

The Impact of Digital Transformation on Institutional Efficiency and Competitive Advantage: Insights from Financial Institutions in Algeria

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Abstract

Digital transformation has become a strategic necessity for organizations seeking to improve operational efficiency and maintain competitive advantage in rapidly changing business environments. This study aimed to examine the impact of digital transformation on institutional efficiency and competitive advantage in financial and banking institutions in El Oued Province, Algeria. The study adopted a quantitative approach using the descriptive-analytical method. Data were collected through a structured questionnaire distributed to employees working in financial and banking institutions. The study examined digital transformation through three dimensions: technological infrastructure, electronic management and process digitalization, and cybersecurity. Institutional efficiency and competitive advantage represented the dependent variables.

The findings revealed that the level of digital transformation adoption in the studied institutions was high. The results also showed a significant positive relationship between digital transformation and institutional efficiency, as well as between digital transformation and competitive advantage. Multiple regression analysis confirmed that technological infrastructure, electronic management, and cybersecurity positively influence organizational performance and competitive positioning. Among the dimensions of digital transformation, electronic management demonstrated the strongest impact on both institutional efficiency and competitive advantage. The study concluded that digital transformation plays a vital role in enhancing organizational effectiveness, improving service quality, supporting innovation, and strengthening competitiveness within financial institutions.

The study recommends that financial and banking institutions continue investing in digital infrastructure, strengthen cybersecurity systems, and provide continuous employee training to maximize the benefits of digital transformation. The study also highlights the importance of adopting integrated digital strategies to achieve sustainable institutional performance and long-term competitive advantage.

Keywords- Digital Transformation; Institutional Efficiency; Competitive Advantage; Financial Institutions; Electronic Management; Cybersecurity; Banking Sector; Algeria.

Introduction

Digital transformation has become one of the most influential drivers of organizational development in the contemporary business environment, particularly within financial and banking institutions. The rapid advancement of information and communication technologies, artificial intelligence, cloud computing, and digital platforms has fundamentally changed the way organizations operate and deliver services. Financial institutions increasingly depend on digital transformation to improve operational processes, reduce costs, enhance customer experience, and strengthen their competitive position in highly dynamic markets. Moreover, digital transformation enables institutions to redesign internal processes, improve service quality, and increase organizational flexibility in responding to environmental changes and customer expectations (Kitsios et al., 2023; Otieno et al., 2025).

In recent years, organizations have recognized that digital transformation is no longer a technological option but a strategic necessity for achieving efficiency and sustainable competitive advantage. The banking sector, in particular, has witnessed significant digital developments through the adoption of electronic management systems, digital banking services, cybersecurity solutions, and data analytics tools. These digital initiatives contribute to improving operational efficiency, accelerating decision-making processes, increasing productivity, and supporting innovation within institutions (Alqararah et al., 2025; Haryanti et al., 2025). However, despite the growing adoption of digital

technologies, many financial institutions still encounter challenges related to technological readiness, cybersecurity risks, employee digital competencies, and organizational adaptation to digital environments. Such challenges may limit the effectiveness of digital transformation initiatives and reduce their contribution to institutional efficiency and competitiveness (Otieno et al., 2025; Haryanti et al., 2025).

Accordingly, the problem of this study emerges from the need to examine whether digital transformation actually contributes to enhancing the efficiency of financial institutions and strengthening their competitive advantage, particularly in developing economies and local banking environments. Although previous studies have emphasized the positive role of digital transformation in improving organizational performance and market competitiveness, empirical evidence regarding its impact on financial institutions in Algeria remains limited. Therefore, this study seeks to answer the following research question: What is the impact of digital transformation on enhancing institutional efficiency and achieving competitive advantage in financial and banking institutions? Based on this question, the study aims to evaluate the level of digital transformation adoption, analyze its effect on organizational efficiency, and determine its contribution to achieving competitive advantage in financial institutions (Maqbuli, 2026; Haddad, 2024).

The significance of this study lies in its theoretical and practical contributions. Theoretically, the study contributes to enriching the academic literature related to digital transformation, organizational efficiency, and competitive advantage, especially within the context of financial institutions and developing economies. It also provides a comprehensive understanding of how digital transformation dimensions influence institutional performance and competitiveness. Practically, the findings of this study may assist managers, policymakers, and decision-makers in financial institutions in developing effective digital transformation strategies that improve operational efficiency, enhance innovation, strengthen cybersecurity systems, and achieve sustainable competitive advantage. Furthermore, the study may support future research concerning digital transformation applications in banking and financial sectors and provide guidance for organizations seeking to improve their competitive capabilities in the digital era (Otieno et al., 2025; Felipe, 2025).

Literature review

Digital transformation has become a strategic priority for organizations seeking to improve efficiency and maintain competitiveness in rapidly changing business environments. It refers to the integration of digital technologies into organizational processes, services, and strategies to improve performance and create value (Vial, 2019). In the financial and banking sector, digital transformation plays a critical role in enhancing operational speed, reducing costs, improving customer experience, and supporting innovation (Verhoef et al., 2021). Financial institutions increasingly rely on technologies such as electronic management systems, cloud computing, and cybersecurity tools to improve service delivery and strengthen their market position.

Several theories explain the importance of digital transformation in organizations. The Dynamic Capabilities Theory argues that organizations achieve better performance when they effectively adapt their resources and capabilities to technological and environmental changes (Teece, 2018). Similarly, the Technology Acceptance Model (Davis, 1989) highlights that the successful implementation of digital technologies depends on employees' acceptance and perceived usefulness of these systems. These theories suggest that digital transformation contributes to improving institutional efficiency through automation, faster decision-making, and enhanced resource utilization.

Previous studies confirmed the positive relationship between digital transformation, organizational efficiency, and competitive advantage. AlNuaimi et al. (2022) found that digital transformation improves operational efficiency and service quality in banking institutions. Likewise, Otieno et al. (2025) emphasized that digital transformation enhances competitive advantage through innovation, flexibility, and improved customer engagement. Porter (1985) also argued that organizations achieve competitive advantage through differentiation, innovation, and cost leadership, all of which can be supported by digital technologies.

Despite the growing literature on digital transformation, limited studies have examined its combined impact on both institutional efficiency and competitive advantage in financial institutions, especially in developing countries such as Algeria. Therefore, this study seeks to investigate the impact of digital transformation dimensions on enhancing institutional efficiency and achieving competitive advantage in financial and banking institutions.

Based on the literature review, the following hypotheses are proposed:

H1: Digital transformation has a significant positive effect on institutional efficiency in financial and banking institutions.

Method:

Research Design

This study adopted a quantitative research approach using the descriptive-analytical method to examine the impact of digital transformation on institutional efficiency and competitive advantage in financial and banking institutions in El Oued Province, Algeria. The descriptive-analytical approach is commonly applied in organizational and management research because it allows researchers to describe phenomena systematically and analyze relationships between variables (Saunders et al., 2019). This approach was suitable for the present study because it enabled the investigation of how digital transformation dimensions influence institutional efficiency and competitive advantage.

Population and Sample

The study population consisted of employees working in financial and banking institutions in El Oued Province, including Algeria Post and banking institutions operating in the region. Employees involved in administrative and digital operations were targeted because they directly interact with digital systems and transformation practices within their institutions.

Data Collection Instrument

A structured questionnaire was used as the primary instrument for data collection. The questionnaire was developed based on previous literature and studies related to digital transformation, institutional efficiency, and competitive advantage (Vial, 2019; Verhoef et al., 2021). The questionnaire included items measuring the dimensions of digital transformation, institutional efficiency, and competitive advantage.

Study Variables

The study included digital transformation as the independent variable, represented by three dimensions: technological infrastructure, electronic management and process digitalization, and cybersecurity. Institutional efficiency and competitive advantage represented the dependent variables. Institutional efficiency was measured through organizational structure, conduct, and performance dimensions, while competitive advantage was measured through cost leadership, differentiation and innovation, and market power, based on Porter's framework of competitive advantage (Porter, 1985).

Validity and Reliability

To ensure the validity of the research instrument, the questionnaire was reviewed by academic experts and specialists in business administration and digital transformation. Reliability analysis was conducted using Cronbach's Alpha and McDonald's Omega coefficients to assess internal consistency. The results showed acceptable reliability levels for all study variables, exceeding the minimum threshold recommended by Hair et al. (2019).

Data Analysis Techniques

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS version 27). Several statistical methods were employed, including descriptive statistics, Pearson correlation analysis, multiple linear regression analysis, independent sample t-test, and one-way ANOVA. These techniques are widely used in quantitative organizational research to test hypotheses and examine relationships between variables (Field, 2018).

Study Duration and Location

The field study was conducted between March 2026 and April 2026 in financial and banking institutions located in El Oued Province, Algeria

Findings

Descriptive Analysis of Digital Transformation

The findings revealed that the level of digital transformation adoption in financial and banking institutions in El Oued Province was high. Employees indicated that their institutions possessed adequate technological infrastructure, electronic management systems, and cybersecurity measures that support digital operations and service delivery. These findings suggest that financial institutions increasingly recognize the importance of digital technologies in improving operational effectiveness and responding to customer needs.

Table 1

Level of Digital Transformation Adoption

Dimension	Mean	Std. Deviation	Level
Technological Infrastructure	4.12	0.61	High
Electronic Management	4.08	0.58	High
Cybersecurity	3.97	0.65	High
Overall Digital Transformation	4.06	0.60	High

The results in Table 1 indicate that technological infrastructure recorded the highest mean score, reflecting the strong availability of digital systems and technological resources within the studied institutions. Electronic management also achieved a high score, demonstrating the increasing reliance on digital processes in administrative and operational activities. Cybersecurity received a relatively lower mean compared to other dimensions, which may indicate the need for additional investment in data protection and digital security systems.

Relationship Between Digital Transformation and Institutional Efficiency

The correlation analysis demonstrated a significant positive relationship between digital transformation and institutional efficiency. This finding indicates that improvements in digital infrastructure, electronic management, and cybersecurity contribute positively to enhancing organizational structure, operational conduct, and institutional performance.

Table 2

Correlation Between Digital Transformation and Institutional Efficiency

Variables	Correlation Coefficient (r)	Significance
Digital Transformation & Institutional Efficiency	0.768	0.000

The results presented in Table 2 show a strong positive correlation between digital transformation and institutional efficiency. The significance value confirms that the relationship is statistically significant at the 0.05 level. This suggests that organizations adopting digital technologies are more capable of improving operational effectiveness and resource utilization.

Impact of Digital Transformation on Institutional Efficiency

Multiple regression analysis was conducted to examine the effect of digital transformation dimensions on institutional efficiency. The results confirmed that digital transformation significantly affects institutional efficiency.

Table 3

Regression Analysis of Digital Transformation and Institutional Efficiency

Variable	Beta	t-value	Sig.
Technological Infrastructure	0.341	4.85	0.000
Electronic Management	0.387	5.21	0.000
Cybersecurity	0.298	4.12	0.001

The findings in Table 3 indicate that all dimensions of digital transformation positively and significantly influence institutional efficiency. Electronic management had the strongest effect, followed by technological infrastructure and cybersecurity. These results imply that digital administrative systems and technological capabilities enhance organizational processes and improve institutional performance.

Relationship Between Digital Transformation and Competitive Advantage

The study findings also revealed a significant positive relationship between digital transformation and competitive advantage. Financial institutions that adopt digital transformation strategies were found to achieve greater innovation, stronger market position, and better service differentiation.

Table 4

Correlation Between Digital Transformation and Competitive Advantage

Variables	Correlation Coefficient (r)	Significance
Digital Transformation & Competitive Advantage	0.801	0.000

The results demonstrate a strong positive relationship between digital transformation and competitive advantage. This finding confirms that digital technologies support institutions in achieving cost efficiency, innovation, and stronger market competitiveness.

Impact of Digital Transformation on Competitive Advantage

Regression analysis further confirmed that digital transformation dimensions significantly contribute to achieving competitive advantage in financial and banking institutions.

Table 5

Regression Analysis of Digital Transformation and Competitive Advantage

Variable	Beta	t-value	Sig.
Technological Infrastructure	0.322	4.43	0.000
Electronic Management	0.401	5.67	0.000
Cybersecurity	0.287	3.98	0.001

The findings presented in Table 5 indicate that electronic management had the strongest influence on competitive advantage, followed by technological infrastructure and cybersecurity. These results suggest that institutions adopting advanced digital systems and secure technological environments are more capable of achieving innovation, customer satisfaction, and market leadership.

Overall, the findings confirm that digital transformation plays a critical role in improving institutional efficiency and strengthening competitive advantage within financial and banking institutions in El Oued Province. The results support previous studies emphasizing the strategic importance of digital technologies in enhancing organizational performance and competitiveness.

Discussion

The findings of this study confirm that digital transformation has a significant positive effect on both institutional efficiency and competitive advantage within financial and banking institutions in El Oued Province. The high level of digital transformation adoption observed in the studied institutions indicates that financial organizations are increasingly investing in technological infrastructure, electronic management systems, and cybersecurity measures to improve their operational capabilities and service quality. These findings are consistent with Vial (2019), who emphasized that digital transformation enables organizations to redesign operational processes and improve organizational performance through technological integration.

The results also demonstrated a strong positive relationship between digital transformation and institutional efficiency. This indicates that institutions adopting digital technologies are more capable of improving organizational structure, accelerating operational processes, reducing administrative burdens, and enhancing employee productivity. Electronic management showed the strongest impact on institutional efficiency, suggesting that digital administrative systems contribute substantially to operational effectiveness and decision-making quality. These findings support the study of AlNuaimi et al. (2022), which concluded that digital transformation improves organizational efficiency through automation and process integration.

Furthermore, the study revealed that digital transformation significantly contributes to achieving competitive advantage. Institutions with advanced digital capabilities were found to possess stronger market positions, greater service innovation, and better customer responsiveness. Electronic management again emerged as the most influential factor affecting competitive advantage, indicating that digital service delivery and efficient internal processes enhance institutional differentiation and customer satisfaction. These findings are aligned with Porter's (1985) theory of competitive advantage, which highlights innovation and operational efficiency as key sources of competitiveness. They are also consistent with Verhoef et al. (2021), who argued that digital transformation strengthens organizational agility and market competitiveness.

Cybersecurity also demonstrated a significant positive effect on both institutional efficiency and competitive advantage. This finding reflects the growing importance of secure digital environments in financial institutions, where data protection and customer trust represent critical success factors. Institutions with stronger cybersecurity

systems are more capable of maintaining operational stability and protecting sensitive financial information, which enhances both performance and competitiveness.

Overall, the study findings suggest that digital transformation should not be viewed merely as a technological change, but rather as a strategic organizational process that enhances institutional efficiency and supports sustainable competitive advantage. Financial and banking institutions must therefore continue investing in technological infrastructure, employee digital competencies, and cybersecurity systems to maximize the benefits of digital transformation and remain competitive in the digital economy.

Conclusion

This study investigated the impact of digital transformation on institutional efficiency and competitive advantage within financial and banking institutions in El Oued Province, Algeria. In light of the rapid technological developments and the increasing importance of digital systems in the financial sector, the study aimed to examine how technological infrastructure, electronic management, and cybersecurity contribute to improving institutional performance and strengthening competitive positioning. The findings demonstrated that digital transformation has become an essential strategic tool for financial institutions seeking to improve operational effectiveness, deliver high-quality services, and maintain competitiveness in a dynamic business environment.

The results revealed that the level of digital transformation adoption among the studied institutions was relatively high, indicating a growing awareness among financial organizations regarding the importance of digital technologies in modern banking and financial operations. The findings further showed that digital transformation significantly improves institutional efficiency by enhancing organizational structure, accelerating work processes, facilitating communication, reducing operational costs, and improving employee productivity. Electronic management emerged as the most influential dimension affecting institutional efficiency, highlighting the critical role of digital administrative systems in optimizing organizational operations and supporting faster and more accurate decision-making.

The study also confirmed that digital transformation contributes significantly to achieving competitive advantage in financial institutions. Organizations adopting advanced digital systems were found to possess stronger market capabilities, greater service innovation, improved customer responsiveness, and higher levels of operational flexibility. These outcomes demonstrate that digital transformation enables financial institutions to strengthen customer trust, improve service quality, and differentiate themselves from competitors. In addition, cybersecurity was identified as an important component influencing both institutional efficiency and competitive advantage, particularly because financial institutions rely heavily on secure digital environments to protect customer information and maintain operational continuity.

The findings of this study support previous theoretical and empirical research emphasizing the strategic role of digital transformation in organizational development and competitiveness. The study confirms that digital transformation should not be viewed merely as the implementation of technological tools, but rather as a comprehensive organizational transformation process involving technological, administrative, and human dimensions. Therefore, financial institutions must adopt integrated digital transformation strategies that combine technological investment, employee training, cybersecurity enhancement, and organizational innovation.

From a practical perspective, the study provides valuable implications for managers and policymakers in the financial and banking sector. Financial institutions are encouraged to continue investing in modern technological infrastructure and digital platforms in order to improve service delivery and operational performance. The study also highlights the importance of developing employee digital competencies through continuous training programs and professional development initiatives. Furthermore, institutions should strengthen cybersecurity systems and establish clear digital governance policies to ensure data protection and operational stability in increasingly digitalized environments.

The study additionally contributes to the academic literature by providing empirical evidence from the Algerian financial sector, a context that has received limited attention in previous digital transformation research. By examining the combined relationship between digital transformation, institutional efficiency, and competitive advantage, the study extends existing research and offers a broader understanding of the strategic value of digital transformation in developing economies.

Study Limitations

Despite the valuable findings generated by this study, several limitations should be acknowledged. First, the study was limited to financial and banking institutions located in El Oued Province, Algeria, which may reduce the generalizability of the findings to other regions or sectors. Different institutional, economic, and technological environments may produce different results regarding digital transformation adoption and outcomes.

Second, the study relied on a quantitative research design using questionnaire-based data collection. Although questionnaires provide useful statistical insights, they may not fully capture employees' deeper perceptions, experiences, and challenges related to digital transformation. The use of self-reported data may also introduce response bias, as participants may provide socially desirable responses rather than fully objective evaluations.

Third, the study focused on specific dimensions of digital transformation, namely technological infrastructure, electronic management, and cybersecurity. Other potentially important variables, such as organizational culture, leadership style, digital innovation capability, employee resistance to change, and customer satisfaction, were not included in the research model. Including these variables could provide a more comprehensive understanding of digital transformation outcomes.

Another limitation concerns the cross-sectional nature of the study. The data were collected during a specific time period, which limits the ability to examine long-term changes and developments related to digital transformation. Since digital transformation is a dynamic and evolving process, longitudinal studies may provide deeper insights into how organizations adapt to technological changes over time.

Directions for Future Studies

Future research may expand this study in several important directions. First, researchers are encouraged to conduct similar studies in other sectors such as healthcare, education, telecommunications, and manufacturing in order to compare the impact of digital transformation across different organizational contexts. Comparative studies between public and private institutions may also provide valuable insights regarding differences in digital transformation strategies and outcomes.

Second, future studies may incorporate additional variables that influence digital transformation success, such as organizational culture, leadership support, employee digital skills, innovation capability, organizational agility, and customer satisfaction. Examining mediating and moderating variables could help researchers better understand the mechanisms through which digital transformation affects organizational performance and competitiveness.

Third, future research may employ qualitative or mixed-method approaches to gain deeper insights into the experiences and perceptions of employees, managers, and customers regarding digital transformation practices. Interviews, case studies, and focus groups may provide richer explanations of the challenges and opportunities associated with digital transformation implementation.

In addition, longitudinal studies are recommended to examine the long-term impact of digital transformation on institutional efficiency and competitive advantage. Such studies would help identify how organizations evolve digitally over time and how technological adaptation influences sustainable organizational performance.

Finally, future studies may focus specifically on emerging digital technologies such as artificial intelligence, blockchain, big data analytics, cloud computing, and financial technology (FinTech) applications to explore their direct impact on organizational innovation, cybersecurity, and competitive advantage within financial institutions.

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