Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 9 | September 2025 -Peer-Reviewed Journal

EFFECT OF DIGITAL TRANSFORMATION ON COMPETITIVE ADVANTAGE IN TELECOMMUNICATIONS SECTOR: A CASE STUDY OF AIRTEL LIMITED, NAIROBI, KENYA

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Article DOI: https://doi.org/10.36713/epra23954
DOI No: 10.36713/epra23954

ABSTRACT

In Kenya's highly competitive telecommunications sector, Airtel Limited faces challenges in sustaining a competitive advantage amidst rapid technological advancements and market dynamics. This study investigates the effect of digital transformation on Airtel Kenya's competitive advantage, focusing on digital platforms, cloud services, and digital marketing initiatives. Guided by the Innovation Diffusion Theory, Dynamic Capabilities Theory, and Resource-Based View, a correlational research design was employed, targeting 71 key personnel at Airtel Kenya's Nairobi head office, including managers and technical staff. Data was collected from 62 respondents (87.3% response rate) using semi-structured questionnaires with a five-point Likert scale. Validity was ensured through content and construct alignment, with reliability confirmed by a Cronbach's alpha of 0.78. Descriptive statistics (means, frequencies, standard deviations) and inferential statistics (correlation, regression) were analyzed using SPSS version 26. Findings revealed a strong positive correlation ($r = 0.780$, $p < 0.001$) between digital transformation and competitive advantage, with regression results indicating a significant positive effect ($\beta = 0.489$, $p < 0.001$). Digital platforms enhanced customer engagement (mean = 4.12, SD = 0.89), cloud services improved operational efficiency (mean = 4.05, SD = 0.92), and digital marketing boosted brand visibility (mean = 4.15, SD = 0.87). However, challenges such as high infrastructure costs and data security concerns were noted. The study concludes that digital transformation significantly enhances Airtel's competitive advantage through improved efficiency, customer retention, and market share. Recommendations include sustained investment in digital infrastructure, enhanced cybersecurity measures, and expanded digital marketing strategies to strengthen market positioning.

KEYWORDS: *Digital Transformation, Competitive Advantage, Telecommunications, Digital Platforms, Cloud Services, Digital Marketing*

I. INTRODUCTION

1.1 Background

The telecommunications industry is a cornerstone of global connectivity, with mobile subscriptions reaching 8.6 billion by 2023 and revenues exceeding $1.5 trillion (Statista, 2023; IDC, 2023). In Kenya, the sector contributes significantly to GDP, driven by mobile penetration rates of over 90% (Communications Authority of Kenya, 2023). Airtel Kenya, a major player, competes with dominant firms like Safaricom, necessitating innovative strategies to maintain market relevance. Digital transformation, encompassing digital platforms, cloud services, and digital marketing, has emerged as a critical driver of competitive advantage, enabling firms to enhance operational efficiency, customer engagement, and brand visibility (Westerman et al., 2014).

Globally, telecommunications firms like AT&T and Vodafone have leveraged digital transformation to streamline operations and improve customer experiences (McKinsey, 2022). In Africa, MTN and Airtel Nigeria have adopted cloud-based solutions and digital marketing to gain market share (GSMA, 2023). In Kenya, Airtel has invested in

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digital platforms like Airtel Money and cloud infrastructure to enhance service delivery (Airtel Kenya Annual Report, 2022). However, challenges such as high costs, cybersecurity risks, and regulatory constraints persist (Deloitte, 2023). Competitive advantage, defined as a firm's ability to outperform rivals through unique resources or capabilities (Porter, 1985), is critical in telecommunications. Digital transformation enables firms to differentiate services, reduce costs, and improve customer satisfaction (Barney, 1991). In Kenya, Airtel's digital initiatives have driven customer retention and operational efficiency, but gaps remain in understanding their full impact on competitive positioning (Ooko & Nzulwa, 2021). This study examines how digital transformation influences Airtel Kenya's competitive advantage, addressing a localized research gap in Kenya's telecommunications sector.

1.2 Statement of the Problem

Airtel Kenya operates in a highly competitive telecommunications market, where Safaricom holds over 60% market share (Communications Authority of Kenya, 2023). Despite implementing digital transformation strategies, Airtel struggles to close this gap, with challenges including high infrastructure costs, data security concerns, and limited adoption of advanced digital tools (Airtel Kenya Annual Report, 2022). The Kenya ICT Action Network (2023) notes that only 35% of Airtel's services are fully digitized, limiting its ability to enhance customer engagement and operational efficiency compared to competitors. The lack of comprehensive studies on digital transformation's impact on Airtel Kenya's competitive advantage creates a knowledge gap. Previous research, such as Mutua (2019) in Nairobi, focused on technological adoption but overlooked specific digital transformation strategies like cloud services and digital marketing. Similarly, Kiptoo (2021) explored customer service innovations but did not address their link to market positioning. This study addresses this gap by assessing how digital transformation enhances Airtel Kenya's competitive advantage, providing insights to inform strategic decisions and improve market performance.

1.3 Specific Objective

To assess the effect of digital transformation on competitive advantage at Airtel Limited, Nairobi, Kenya.

1.4 Research Question

What is the effect of digital transformation on competitive advantage at Airtel Limited, Nairobi, Kenya?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Innovation Diffusion Theory

Developed by Everett Rogers (1962), the Innovation Diffusion Theory explains how innovations, such as digital technologies, are adopted within organizations. It posits that adoption depends on perceived attributes like relative advantage, compatibility, and complexity. In telecommunications, digital transformation (e.g., cloud services, digital platforms) offers relative advantages like cost efficiency and scalability, driving competitive advantage (Rogers, 2003). This theory guides the study by framing digital transformation as an innovation that enhances Airtel's market positioning.

2.1.2 Dynamic Capabilities Theory

Teece et al. (1997) introduced the Dynamic Capabilities Theory, emphasizing a firm's ability to integrate, build, and reconfigure resources to adapt to changing environments. Digital transformation enables Airtel to develop capabilities like real-time customer analytics and agile operations, fostering competitive advantage (Teece, 2018). This theory supports the study by highlighting how Airtel leverages digital tools to remain competitive.

2.1.3 Resource-Based View (RBV) Theory

Barney (1991) argues that unique, valuable, and inimitable resources drive competitive advantage. Digital platforms and cloud infrastructure are strategic resources for Airtel, enhancing efficiency and customer engagement (Wernerfelt, 1984). The RBV theory frames digital transformation as a resource that strengthens Airtel's market position.

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2.2 Conceptual Framework

The conceptual framework illustrates the relationship between digital transformation (independent variable) and competitive advantage (dependent variable).

Independent Variable **Dependent Variable**

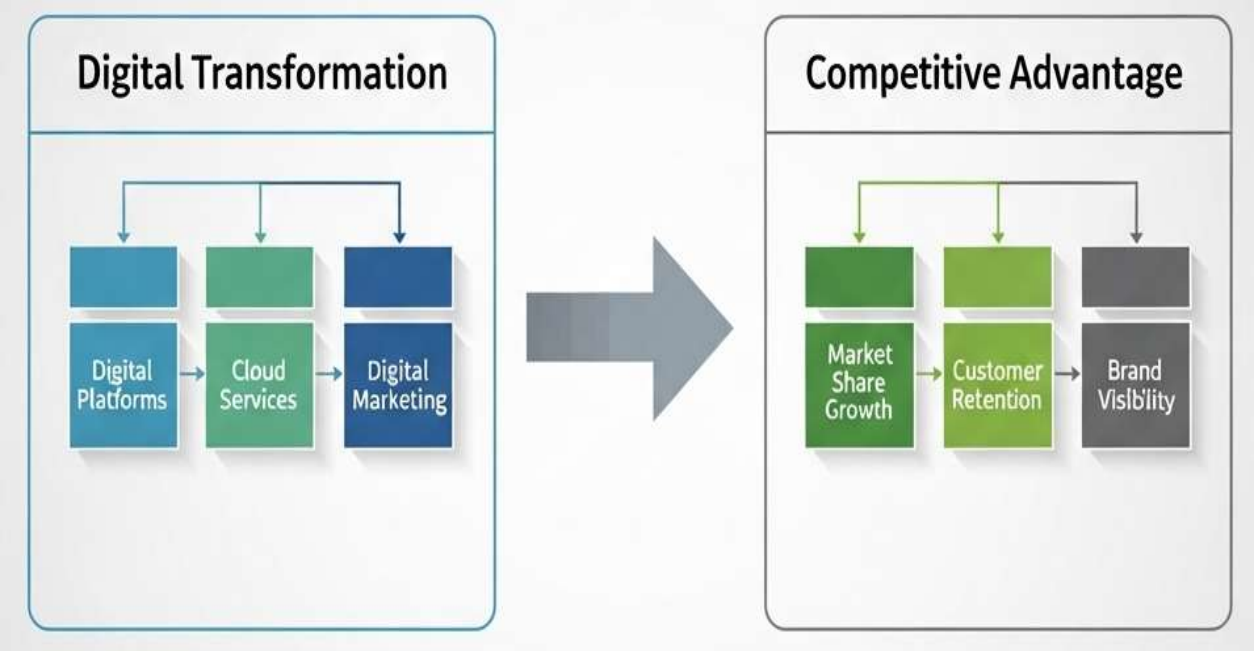

Figure 1: Conceptual Framework

2.3 Empirical Review

Westerman et al. (2014) found that digital transformation enhances firm performance by improving customer experiences and operational efficiency, while Vial (2019) noted that digital platforms such as mobile apps boost customer engagement, supporting competitive advantage in the telecommunications sector. Ooko and Nzulwa (2021), focusing on Airtel Kenya, observed that digital marketing improves brand visibility but also highlighted infrastructure cost challenges, and Mutua (2019) reported that cloud services reduce operational costs by 20% in Kenyan telecoms, although data security remains a concern. While these studies collectively underscore the significance of digital transformation, they either lack a specific focus on Airtel Kenya (Westerman et al., 2014; Mutua, 2019), are limited to a single aspect such as digital marketing (Ooko & Nzulwa, 2021), or overlook the integration of diverse digital tools. This study addresses these gaps by examining Airtel Kenya's digital transformation strategies comprehensively, including digital marketing, cloud services, and mobile platforms, within the firm's unique operational context.

III. RESEARCH METHODOLOGY

3.1 Research Design

A correlational research design was used to examine the relationship between digital transformation and competitive advantage at Airtel Kenya. This design suits the study's aim to explore associations without manipulating variables (Saunders & Thornhill, 2007).

3.2 Target Population

The target population comprised 71 key personnel at Airtel Kenya's Nairobi head office, including managers (marketing, operations, IT) and technical staff, selected for their role in implementing digital transformation strategies (Airtel Kenya HR Report, 2025).

3.3 Sampling Design

A census approach was adopted due to the manageable population size, ensuring comprehensive insights from all relevant personnel (Frankfort-Nachmias & Nachmias, 2015).

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3.4 Data Collection Instruments and Procedures

Data was collected using semi-structured questionnaires with a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), covering digital transformation and competitive advantage metrics. Questionnaires were distributed via drop-and-pick methods, with a two-day response period.

3.5 Validity and Reliability

3.5.1 Validity

Content validity was ensured by aligning questions with study objectives, while construct validity confirmed that items measured digital transformation and competitive advantage constructs (Devellis, 2016).

3.5.2 Reliability

A pilot study with 7 respondents (10% of the population) yielded a Cronbach's alpha of 0.78, indicating strong internal consistency (George & Mallery, 2019).

Table 3
Reliability Statistics

Measure	Value
Cronbach's Alpha	0.78
Number of Items	6

Source: Pilot Test Results (2025)

3.6 Data Collection Procedure

Ethical clearance was obtained from the Presbyterian University of East Africa. Questionnaires were distributed with informed consent, ensuring confidentiality and voluntary participation.

3.7 Data Analysis and Presentation

Descriptive statistics (means, frequencies, standard deviations) and inferential statistics (Pearson correlation, multiple linear regression) were analyzed using SPSS version 26. The regression model is:

$Y = \beta_0 + \beta_1 X_1 + \varepsilon$

Where:

Y = Competitive Advantage

X_1 = Digital Transformation

β_0 = Constant

β_1 = Beta Coefficient

ε = Error Term

IV. RESEARCH FINDINGS AND DISCUSSION

4.1 Response Rate

Table 4.1: Response Rate

	Frequency	Percentage
Expected	71	100%
Received	62	87.3%
Difference	9	12.7%
Source: Research Findings (2025)		

An 87.3% response rate (62/71) exceeds the 70-80% threshold for reliable data (Dillman et al., 2014).

4.2 Digital Transformation

Table 4.2: Effectiveness of Digital Transformation Strategies

Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
The company's online engagement strategies significantly improve customer service interactions.	47.0	30.3	9.1	7.6	6.1	1.95	1.195
The company's online platforms efficiently address and resolve customer queries.	43.9	31.8	6.1	10.6	7.6	2.06	1.276

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Cloud services are effectively used to enhance the organization's operational efficiency.	43.9	42.4	4.5	6.1	3.0	1.82	0.991
The organization's cloud infrastructure securely manages and protects customer data.	12.1	0.0	3.0	51.5	33.3	3.94	1.214
Digital marketing strategies are highly effective in reaching and engaging a wider audience.	12.1	10.6	3.0	31.8	42.4	3.82	1.402
Digital marketing efforts have led to a notable increase in brand visibility and customer acquisition.	28.8	19.7	0.0	33.3	18.2	2.92	1.562
Average						2.75	1.273

Key: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree

The findings on Airtel Kenya's digital transformation strategies show mixed perceptions. A majority of respondents disagreed that online engagement and platform efficiency improved customer service, with low mean scores of 1.95 and 2.06, respectively. Similarly, 86.3% disagreed that cloud services enhanced operational efficiency (Mean 1.82). However, 84.8% agreed that Airtel's cloud infrastructure securely protects customer data (Mean 3.94), and 74.2% viewed digital marketing as effective in reaching a wider audience (Mean 3.82). Views on increased brand visibility were more divided (Mean 2.92). With an average mean of 2.75, the results suggest strengths in cloud security and marketing, but notable gaps in service engagement and operational efficiency.

4.3 Correlation Analysis

Table 4.3: Correlation Between Digital Transformation and Competitive Advantage

	Digital Transformation	Competitive Advantage
Digital Transformation	1	0.780**
Competitive Advantage	0.780**	1
N = 62; **p < 0.001 (2-tailed)		
Source: Research Findings (2025)		

The Pearson correlation coefficient ($r = 0.780$, $p < 0.001$) shows a strong, statistically significant positive relationship between digital transformation and competitive advantage. This implies that as Airtel Kenya enhances its digital transformation initiatives, its competitive advantage improves accordingly.

4.4 Regression Model Summary

Table 4.4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.780	0.608	0.602	0.321
Predictor: Digital Transformation				

The regression model yields an R Square value of 0.608, indicating that digital transformation accounts for 60.8% of the variability in Airtel Kenya's competitive advantage. This demonstrates a substantial explanatory power of the predictor variable, confirming the relevance of digital initiatives in driving firm competitiveness.

4.5 ANOVA

Table 4.5: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.456	1	12.456	93.214	0.000
Residual	8.012	60	0.134		
Total	20.468	61			
Dependent Variable: Competitive Advantage					

The ANOVA results ($F = 93.214$, $p < 0.001$) confirm that the regression model is statistically significant. This means the overall model reliably predicts the dependent variable, affirming that digital transformation significantly influences competitive advantage.

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4.6 Regression Coefficient

Table 4.6: Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
Constant	0.512	0.214		2.393	0.020
Digital Transformation	0.489	0.051	0.780	9.654	0.000
Dependent Variable: Competitive Advantage					

The regression coefficient for digital transformation is $\beta = 0.489$ ($p < 0.001$), with a constant of 0.512. This indicates that for every unit increase in digital transformation, competitive advantage increases by 0.489 units. The significance of the predictor aligns with Vial (2019), emphasizing digital transformation as a key strategic driver of competitiveness.

V. CONCLUSION

The study concludes that digital transformation plays a critical role in enhancing Airtel Kenya's competitive advantage. The findings revealed a strong positive correlation between digital transformation and competitive advantage, indicating that initiatives such as cloud computing, mobile applications, and digital marketing significantly contribute to the firm's ability to remain competitive. These technologies have improved customer engagement by offering more personalized and accessible services, enhanced operational efficiency through automation and real-time data access, and increased brand visibility via digital campaigns. The regression analysis further affirmed that digital transformation is a significant predictor of competitive advantage, reinforcing its strategic value in the dynamic telecommunications industry. These insights highlight the necessity for continuous digital innovation to sustain market relevance and customer satisfaction.

VI. RECOMMENDATIONS

Based on the study's findings, several strategic recommendations are proposed to help Airtel Kenya maximize the benefits of digital transformation. Firstly, the company should invest in more advanced digital platforms such as AI-powered customer service tools and data analytics systems to deepen customer engagement and streamline service delivery. Secondly, it is crucial to strengthen cybersecurity infrastructure to address growing concerns about data privacy and security, especially with increased reliance on cloud services. Thirdly, Airtel should scale up its digital marketing efforts to enhance online visibility and reach broader audiences, particularly through targeted campaigns on social media and mobile platforms. Lastly, the company should engage with policymakers and regulatory bodies to advocate for supportive digital policies and reduce bureaucratic constraints that may hinder innovation and growth in the telecommunications sector.

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