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Validation of factors affecting the development of digital banking services with a focus on information technology in Iranian banking.

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Abstract

The present study aimed to validate the factors influencing the development of digital banking services, with an emphasis on information technology, at Iran Zamin Bank. In terms of purpose, the research was applied, and in terms of implementation, it was quantitative. The statistical population consisted of 307 customers of Iran Zamin Bank in Tehran, who were selected through convenience sampling. Data were collected using a researcher-made questionnaire, whose reliability and validity were confirmed through Cronbach's alpha, composite reliability, and content validity methods. Data analysis was conducted using structural equation modeling based on the partial least squares approach, and SmartPLS 4 software was employed to test and assess the final model fit. The findings indicated that information technology and infrastructure, digital strategy, security and risk, user experience, product development and innovation, organizational structure and culture, environment and competition, change management, and data management and decision intelligence have significant relationships with the development of digital banking services. Ultimately, this study demonstrates that banks' success depends on effectively integrating advanced technological capabilities with strategic, security-related, customer-centric, and organizational agility requirements in the process of digital development.

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Extended Abstract

Introduction

In the contemporary era, the expansion of emerging technologies and changes in customer behavioral patterns have compelled banks to redefine their traditional practices. Information technology, as a powerful tool, has become a driving force for service development, a supporter of growth, a catalyst for innovation, and an enhancer of organizational competitiveness (Abdurrahman, 2024). These technologies provide unprecedented opportunities for developing countries to reduce their development gap and achieve accelerated growth by joining the global networked society (Guo, 2025). Moreover, growing evidence indicates that when information technology is employed as part of a comprehensive development strategy and supported by tripartite collaboration among governments, businesses, and civil society, it can become a powerful instrument for development (Liu et al., 2024). Information and communication technologies, together with knowledge management, possess considerable potential to accelerate development processes. The critical role of these technologies is evident across a wide range of industries and sectors, exerting a direct influence on economic development and overall growth in different societies. The adoption of these technologies has brought about major transformations in these sectors and has reshaped the trajectory of economic development in developing countries (Sonmez Cakir et al., 2024).

In recent years, developing countries have made significant investments in the development and enhancement of their information technology infrastructure, with key areas of focus including e-commerce, digital banking, and e-learning. Nevertheless, despite the substantial potential of information technology to accelerate development, the realization of this potential depends on the presence of essential complementary factors, including an empowered community of users capable of utilizing the opportunities created (Abdurrahman, 2024). Accordingly, it is necessary to formulate and implement effective policies that provide an appropriate framework for realizing the benefits of information technology across various economic sectors. Alongside these developments, increasing competition among manufacturing and service firms to attract and retain customers has become one of the primary challenges facing businesses. Therefore, the research question is: **How can the factors influencing the development of digital banking services, with an emphasis on information technology, be validated at Iran Zamin Bank?**

Theoretical Framework

Digital Banking

Digital banking extends beyond the simplified notion of replacing physical channels with electronic interfaces; it represents a comprehensive and systematic redefinition of all banking processes, in which emerging technologies function not merely as supporting tools but as the driving force of transformation. This three-layered transformation operates at the channel level by expanding an ecosystem of digital touchpoints—from mobile applications and internet banking platforms to smart automated teller machines and interactive chatbots—thereby extending customer interactions beyond temporal and geographical constraints. At the process level, the deep automation of internal processes through technologies such as artificial intelligence for risk analysis and smart contracts not only enhances operational efficiency but also enables the delivery of complex services in the shortest possible time (Hidayat & Kassim, 2023).

Information Technology in Banking

Information technology in banking refers to an integrated set of systems, processes, and technological enablers that are coordinated to collect, process, analyze, and deliver information in support of operational and strategic decision-making, as well as effective customer interaction. This concept is formed through five interrelated dimensions, each playing a vital role in establishing a digital banking ecosystem. The technological dimension includes advanced hardware, such as cloud servers and high-speed networks; specialized software, such as core banking platforms; and emerging technologies, including artificial intelligence for fraud detection and blockchain for transparent transactions, all of which provide the technical infrastructure required for service delivery. The process dimension refers to structured procedures that transform raw data into reliable and actionable information (Junarsin et al., 2023).

Dalvand et al. (2025) investigated the identification and prioritization of factors influencing the digital banking ecosystem. Their findings indicated that the digital banking ecosystem consists of four main dimensions, including key activities, enablers, infrastructure, and tools and products, encompassing a total of 16 criteria. The analyses revealed that the digital banking infrastructure dimension was the most influential factor, whereas the tools and products dimension was the least influential component within this ecosystem.

Zinati et al. (2025) examined the design of an Industry 4.0 maturity model in the banking service supply chain and the development of digital banking using a grounded theory approach. The findings identified ten categories under causal conditions, seven categories as components of the central phenomenon, four categories related to contextual conditions, eleven categories in the strategies dimension, seven categories under intervening conditions, and eight categories in the consequences dimension of the model.

Research Methodology

In terms of purpose, this study was applied research, and in terms of implementation, it employed a quantitative approach. The statistical population consisted of 307 customers of Iran Zamin Bank in Tehran, who were selected through convenience sampling. Data were collected using a researcher-developed questionnaire. The reliability and validity of the instrument were confirmed through Cronbach's alpha, composite reliability, and content validity methods.

Research Findings

To analyze the data, structural equation modeling using the partial least squares (PLS) approach was employed. The PLS software was used to test the model and assess its final fit. The findings indicated that information technology and infrastructure, digital strategy, security and risk, user experience, product development and innovation, organizational structure and culture, environment and competition, change management, and data management and decision intelligence have significant relationships with the development of digital banking services.

Ultimately, the study demonstrates that banks' success in digital transformation depends on their ability to intelligently integrate advanced technological capabilities with strategic requirements, security considerations, customer-centricity, and organizational agility.

Conclusion

The present study aimed to validate the factors influencing the development of digital banking services, with an emphasis on information technology, at Iran Zamin Bank. The findings of this study are consistent with those reported by Dalvand et al. (2025), Zinati et al. (2025), Mohaisen et al. (2025), Panah et al. (2024), Takhtaei et al. (2023), Alghizzawi et al. (2024), Sangeetha and Nisa (2024), Sagala et al. (2022), and Chukwukaelo et al. (2018). Alghizzawi et al. (2024) demonstrated that digital technologies, including automated teller machines, electronic financing, and electronic payment systems, have a positive and significant effect on improving the quality of digital banking services. These findings underscore the need for banking policymakers to prioritize the development of business intelligence in order to improve service quality and enhance competitiveness in an increasingly competitive environment.

Based on the findings, it is recommended that banks adopt an integrated and phased approach to the effective development of digital services. As an initial step, formulating a clear and actionable digital strategy based on an analysis of the competitive environment and the development of a technical and organizational roadmap is essential as the primary guiding framework.

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Conflicts of Interest

The authors declare that they have no financial or non-financial, personal, professional, or institutional conflicts of interest relevant to this work.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

AI Use Statement

The authors declare that no generative artificial intelligence (AI) or AI-assisted technologies were used in the preparation, writing, or editing of this manuscript.

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Ethics Approval

All procedures performed in this study were conducted in accordance with the ethical standards of the responsible institutional and national research committee.