Jing 2023). Unlike traditional risk management, digital risk management emphasizes real-time monitoring, predictive analytics, and integrated risk governance across operational, financial, cyber, regulatory, and reputational domains (Menezes and Rete 2026). Scholars argue that digital risk management enhances organizational agility and resilience by enabling proactive rather than reactive risk mitigation. Technologies such as machine learning improve fraud detection, while cloud-based risk dashboards enhance transparency and decision-making speed (Abiodun et al. 2024).

In Islamic finance, risk management is inherently linked to Shariah compliance. Islamic finance institutions face additional risks such as Shariah non-compliance risk, displaced commercial risk, and equity investment risk (Ines and Adnene 2025). Digital risk management tools can strengthen Shariah governance through automated compliance checks,

smart contracts, and blockchain-enabled transparency. Studies suggest that digital risk management supports Islamic finance institutions in managing profit-and-loss sharing arrangements, monitoring asset-backed transactions, and ensuring ethical compliance (Sarwar and Ghauri 2024). However, adoption levels vary due to regulatory constraints, lack of technical expertise, and concerns over Shariah permissibility of certain technologies.

Innovative banking services refer to the introduction of new or significantly improved financial products, processes, delivery channels, or business models that enhance customer value and operational efficiency (Yuryev et al. 2022). In the digital era, innovation is increasingly driven by fintech, big data, and platform-based banking ecosystems. In Islamic banking, innovation must align with Shariah principles, which influences product design and service delivery. Examples include digital mudarabah savings accounts, mobile zakat platforms, peer-to-peer Islamic financing, and blockchain-based takaful solutions (Mustapha and Malkan 2025). Previous studies highlight that innovation in Islamic banking is essential for competitiveness and financial inclusion. Digital innovation enables Islamic finance institutions to reach underserved populations, reduce transaction costs, and enhance customer experience (Atif et al. 2021).

Empirical evidence suggests that technological capability, regulatory support, and risk management effectiveness are key determinants of successful innovation in Islamic finance institutions (Rashid et al. 2024). The literature increasingly recognizes risk management not as a constraint, but as an enabler of innovation. Effective digital risk management reduces uncertainty, enhances managerial confidence, and allows institutions to experiment with new digital products while maintaining control over potential risks (Kessler et al. 2024). In banking, strong digital risk management frameworks facilitate the safe adoption of fintech solutions, open banking, and digital platforms. For Islamic banks, digital risk management ensures that innovative services comply with Shariah requirements while maintaining financial stability (Nasution 2025).

Empirical studies in conventional banking demonstrate a positive relationship between advanced risk management systems and service innovation. Banks with strong digital risk analytics are more likely to introduce mobile banking services, AI-based customer support, and digital lending platforms (Pattabhi 2022). Although limited, existing research in Islamic finance indicates that institutions with robust governance and risk management structures show higher levels of product innovation and digital transformation. This suggests that digital risk management may play a significant role in fostering innovative banking services in Islamic finance institutions (Liaqat et al. 2025).

Over the past decade, Jordan has witnessed a remarkable transformation in its financial landscape driven by the evolution of digital financial services which has been influenced by a number of factors such as the increased use of smartphones, internet usage, and government efforts to promote financial inclusion (Raimi et al. 2024). Consequently, digital financial services have become a potent instrument for providing access to a larger portion of the populace, as these financial services were previously unattainable. The growth of branchless banking services has been one of the biggest trends. These companies have been essential in helping millions of people to access basic financial services. For people in Jordan, particularly those living in underdeveloped and rural areas, these services enable users to conduct transactions through them, pay bills, and even receive remittances through mobile wallets, significantly reducing the reliance on (Al-khawaja et al. 2025).

The kingdom's implementation of the digital payment system is another significant development in the Jordanian digital financial services environment. Peer-to-peer transactions and instantaneous inexpensive digital payments are made possible by this system, which is anticipated to play a key role by providing a quicker and safer payment system (Hazar and Babuşcu 2023). The expansion of digital financial services has also been greatly

aided by the government and regulatory agencies. Projects such as the national financial inclusion strategy utilize digital technology; these programs seek to integrate the unbanked population into the established financial system and the platforms lowering poverty and encouraging economic inclusion (Mbodj and Laye 2025).

Another factor propelling Jordan's digital financial service revolution is fintech startups. The companies are creating creative solutions such as microloans for small businesses that are suited to the demands of different market segments. The emergence of these fintechs has raised competition in addition to introducing new financial products that result in cheaper prices and improved services for customers (Kumari and Devi 2022). Despite these developments, Jordan's digital financial service expansion still faces a number of obstacles including inadequate funding and literacy concerns about cyber security and problems with trust. However, with continued investment in digital infrastructure, supportive regulatory frameworks, and public campaigns for awareness, these challenges can be surmounted (Webber et al. 2022). Furthermore, the expansion of digital financial services in Jordan is a major step in the right direction—a financial system that is inclusive. Jordan is utilizing technology to generate new economic opportunities, especially for those who were previously shut out of the financial mainstream.

These insights are becoming more pertinent to Islamic banks even though a large portion of the larger literature on digital banking concentrates on risk impacts and response mechanisms in traditional settings. In order to protect digital services, a systematic review of digital banking risk highlights the ongoing risks posed by cyberattacks and the implementation of security measures like encryption biometric authentication and AI-driven fraud detection (Aziz and Andriansyah 2023). Additionally, the literature indicates that Islamic banks' digital inclusion results are different from those of their conventional counterparts. Digital financial services can improve access and lower some risks, but they may not always increase stability because of customer resistance and compliance-related limitations when digital offerings do not follow Islamic principles (Kamal et al. 2021). The literature highlights how digital innovation and risk management in Islamic banking are mutually reinforcing.

Dynamic Capabilities Theory is incorporated to strengthen the theoretical basis of this study. According to the theory, organizations can gain a sustainable competitive advantage by continuously sensing changes in their surroundings, seizing new opportunities, and rearranging organizational resources in response to quickly changing market conditions. Thus, organizations should build adaptive capabilities that allow them to effectively respond to cybersecurity threats, regulatory changes, technological disruptions, and shifting customer expectations in highly digitalized and uncertain environments (Durman et al. 2025). Digital transformation has brought about both opportunities and risks for Islamic banking. In order to provide cutting-edge services while adhering to Shariah principles, Islamic banks are depending more and more on digital platforms, fintech solutions, artificial intelligence, mobile banking apps, and cloud-based systems. As a result, efficient digital risk management turns into a crucial organizational skill that helps banks recognize, evaluate, track, and reduce digital risks. According to the theory, digital risk management is a strategic organizational process that aids organizations in identifying and addressing digital threats while preserving operational resilience (Xiao et al. 2020).

The risks associated with Islamic banks are more complicated and more varied than traditional banks as a result of their goods and services. The results claim that the cornerstone of Islamic banking is different from conventional banking where the main difference is that loans operate in conventional banks' interests, whereas Islamic banks operate using profit-loss sharing (Syahri and Harjito 2020). Banks' products create numerous risks, for example, market risk, credit risk, liquidity risk, and foreign exchange risk being particular risks.

Therefore, exposure to risks can endanger one's survival and success, and we are heavily reliant on the Islamic banking sector's capacity to control risks (Archer and Haron 2013). Moreover, the Islamic banks oversee risk sensibly and successfully identify the practice of risk management by measuring, keeping an eye on, and managing its nature.

The service innovation literature and digital banking and financial technology serve as the foundation for the conceptualization of innovative Islamic banking services through some dimensions like web design, security convenience, and speed (Susanto et al. 2023). Innovation in banking now includes the ongoing improvement of customer experiences, digital interactions, and service delivery procedures rather than just the launch of completely new financial products. Innovation in Islamic banking must concurrently meet Shariah compliance principles, technological developments, regulatory requirements, and customer expectations. The most prominent and strategically significant examples of innovation in contemporary Islamic banking services are thus captured by these dimensions. Because these dimensions encompass the main ways that digital technologies improve service delivery and add value for customers' security and speed, taken together, they represent innovation in Islamic banking. Convenience, for example, captures innovation in terms of usability, accessibility speed reflects innovation in operational responsiveness, efficiency security reflects innovation in trust and protection mechanisms, and web design measures innovation in customer interaction (Ayinaddis et al. 2023).

The quick development of financial technologies which allow banks to offer quicker, more flexible, and customer-focused services has drastically changed the banking sector (Zhen et al. 2021). In Islamic banking, however, digital capabilities are even more crucial since organizations must make sure that innovations adhere to Sharia principles while still being efficient and competitive. Furthermore, research highlights the importance of digital capabilities in adapting to shifting consumer demands in the digital age. Islamic banks are forced to constantly improve their technological capabilities as a result of customers' growing demands for seamless, secure, and real-time banking services (Proksch et al. 2024). Despite their significance, Islamic banks encounter obstacles in building their digital capabilities such as inadequate infrastructure, a shortage of qualified personnel, and regulatory limitations. These obstacles underscore the necessity of ongoing investment in digital transformation projects. The term digital culture describes the common values, attitudes, and behaviors that foster innovation and technology adoption within an organization (Ly and Huong 2024). It has a significant impact on how well digital capabilities are applied. Digital culture also affects how workers view and use new technologies. Innovation outcomes may be limited by a weak culture, even in banks with sophisticated digital capabilities (Teguh et al. 2022). On the other hand, a positive digital culture encourages staff members to use digital tools to create new banking services.

Jordan's Islamic finance institutions function in an increasingly digital world where cutting-edge digital payment systems, online platforms, mobile apps, and fintech partnerships are revolutionizing the provision of financial services. Institutions must deal with growing digital risks in addition to these opportunities, such as cybersecurity risks, operational disruptions, data privacy issues, and compliance difficulties. Enabling innovation without jeopardizing Shariah compliance, customer trust, or institutional resilience requires effective digital risk management (Salleh et al. 2025). Digital risk management serves as both a basis and a catalyst for cutting-edge banking services in Jordan's Islamic finance sector. Adopting and expanding digital services that satisfy contemporary demands while upholding Shariah principles is made possible by effective digital risk management, which also improves customer trust regulatory compliance and operational resilience.

3. Methodology

A strategy for conducting the study and gathering data is known as the research design, conducted through the gathering and evaluation of the variables in this research. In this study, the data was gathered using a quantitative approach and the cross-sectional survey method with responses from participants who were chosen as the unit of analysis being investigated for the study. Islamic finance institutions in Jordan were used as the unit of analysis in this study. Examining how different risk factors impact innovative banking services was the research key aim, and the setting in which digital financial services are used. The study started with a literature search in well-known databases like Google Scholar and Scopus, among others. A plethora of studies and research papers were examined following the use of sources of literature were chosen for reviews. We examined the results in order to classify and arrange the findings and outcomes—using inclusion criteria (e.g., time frame not before 2010)—of research papers according to their classification enabling us to arrange them.

The study was able to remove studies that did not meet our review's inclusion criteria and the objectives from the search, as well as to eliminate search terms that are repeated. These were the search criteria that we used, deciding on them after a brainstorming session and an analysis of the study's objectives. The search parameters are set at a high level and made use of general best-fit phrases which directed us to several sources and we realized that a more limited syntax would be used if the first search produced no noteworthy results. By using a specific criteria we were able to obtain the most relevant search and then we focused on digital risk management and innovative banking services. The current study's measurement scales came from earlier publications. The variables of data privacy encryption and authentication and the items that were modified and adapted were used to measure the information and details provided. To gather information in order to investigate how digital risk management affects innovative banking services, the study developed and distributed a survey to protect responses using digital financial services.

In order to guarantee the validity, reliability, and appropriateness of the questionnaire for measuring the study constructs, it underwent a rigorous multi-stage development process. A thorough analysis of the pertinent literature, theoretical frameworks, and previously approved measurement scales pertaining to the study variables was the first step in the development process. The questionnaire had multiple sections. The preliminary questionnaire was sent to a panel of academics and business professionals with expertise in the relevant field in order to establish content validity. These specialists assessed the questionnaire's wording, comprehensiveness, relevance, clarity, and alignment with the study's objectives. Rephrasing unclear statements eliminating unnecessary items and enhancing the instrument's overall structure were some of the changes made in response to their input.

The questionnaires first section asked about the respondents demographics, with statements were given a five-point rating system. A panel of academics with expertise in risk management digital transformation and Islamic finance along with professionals from the Islamic banking industry examined the questionnaire to guarantee content validity. The wording clarity and contextual relevance were improved as a result of their input. The instrument's dependability and comprehensibility were then assessed with ten respondents from Islamic financial institutions. Before the final survey was distributed, a few minor adjustments were made in response to participant feedback.

The study is based on the Dynamic Capabilities Theory which holds that companies can gain a sustainable competitive advantage. All measurement items were modified from previously validated scales that have been widely used in digital transformation information system innovation and banking research to guarantee construct validity and

reliability. While maintaining the original items' conceptual meaning, a few minor changes were made to reflect the unique context of Islamic banking.

In order to guarantee validity, reliability, and contextual appropriateness of the questionnaire, it underwent a rigorous multi-stage development process. The questionnaire's items were modified from scales that had already been validated in research on innovative banking services, digital risk management, digital capabilities, and digital culture. Sections pertaining to study variables like demographics, digital risk management, digital capabilities, and digital culture made up the questionnaire. Using a five-point Likert scale from strongly disagree (1) to strongly agree (5), the instrument's items measured digital risk management, digital capabilities, digital culture, and innovative Islamic banking services. This scale was chosen because it generates consistent variance in responses and is simple for respondents to comprehend.

The questionnaire was translated into Arabic to aid respondents' comprehension and guarantee the instrument's suitability within the Jordanian Islamic finance context as the original measurement scales were taken from earlier research published in English. A thorough translation and back-translation process was used. First, two bilingual experts who were proficient in both Arabic and English and who were familiar with terms related to risk management, digital transformation, and Islamic banking translated the original English questionnaire into Arabic. A group of scholars and professionals in the fields of Islamic finance and digital risk management evaluated the translated Arabic version. To make the items easier to read and to make sure they reflected terminology frequently used in Jordanian Islamic finance institutions, a few minor changes were made. Lastly a pilot study was carried out with a small sample of workers from Jordanian Islamic finance institutions to evaluate the Arabic questionnaire's appropriateness and clarity. Regarding the items' wording and interpretation, respondents were asked for their opinions. Before distributing the final questionnaire, a few minor linguistic changes were made in response to their feedback.

Responses about different Islamic finance institutions were surveyed in a structured manner to collect data. The survey was carried out in the first quarter of 2026. Participants in Jordan who utilized Islamic finance institutions' services made up the sample and produced 281 valid responses which is ideal according to Hinkin's (1995) recommendation of sample size for structural equation modeling. For every scale examined Hinkin recommended that the item-to-response ratio fall between 120 and 300 responses.

A total of 350 questionnaires were distributed among employees of Islamic finance institutions in Jordan. Of these, 287 questionnaires were returned, representing a response rate of 82% of the distributed questionnaires. After screening for completeness and consistency, 281 questionnaires were deemed suitable for statistical analysis, yielding a usable response rate of 98% of the returned questionnaires. To guarantee sufficient representation of various institution areas, a stratified random sampling technique was used. Employees of Islamic financial organizations that offer Shariah-compliant financial services made up the target population. A probability-based sampling approach was deemed suitable since employees may have differing degrees of involvement in risk management and digital transformation initiatives as well as occupying various organizational positions and departments. The sampling frame was a number of employees that was gathered from the participating Islamic finance institutions. Employees from a variety of departments including risk management, operations, internal audit, senior and middle management were included in the sampling frame. Because Islamic finance institutions are made up of diverse employee groups with varying responsibilities and levels of expertise in digital risk management and innovation, stratified random sampling was chosen. Based on the

organizational managerial levels of the employees, the population was separated into mutually exclusive strata.

The study decreased sampling bias and improved the samples' representativeness by employing stratification. The current study then used a structural equation modeling tool called SmartPLS3 (partial least square) to investigate the relationship between the variables. Because the data for all research constructs were gathered from the same respondents using a single questionnaire given at one time, Common Method Bias (CMB) was taken into consideration in this study. The validity of the study's conclusion may be jeopardized by elements like respondents' inclination toward social desirability, consistency motifs bias, and common scale formats. Statistical analyses including Harman's single-factor test were then carried out to ascertain whether common method bias posed a serious risk to the validity of the results.

4. Data Analysis and Findings

This section's main objective is to present the results of the analysis of the information—inferential and descriptive statistics are both included in the analysis. Analysis was done to show the demographic features of the present investigation. This section also explores the results of SmartPLS3 path modeling wherein convergent cross-loadings were examined using the measurement model using validity, discriminant validity, and internal consistency dependability. To determine the impact of the path coefficients and the R-squared values upon which the model was created, the predictive relevance model and the effect size of each individual variable were examined and PLS-SEM analysis was used to determine the results. The distribution of the questionnaire and the percentage of responses are displayed in Table 1. In terms of gender, the data show that males made up the majority for 62% of all responses with females making up 38%. Additionally, the descriptive analysis shows that 35% of respondents were between the ages of 25 and 45 while the remaining respondents were between the ages of 35 and 45. 15% of the population was between the ages of 44 and 55. In terms of educational level, 56% of the respondents had a bachelor's degree. 35% had a master's degree, those who have completed a post-master's degree constituted 9% of all respondents.

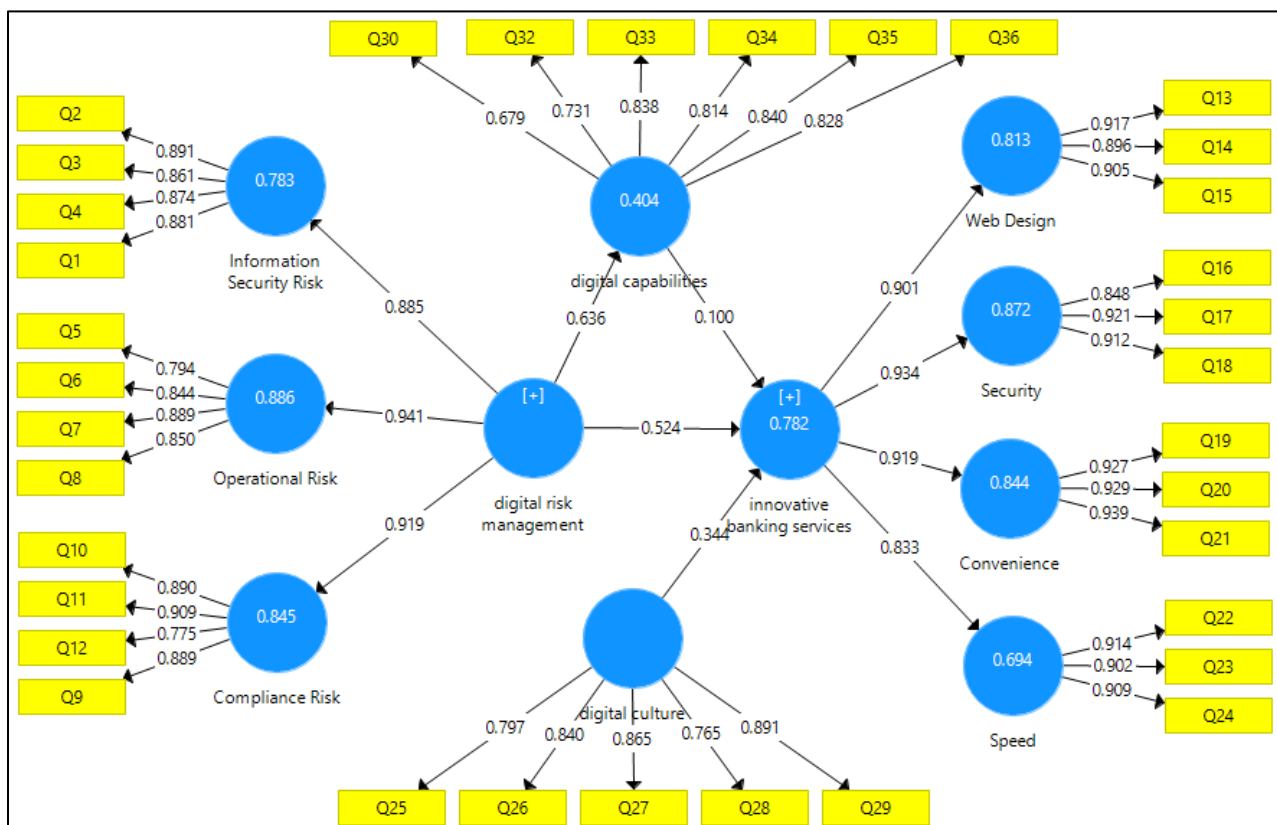
Table 1. Response rate of questionnaires.

Type of Questionnaire	Response Rate
Distributed	305
Returned	291
Incomplete	10
Returned and usable	281
Response rate percentage	92%

The descriptive statistics that follow were calculated using a five-point Likert scale. The mean and minimum are among the statistics values of the maximum and standard deviation. The mean is shown by the descriptive statistics values, falling between 2.9 and 3.9, and the standard deviation falls between 0.7 and 1.1 revealed in Table 2. Furthermore, Cronbach alpha results are in line with the norm requirements for dependability. While average reliability is deemed to be at least 0.76. A higher level of instrument reliability is indicated by a reliability score of 0.70 or higher. The validity and internal consistency reliability of the study were examined using a model also known as the measurement model that is employed to evaluate the outer model which is shown in Figure 1.

Table 2. Descriptive Analysis of Latent Construct.

	Min	Max	Mean	SD	Cronbach
Information Security Risk	1	5	3.49	0.874	0.776
Operational Risk	1	5	3.55	0.984	0.789
Compliance Risk	1	5	3.78	0.786	0.791
Web Design	1	5	3.21	1.033	0.811
Security	1	5	2.99	1.109	0.820
Convenience	1	5	3.98	0.873	0.852
Speed	1	5	3.02	0.764	0.765
Digital capabilities	1	5	3.17	0.810	0.672
Digital culture	1	5	3.0282	0.901	0.722

**Figure 1.** The outer model.

It is generally accepted that common method bias is not a significant concern if the unrotated single factor accounts for less than 50% of the total variance. Significant bias is probably present if one factor accounts for 50% or more of the variation. The percentage of variance related to the first component in Harman's single factor test which denotes the highest eigenvalue is contrasted with the 0.5 threshold. The total variance explained in PLS-SEM is actually the average variance following the creation of a model with a single latent variable and a factor-based analysis extracted for the latent variable (AVE). The AVEs for dataset are shown, contaminated and not contaminated by common method bias. The AVE for the dataset contaminated by common method bias is 0.455, which is less than the threshold of 0.5.

Table 3 illustrated the validity result which used the composite reliability (CR) to evaluate the model's internal consistency. All values are greater than 0.50 as the table below shows which meet the standards specified by Hair et al. (2014). Ringle et al. (2020) define the degree to which a latent construct explains the variation in is known as convergent

validity. Furthermore, Table 3 reveals that each construct achieves at least 50 percent of the variance. AVE exceeds the designated threshold value and is equal to or greater than 0.50, through Ringle et al. (2020).

Table 3. Reliability and validity results.

Factor	Item	Loadings	Alpha	CR	AVE
Information Security Risk	Q1	0.881	0.906	0.927	0.681
	Q2	0.891			
	Q3	0.861			
	Q4	0.874			
Operational Risk	Q5	0.794	0.944	0.927	0.681
	Q6	0.844			
	Q7	0.889			
	Q8	0.850			
Compliance Risk	Q9	0.889	0.903	0.928	0.723
	Q10	0.890			
	Q11	0.909			
	Q12	0.775			
Web Design	Q13	0.917	0.911	0.934	0.741
	Q14	0.896			
	Q15	0.905			
Security	Q16	0.848	0.911	0.934	0.741
	Q17	0.921			
	Q18	0.912			
Convenience	Q19	0.927	0.911	0.934	0.741
	Q20	0.929			
	Q21	0.939			
Speed	Q22	0.914	0.911	0.934	0.741
	Q23	0.902			
	Q24	0.909			
Digital capabilities	Q30	0.679	0.878	0.909	0.625
	Q32	0.731			
	Q33	0.838			
	Q34	0.814			
	Q35	0.840			
	Q36	0.828			
Digital culture	Q25	0.797	0.889	0.919	0.694
	Q26	0.840			
	Q27	0.865			
	Q28	0.765			
	Q29	0.891			

To evaluate the construct's validity, the criteria from Kline (2011) were used. We incorporated two frequently used parameters, specifically HTMT0.85 as well as HTMT 0.90, with preset cutoff points. These thresholds were used to assess the HTMT values. Table 4 shows values that fall below the designated threshold. The emphasis shifted to evaluating the structural model after the measurement model was evaluated. Path coefficients and t-values are incorporated into the structural model which examine direct effects. Additionally, a t-value of more than 1.64 is taken into account and significant in determining the strength of the relationship and is subsequently utilized to decide on the previously suggested hypotheses.

Table 4. Heterotrait–monotrait ratio of correlations (HTMT).

Variable	Information Security Risk	Operational Risk	Compliance Risk	Web Design	Security	Convenience	Speed	Digital Capabilities	Digital Culture
Information Security Risk	0.785								
Operational Risk	0.760	0.861							
Compliance Risk	0.690	0.723	0.884						
Web Design	0.772	0.764	0.719	0.825					
Security	0.727	0.675	0.800	0.711	0.690				
Convenience	0.863	0.654	0.812	0.763	0.800	0.699			
Speed	0.812	0.567	0.656	0.609	0.753	0.567	0.732		
Digital capabilities	0.779	0.654	0.373	0.490	0.574	0.632	0.324	0.576	
Digital culture	0.791	0.699	0.490	0.368	0.755	0.654	0.454	0.432	0.654

The hypotheses that were supported in the current study with t-values greater than 1.64 are shown in Table 5 and Figure 2 of structural model. As a result, every direct relationship hypothesis was supported in the current study. The main hypothesis which examines the digital risk management impact on innovative banking services was supported (beta) value = 0.536 and $p < 0.05$. However, the first sub-hypothesis which examines the digital risk management impact on web design was supported (beta) value = 0.789 and $p < 0.05$. The second sub-hypothesis examines how digital risk management affects security and got support (beta) value = 0.739 and $p < 0.05$. Similarly, the third sub-hypothesis focusing on the convenience was found to be significantly impacted by the digital risk management and got (beta) value = 0.757 and $p < 0.05$. Lastly, the fourth sub-hypothesis looks at the digital risk management impact on speed was also determined to be substantial and got (beta) value = 0.705 and $p < 0.05$.

Table 5. Path coefficients and significance.

	Hypotheses	Path Coefficient	T Values	p-Values	Result
H1	digital risk management → innovative banking services	0.536	2.654	0.000	Supported
H1.1	digital risk management → web design	0.789	2.654	0.000	Supported
H1.2	digital risk management → security	0.739	2.998	0.000	Supported
H1.3	digital risk management → convivence	0.757	3.209	0.000	Supported
H1.4	digital risk management → speed	0.705	2.766	0.000	Supported
H2	digital risk management → digital capabilities	0.636	6.029	0.000	Supported
H3	digital capabilities → innovative banking services	0.100	2.102	0.036	Supported
H4	digital risk management → digital capabilities → innovative banking services	0.058	2.053	0.041	Supported
H5	digital risk management x digital culture → innovative banking services	0.023	1.427	0.154	Not supported

The findings show that digital risk management significantly improves digital capabilities, suggesting that managing digital risks effectively is essential to improving Islamic financial institutions' technological proficiency and digital preparedness—this supported H2. In addition, there is a significant effect of digital capabilities on innovative banking services, implying that Islamic financial institutions with strong digital capabilities are better equipped to create and provide innovative banking solutions—this supported H3. The results also find digital risk management techniques help an organization develop its technological proficiency digital preparedness and capacity to strategically use digital resources in addition to lowering operational and technological risks—this supported

H4. However, the results showed that the relationship between digital risk management and innovative banking services is not significantly moderated by digital culture, which implies that the effectiveness of digital risk management in fostering innovation is largely unaffected by the dominant digital culture in Islamic financial institutions—this did not support H5.

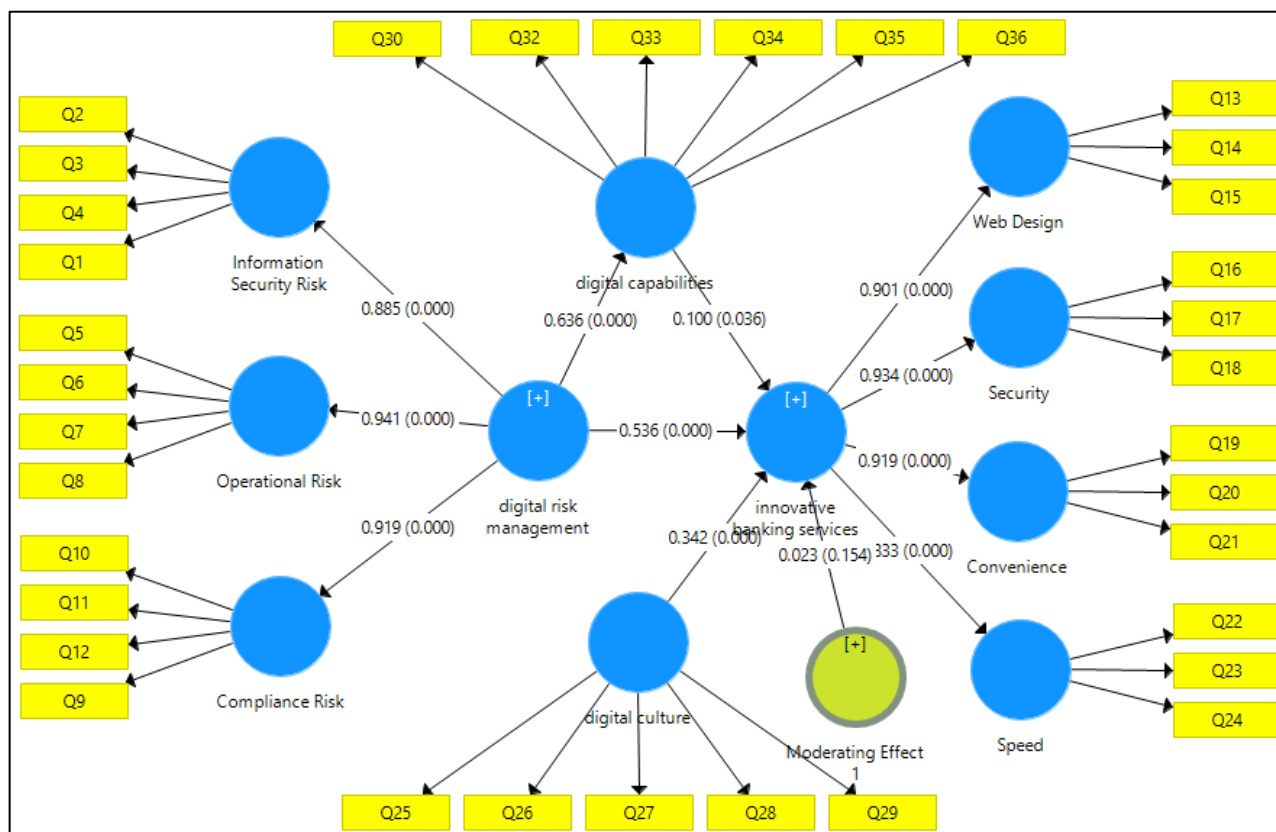


Figure 2. The model's structure.

The research calculated the predictive accuracy of the research model R^2 or coefficient of determination. The coefficient of determination (R^2) in this study is determined to be 0.696. Every exogenous variable contributes to the explanation of this variable. Based on the defined thresholds by Hair et al. (2014) an R^2 value of 0.75 as substantial and the predictive accuracy of 0.50 is regarded as moderate and 0.25 is regarded as weak, the value shows a high degree of predictive accuracy.

5. Discussion

The results of this study show that Innovative Islamic banking services greatly benefit from digital risk management. This outcome is in line with earlier empirical research that highlighted the strategic role that digital risk management plays in fostering innovation in financial institutions. Effective digital risk governance and regulatory technology capabilities lower operational uncertainty and boost organizational confidence in embracing emerging technologies according to earlier research. Research conducted by Al-Okaily and Al-Okaily (2025) discovered that in order to promote innovation and resilience, the findings encourage financial firms to embrace digital transformation by investing in cutting-edge technologies and enhancing their digital capabilities. It is essential to build internal capacity through digital literacy, employee training, and strategic FinTech collaborations.

However, effective digital risk management fosters a safe and reliable digital environment that promotes creativity which is the fundamental mechanism explaining this

relationship. Financial innovations must meet Shariah requirements in the highly regulated environment in which Islamic banks operate. Banks can detect and reduce risks before they become operational failures by using advanced analytics, artificial intelligence, cybersecurity systems, and automated compliance mechanisms. Furthermore, managers can more confidently direct resources toward innovation initiatives thanks to this decrease in uncertainty. As a result, digital risk management serves as a strategic tool that promotes experimentation, digital transformation, and service innovation, in addition to serving as a safeguard. The results also show that the relationship between digital risk management and innovative Islamic banking services is substantially mediated by digital capabilities. The results align with empirical research conducted by [Matarazzo et al. \(2021\)](#) which stated that digital capabilities are a crucial way that initiatives for digital transformation lead to innovative results.

In a similar vein, studies conducted in the banking industry have demonstrated that digital skills, data analytics expertise, and technology infrastructure improve an organization's capacity to use technology investments for service innovation. The mediating effect implies that innovative banking services cannot be produced by digital risk management alone. Rather, digital risk management enhances an organization's capacity to develop digital competencies, enhance data-driven decision-making, improve technological integration, and cultivate digital expertise among staff members. As a result, Islamic banks are able to create and provide cutting-edge services like blockchain-enabled transactions, fintech-based Shariah-compliant products, mobile Islamic banking apps, and digital financing platforms. Therefore, digital capabilities act as the organizational mechanism through which risk management practices are translated into tangible innovation outcomes.

Additionally, the study discovered that the relationship between digital capabilities and innovative Islamic banking services is not moderated by digital culture. Organizational culture has less of an impact on these mechanisms' efficacy because they use technology and standardized processes that are applied throughout the entire organization. Therefore, rather than through cultural factors, digital risk management may foster innovation through technological infrastructure and organized procedures. Another explanation is that there might not have been much variation in the degree of digital culture among the institutions surveyed. However, a piece of research like [Chauhan et al. \(2025\)](#) showed the role of digital transformation in improving organizational resilience, as well as the main obstacles that businesses must overcome and methods for integrating resilience into corporate culture. This may be explained through the capacity of the Islamic finance institutions to improve or worsen the connection between digital risk management and cutting-edge banking services being constrained when they display comparable degrees of digital culture.

This research demonstrates that technological resources by themselves do not ensure innovation; rather, innovation arises when digital capabilities are bolstered by an organizational learning and technological-advancement-friendly culture. Overall, by offering empirical evidence that in digital risk management, digital capabilities function as complementary mechanisms that collectively enhance innovative service development, the study adds to the expanding body of literature on Islamic banking. By showing that digital risk management is a crucial organizational resource, digital capabilities are the means by which that resource is mobilized and offer the contextual setting that dictates the degree to which capabilities can produce innovation. When taken as a whole these elements allow Islamic financial institutions to innovate sustainably while adhering to Shariah rules and successfully meeting the needs of a financial ecosystem that is becoming more and more digital.

An explanation concerning the features of Jordan's Islamic financial institutions: The banking industry is subject to stringent regulations enforced by Shariah governance frame-

works and financial authorities. Regardless of their internal cultural orientation, these regulatory pressures may force institutions to adopt comparable digital risk management techniques. Because compliance requirements establish a uniform approach to risk management and innovation across institutions the impact of digital culture may therefore be lessened. Additionally, innovative banking services were significantly impacted directly by digital risk management and digital capabilities, indicating that technological resources and operational competencies may be more important in fostering innovation than cultural considerations. Instead of acting as a catalyst to increase the impact of digital risk management in this situation, digital culture may serve as a background organizational trait. Managers and staff may already be aware of the significance of digital transformation which would limit its potential to have a major moderating effect and lead to comparatively uniform views of digital culture across organizations.

Another explanation for the non-significant moderating effect could be that digital culture uses other methods to influence people. Instead of improving the connection between innovative banking services and digital risk management, digital culture may either directly or indirectly impact innovation outcomes by improving organizational learning and employee digital competencies (Mohammad et al. 2022). A theoretical standpoint: the non-significant moderation suggests that digital culture may function independently of the relationship between innovation and digital risk management or that it may exert its influence through different mechanisms like directly improving digital capabilities or preparing organizations for digital transformation. As a result, the results support the Dynamic Capabilities Theory by indicating that in highly regulated industries like Islamic finance, contextual cultural factors do not always strengthen all digital transformation relationships. The results suggest that in order to maximize the innovative results of digital risk management programs, managers of Islamic financial institutions should not only focus on developing a digital culture.

6. Conclusions and Implications

The results indicate that in order to support innovation initiatives, management in Islamic finance institutions should give top priority to investing in strong digital risk management frameworks. For innovative services to be both technologically sound and Shariah-compliant, senior executives and risk managers must incorporate digital risk strategies into organizational decision-making processes. Building institutional capacity and resilience also requires training programs that emphasize emerging technologies and digital risk awareness. The findings can be used by regulators and Shariah supervisory organizations to create flexible regulatory frameworks that promote digital innovation while upholding stringent risk and compliance requirements. Stability and innovation in the sector can be fostered by harmonizing digital risk regulations with Islamic finance principles.

By placing digital capabilities in the context of Islamic banking services—which are governed by particular Sharia principles—this study adds to the expanding body of knowledge on the subject. It illustrates how digital innovation in Islamic banks is risk-sensitive, compliance-focused, and technology-driven, enhancing current frameworks for innovation. The results demonstrate that digital risk management, when bolstered by organizational capabilities, is both a strategic enabler of innovation and a protective mechanism. As a result, the conventional perspective on risk management is changed from being reactive to proactive and value-creating. Digital risk management should not be viewed by Islamic banks as merely a requirement for compliance. Rather, they ought to increase confidence in digital platforms use digital risk management. The mediating effect emphasizes the importance of bolstering systems integration and digital infrastructure which can improve the digital

competencies and skills of staff members. The advantages of digital risk management cannot be converted into cutting-edge services without these capabilities.

7. Future Research Directions and Limitations

Future research could compare the digital risk management strategies of Islamic and conventional banks. Further insights into the long-term impacts of digital risk management on innovation performance and financial sustainability in Islamic finance institutions may be obtained through empirical research employing longitudinal data. Several directions for further research are suggested building on the limitations of this study. To improve generalizability and offer cross-institutional insights into digital risk management practices, future research could first compare Islamic and conventional banks in Jordan or several Middle Eastern countries. Second, as Jordanian Islamic banks increasingly embrace blockchain fintech and AI longitudinal research, designs are encouraged to investigate how digital risk management capabilities affect innovation performance over time. Third, by investigating how digital risk management influences customer trust satisfaction and the adoption of cutting-edge Islamic banking services, future research may integrate customer-centric viewpoints. Fourth, in order to determine which risk factors have the greatest impact on innovation in Jordan's Islamic finance institutions, future research could examine particular aspects of digital risk management such as cybersecurity risk, data privacy, Shariah non-compliance risk, and operational resilience.

Despite its contributions this study has a number of limitations that should be taken into account when interpreting the results. First the study is restricted to Jordanian Islamic financial institutions. The results may not be entirely applicable to Islamic financial institutions in other nations with different regulatory frameworks, degrees of technological maturity, and socioeconomic circumstances, even though this contextual focus offers insightful information about a growing Islamic banking market. Second, the study might make use of cross-sectional data which records attitudes and behaviors at a particular moment in time. This method makes it more difficult to determine causal relationships or track changes in innovation outcomes and digital risk management techniques over time. A more thorough understanding would be provided by longitudinal insights as digital technologies and related risks change quickly.

Third, self-reported data gathered from managers or staff may be the basis for measuring digital risk management and cutting-edge banking services. The accuracy of the results may be impacted by response bias in such data which includes social desirability and subjective interpretation. Lastly, the study might concentrate mostly on internal organizational viewpoints, possibly ignoring customer opinions, the roles of fintech partners, and external environmental elements like Jordan's cybersecurity readiness, national digital infrastructure, and level of regulatory enforcement.

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