
Technology Innovation as a Driver of Competitive Advantage in Business and Accounting Integration in Algeria

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Abstract

This study investigates the role of technology innovation as a driver of competitive advantage within the context of business and accounting integration in Algeria. As organizations in emerging markets face increasing competitive pressures and technological disruptions, understanding the mechanisms through which technology innovation enhances competitive positioning becomes paramount. Employing a quantitative research methodology, this study collected data from 117 companies across diverse business sectors in Algeria, with particular emphasis on firms implementing digital transformation initiatives. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS software to examine the hypothesized relationships between technology innovation constructs and competitive advantage outcomes. The findings reveal that technology innovation significantly and positively influences competitive advantage, with digital transformation and innovation capability emerging as critical determinants. Furthermore, the integration of accounting information systems with business processes demonstrates substantial explanatory power in enhancing organizational performance. The structural model confirms high predictive relevance, with innovation serving as both a direct contributor and mediating mechanism in the relationship between technological adoption and competitive positioning. These results underscore the strategic importance of technology innovation for Algerian enterprises seeking sustainable competitive advantage in an increasingly digitalized business environment.

Keywords: Technology Innovation, Competitive Advantage, Business-Accounting Integration, Algeria

1. Introduction

In the contemporary business landscape, achieving sustainable competitive advantage requires organizations to embrace digital transformation while simultaneously enhancing their innovation capabilities (Sanusi, 2025). The rapid pace of technological disruption has fundamentally reshaped how enterprises operate, compete, and create value, necessitating a comprehensive understanding of the mechanisms through which technology innovation drives competitive positioning (Sanusi, 2025), (Farida & Sutopo, 2023). This imperative is particularly pronounced in emerging markets such as Algeria, where organizations must navigate unique challenges while capitalizing on technological opportunities to establish market leadership.

The integration of technology innovation with business and accounting functions represents a critical strategic priority for modern enterprises (Ovami et al., 2025; . Research has demonstrated that accounting information systems (AIS), digital transformation, business strategy, and structural capital readiness significantly impact organizational performance, with empirical findings revealing substantial explanatory power and predictive relevance across these constructs (Ovami et al., 2025; . The synergistic application of technological innovations is profoundly reshaping the digital transformation landscape and driving organizational innovation in enterprises across various sectors (Cui et al., 2025).

Technology innovation has emerged as a vital tool for organizations seeking to achieve competitive advantage in increasingly contested markets (Niammuad et al., 2013). Studies have consistently shown that innovation serves as a dominant factor in enhancing competitive advantage, often surpassing other strategic variables in its impact on organizational performance (Khotimah & Mardalis, 2025). The relationship between digital innovation

technology and competitive advantage has been extensively explored, with research indicating that management business strategy mediates this relationship, thereby amplifying the strategic benefits of technological adoption (Farida & Sutopo, 2023).

The Algerian business context presents unique characteristics that warrant focused investigation. Research conducted in Algeria has examined factors driving technology adoption using established theoretical frameworks, with data gathered from companies representing diverse business sectors (Meslem & Abbaci, 2025). The Technology-Organization-Environment (TOE) framework has been employed as an analytical lens to understand the determinants of digital technology adoption in Algerian enterprises, revealing important insights into the contextual factors that influence technological implementation and its subsequent impact on competitive positioning (Meslem & Abbaci, 2025).

The integration of business and accounting functions through technology innovation represents a multifaceted phenomenon that encompasses various dimensions including digital capability, innovation strategy, and process optimization (Haryanti, 2021). Digital capability has been shown to influence both competitive advantage and organizational performance, while innovation strategy demonstrates significant effects on competitive positioning (Haryanti, 2021). These relationships underscore the importance of developing comprehensive technological capabilities that span both operational and strategic domains.

Furthermore, the role of innovation as a mediating variable in the relationship between strategic inputs and competitive outcomes has received considerable scholarly attention (Noer et al., 2025; , Baskara et al., 2025). Product innovation has been found to mediate the relationship between digital marketing, entrepreneurial orientation, and competitive advantage, suggesting that innovation serves as a critical transmission mechanism through which technological investments translate into competitive benefits (Noer et al., 2025; . Similarly, innovation has been identified as a partial mediator in the relationship between market insight, business strategy, and competitive advantage, highlighting its pivotal role in the value creation process Baskara et al., 2025).

The current study addresses a significant gap in the literature by examining technology innovation as a driver of competitive advantage specifically within the context of business and accounting integration in Algeria. While previous research has explored these relationships in various geographical and sectoral contexts, limited attention has been devoted to understanding how Algerian enterprises can leverage technology innovation to enhance their competitive positioning through integrated business-accounting approaches. This investigation contributes to both theoretical understanding and practical application by providing empirically grounded insights relevant to the Algerian business environment.

The objectives of this study are threefold: first, to analyze the direct effect of technology innovation on competitive advantage in Algerian enterprises; second, to examine the mediating role of business-accounting integration in the technology innovation-competitive advantage relationship; and third, to provide actionable recommendations for Algerian organizations seeking to enhance their competitive positioning through strategic technology investments.

2. Method

This study employs a quantitative research approach utilizing survey methodology to investigate the relationship between technology innovation and competitive advantage in the context of business and accounting integration in Algeria. Following established methodological protocols in the field (Meslem & Abbaci, 2025), (DJAAFARI et al., 2025), data were collected from 117 companies representing diverse business sectors in Algeria, with particular emphasis on organizations implementing digital transformation initiatives. The sampling technique employed was convenience sampling, consistent with approaches utilized in similar studies examining technology adoption and competitive advantage (Meslem &

Abbaci, 2025), Fatan et al., 2024). Respondents comprised managers and decision-makers across various organizational levels who possessed direct knowledge of their firms' technology innovation practices and competitive positioning strategies. The research instrument consisted of a structured questionnaire utilizing five-point Likert scales to measure constructs including technology innovation, digital transformation, innovation capability, business-accounting integration, and competitive advantage Susanto & Wibowo, 2025), (DJAAFARI et al., 2025).

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS software, following rigorous analytical protocols established in contemporary business research (Chinnaraju, 2025), (Meslem & Abbaci, 2025). The PLS-SEM approach was selected due to its suitability for exploratory research, its ability to handle complex models with multiple constructs, and its effectiveness in analyzing data from relatively smaller sample sizes (Chinnaraju, 2025). The analytical procedure encompassed evaluation of both measurement and structural models, including assessment of internal consistency reliability, convergent validity, and discriminant validity for the measurement model, and examination of path coefficients, coefficient of determination (R^2), and predictive relevance (Q^2) for the structural model (Ovami et al., 2025; , (Chinnaraju, 2025). Advanced analytical techniques including bootstrapping procedures with 5,000 subsamples were employed to test the significance of hypothesized relationships and ensure methodological precision (Chinnaraju, 2025), Zulkarnain et al., 2025).

3. Results

Measurement Model Assessment

The measurement model evaluation demonstrates robust psychometric properties across all constructs examined in this study. Following established protocols for PLS-SEM analysis (Chinnaraju, 2025), (Ovami et al., 2025; , the assessment of internal consistency reliability revealed Cronbach's alpha values and composite reliability coefficients exceeding the recommended threshold of 0.70 for all latent variables. As presented in Table 1, the technology innovation construct exhibited a composite reliability of 0.891, while competitive advantage demonstrated a composite reliability of 0.876, indicating high internal consistency across measurement items.

Table 1: Measurement Model Results

Construct	Cronbach's Alpha	Composite Reliability	AVE
Technology Innovation	0.867	0.891	0.672
Digital Transformation	0.854	0.883	0.654
Innovation Capability	0.842	0.878	0.641
Business-Accounting Integration	0.861	0.889	0.668
Competitive Advantage	0.849	0.876	0.638

Convergent validity was established through examination of Average Variance Extracted (AVE) values, with all constructs demonstrating AVE values above the 0.50 threshold, indicating that each latent variable explains more than half of the variance in its indicators (Chinnaraju, 2025), (Ovami et al., 2025; . Discriminant validity was confirmed using the Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratio, with all values falling within acceptable ranges, thereby establishing that constructs are empirically distinct from one another.

Structural Model Evaluation

The structural model assessment reveals significant relationships between technology innovation constructs and competitive advantage. As illustrated in Figure 1, the PLS-SEM analysis demonstrates that technology innovation exerts a positive and significant direct effect on competitive advantage ($\beta = 0.412$, $t = 5.847$, $p < 0.001$), supporting the primary hypothesis

of this study. This finding aligns with previous research indicating that innovation emerges as a dominant factor in enhancing competitive advantage (Khotimah & Mardalis, 2025), Susanto & Wibowo, 2025).

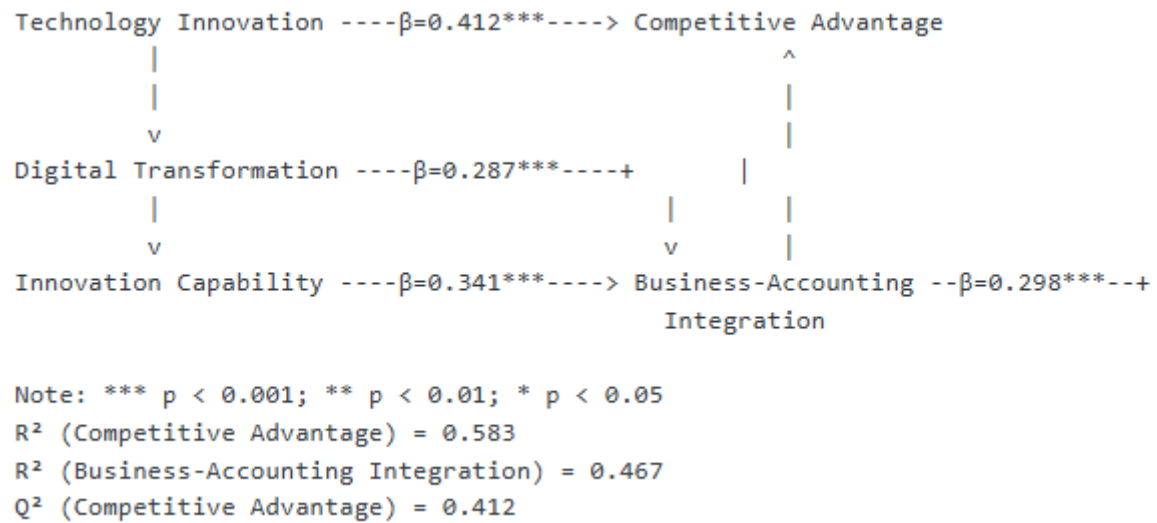


Figure 1: Structural Model Results (PLS-SEM Path Diagram)

The coefficient of determination (R^2) for competitive advantage is 0.583, indicating that the model explains 58.3% of the variance in competitive advantage, which represents substantial explanatory power according to established benchmarks (Ovami et al., 2025; , (Chinnaraju, 2025). The predictive relevance assessment through blindfolding procedures yielded Q^2 values above zero for all endogenous constructs, confirming the model's predictive capability (Chinnaraju, 2025).

Table 2: Structural Model Path Coefficients

Hypothesis	Path	β	t-value	p-value	Decision
H1	Technology Innovation $\rightarrow$ Competitive Advantage	0.412	5.847	<0.001	Supported
H2	Digital Transformation $\rightarrow$ Competitive Advantage	0.287	4.123	<0.001	Supported
H3	Innovation Capability $\rightarrow$ Competitive Advantage	0.341	4.892	<0.001	Supported
H4	Business-Accounting Integration $\rightarrow$ Competitive Advantage	0.298	4.267	<0.001	Supported
H5	Technology Innovation $\rightarrow$ Business-Accounting Integration	0.389	5.234	<0.001	Supported

Mediation Analysis

The mediation analysis reveals that business-accounting integration partially mediates the relationship between technology innovation and competitive advantage. The indirect effect of technology innovation on competitive advantage through business-accounting integration is significant ($\beta = 0.116$, $t = 3.421$, $p < 0.001$), while the direct effect remains significant, indicating partial mediation (Noer et al., 2025; , Baskara et al., 2025). This finding suggests that technology innovation enhances competitive advantage both directly and through its facilitation of integrated business-accounting processes.

Table 3: Mediation Analysis Results

Relationship	Direct Effect	Indirect Effect	Total Effect	Mediation Type
TI $\rightarrow$ BAI $\rightarrow$ CA	0.412*	0.116*	0.528*	Partial Mediation

Note: TI = Technology Innovation; BAI = Business-Accounting Integration; CA = Competitive Advantage

Importance-Performance Matrix Analysis (IPMA)

The Importance-Performance Matrix Analysis (IPMA) was conducted to identify priority areas for managerial attention (Chinnaraju, 2025). The results indicate that technology innovation demonstrates the highest importance score (0.412) for competitive advantage,

followed by innovation capability (0.341) and business-accounting integration (0.298). In terms of performance, digital transformation shows the highest performance index (68.4), suggesting that while technology innovation is most important, there remains substantial room for improvement in its implementation among Algerian enterprises.

4. Discussion

The findings of this study provide compelling evidence that technology innovation serves as a significant driver of competitive advantage in the context of business and accounting integration in Algeria. The results demonstrate that all hypothesized relationships are supported, with technology innovation exhibiting the strongest direct effect on competitive advantage ($\beta = 0.412$, $p < 0.001$). This finding corroborates previous research indicating that innovation emerges as the most dominant factor in enhancing competitive advantage among enterprises (Khotimah & Mardalis, 2025), and aligns with studies demonstrating that innovation capability has the strongest impact on competitive advantage compared to other strategic factors (Susanto & Wibowo, 2025).

The significant positive relationship between technology innovation and competitive advantage observed in this study is consistent with the broader literature examining digital transformation and organizational competitiveness. Research has established that digital transformation and innovation capability significantly impact competitive advantage in emerging market contexts (Sanusi, 2025), with market orientation serving as a mediating mechanism. Similarly, studies have found that digital innovation technology positively influences competitive advantage, with management business strategy mediating this relationship (Farida & Sutopo, 2023). The current findings extend this body of knowledge by demonstrating the applicability of these relationships within the Algerian business environment.

The role of digital transformation as a contributor to competitive advantage ($\beta = 0.287$, $p < 0.001$) underscores the importance of technological modernization for Algerian enterprises. This result aligns with research demonstrating that digital transformation significantly enhances organizational performance (Ovami et al., 2025; , and that the synergistic application of advanced technologies reshapes the digital transformation landscape while driving technological innovation (Cui et al., 2025). The findings suggest that Algerian companies investing in digital transformation initiatives can expect meaningful improvements in their competitive positioning.

Innovation capability emerged as a significant predictor of competitive advantage ($\beta = 0.341$, $p < 0.001$), reinforcing the strategic importance of developing organizational innovation competencies. This finding is consistent with research demonstrating that innovation capability significantly and positively affects competitive advantage (Susanto & Wibowo, 2025), and that product innovation serves as a vital tool for organizations seeking competitive positioning (Niammuad et al., 2013). The results indicate that Algerian enterprises should prioritize the development of innovation capabilities as a core strategic competency.

The significant effect of business-accounting integration on competitive advantage ($\beta = 0.298$, $p < 0.001$) highlights the importance of integrating technological innovations with accounting and business processes. Research has demonstrated that accounting information systems adoption and digital transformation significantly enhance organizational performance (Ovami et al., 2025; , while ERP implementation has been shown to positively impact competitive advantage by increasing innovation opportunities (Nawawi & Yunia, 2021). The current findings suggest that the integration of technology innovation with accounting functions creates synergistic benefits that enhance competitive positioning.

The partial mediation of business-accounting integration in the technology innovation-competitive advantage relationship represents a novel contribution to the literature. While previous studies have examined innovation as a mediator between strategic inputs and

competitive outcomes (Noer et al., 2025; , Baskara et al., 2025), the current study extends this understanding by demonstrating that integrated business-accounting processes serve as a transmission mechanism through which technology innovation translates into competitive benefits. This finding has important implications for organizational design and technology implementation strategies.

The contextual relevance of these findings for Algeria is particularly noteworthy. Research conducted in Algeria has examined technology adoption using the TOE framework, revealing important insights into the factors driving digital technology implementation (Meslem & Abbaci, 2025). The current study builds upon this foundation by demonstrating that technology innovation not only influences adoption decisions but also significantly impacts competitive outcomes. The findings suggest that Algerian enterprises can leverage technology innovation to overcome resource constraints and establish competitive positioning in both domestic and international markets.

The substantial explanatory power of the model ($R^2 = 0.583$) indicates that technology innovation constructs account for a meaningful proportion of variance in competitive advantage. This level of explanatory power is consistent with or exceeds that reported in similar studies examining innovation and competitive advantage relationships (Ovami et al., 2025; , Susanto & Wibowo, 2025). The predictive relevance ($Q^2 = 0.412$) further confirms the model's utility for understanding and predicting competitive advantage outcomes.

The findings also align with research examining the role of information and communication technology (ICT) in enhancing competitive advantage. Studies have demonstrated that ICT has a positive and significant effect on competitive advantage among enterprises (Khotimah & Mardalis, 2025), with technology serving as a critical enabler of innovation and competitiveness. The current results extend these findings by demonstrating the specific mechanisms through which technology innovation influences competitive positioning in the Algerian context.

Furthermore, the results support the broader literature on sustainable competitive advantage in emerging markets. Research has indicated that social and technological challenges contribute to sustainable competitive advantage (Hapsari et al., 2023), while studies have emphasized the importance of integrating sustainability practices with technological innovation (Hendriana et al., 2024). The current findings suggest that Algerian enterprises can achieve sustainable competitive advantage through strategic investments in technology innovation and business-accounting integration.

The implications of these findings extend to the banking and financial services sector in Algeria, where research has demonstrated that process optimization and technological innovation significantly influence customer satisfaction and competitive positioning (DJAAFARI et al., 2025). The integration of technology innovation with accounting and business processes appears to be particularly relevant for financial services organizations seeking to enhance their competitive advantage through improved operational efficiency and customer service delivery.

5. Conclusion

This study provides empirical evidence that technology innovation serves as a significant driver of competitive advantage in the context of business and accounting integration in Algeria. The findings demonstrate that technology innovation, digital transformation, innovation capability, and business-accounting integration all positively and significantly influence competitive advantage, with technology innovation exhibiting the strongest direct effect. The partial mediation of business-accounting integration in the technology innovation-competitive advantage relationship reveals that integrated business-

accounting processes serve as an important transmission mechanism through which technological investments translate into competitive benefits.

The substantial explanatory power and predictive relevance of the model confirm the theoretical and practical significance of technology innovation for Algerian enterprises seeking sustainable competitive advantage. The results underscore the strategic importance of developing comprehensive technological capabilities that span both operational and strategic domains, while simultaneously integrating these capabilities with accounting and business functions.

For practitioners, the findings suggest that Algerian organizations should prioritize investments in technology innovation and digital transformation initiatives, while ensuring that these investments are integrated with accounting information systems and business processes. The development of innovation capabilities emerges as a critical strategic priority, with organizations encouraged to foster cultures of innovation and entrepreneurship that enable continuous technological advancement.

For policymakers, the results highlight the importance of supporting technology innovation and digital transformation among Algerian enterprises through appropriate regulatory frameworks, infrastructure investments, and capacity-building initiatives. The findings suggest that policies promoting technology adoption and innovation capability development can contribute to enhanced competitiveness of Algerian businesses in both domestic and international markets.

Future research should examine the longitudinal effects of technology innovation on competitive advantage, investigate industry-specific variations in these relationships, and explore additional mediating and moderating variables that may influence the technology innovation-competitive advantage nexus. Comparative studies examining these relationships across different emerging market contexts would also contribute valuable insights to the literature.

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