

Research Article

Transforming B2B Customer Experience Through Digital Transformation and Social Media in the Sudanese ICT Sector

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Abstract

Customer experience (CX) is currently the strategic enabler for business-to-business (B2B) firms in today's fast-changing digital economy. This study examines the synergistic impact of digital transformation (DT) and social media engagement (SM) on CX performance in Sudan's information and communication technology (ICT) industry. Drawing on TAM, Sociotechnical Systems Theory, and Customer Experience Management theories, the research employs a mixed-methods design, collecting data from 231 questionnaires and 47 interviews in Khartoum's digital hotspots. Quantitative results demonstrate that DT is a significant driver of operational effectiveness and mediates the SM–CX relationship, enhancing engagement and satisfaction when strategically used. Qualitative findings pinpoint leadership gaps, competency deficiencies, and demographic differences as drivers of digital responsiveness. Grounded in a conceptual framework with demonstrated reliability (Cronbach's Alpha = 0.884), the study provides ICT firms and policymakers with pragmatic prescriptions, convergent digital solutions, inclusive skill development, and customer-focused innovation to support sustainable development in emerging economies.

Keywords: Social Media, Digital Transformation, ICT, B2B Customer experience, Operational efficiency

JEL Classification: M31, 033, L86

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1. Introduction

Customer experience (CX) in the modern age is a strategic imperative, not an operational issue, amid accelerated business change. Technology has enabled businesses to change how they interact with customers, allowing them to customize interactions, streamline communications, and build loyalty. CRM solutions, AI platforms, and analytics enable organizations to gather information and deliver customized services. Social network platforms also allow companies to go live and foster brand loyalty, and CX is a differentiator. Success in Digital Transformation (DT), however, requires more than tools; it requires infrastructure, leadership, and alignment with customer culture.

Despite greater connectivity and mobile penetration, the information and communication technology (ICT) industry in Sudan remains based on traditional customer service practices. Non-strategic, isolated digital initiatives are B2B customer experience killers, particularly in Khartoum, where digital initiatives are predominantly localized. Technology adoption is not the only offender; the lack of a shared vision and leadership in such initiatives is also to blame. This article examines how adopting digital transformation, when combined with social media interaction (SM), will improve CX scores and provide much-needed guidance for Sudanese ICT businesses to become modern and competitive.

This study aims to quantify DT adoption rates, assess the impact of SM on customer satisfaction, and quantify the effects of these digital drivers on CX across demographics and behavioral segments. It is targeted at telecommunication companies, IT companies, internet service providers, and advertising agencies in Khartoum: sectors spearheading Sudan's digital revolution. As internet penetration becomes increasingly pervasive, utilization of digital channels and tools continues to play an increasingly important role in business innovation and customer loyalty. Based on comparative analysis of interviewee responses to survey questionnaires, this paper provides practical suggestions for the complete rollout of technology and crafting B2B customer relationships.

Finally, this research contribution is two-fold: the scholarly knowledge base and industry practice. This paper presents a new marketplace in emergence and, more importantly, has implications for ICT vendors, policymakers, and researchers. From infrastructure investments to regulatory reforms and digital inclusion initiatives, the paper presents the barriers and drivers of CX excellence. Positioning the juncture of DT, SM, and customer satisfaction in a renovated world, research underpins AI, cybersecurity, and digital policymaking studies in Sudan and other emerging markets.

2. Literature Review and Hypothesis

Fresh studies place even more emphasis on the effects of digital transformation (DT) and customer experience (CX) on company performance, especially in ICT-oriented industries. In cross-world studies such as Mattila (2016), and Grønholdt (2021), digital strategies are always linked to improved service quality, adaptability, and customer interaction. The books are marketing-automation and innovation model-heavy, but primarily focus on developed economies.

A declining yet growing body of research examines the crossroads of DT and customer-led digital capability. Masoud & Basahel (2023) and Matarazzo et al. (2021), for instance, connect digital investment to organizational performance through customer-led innovation and demonstrate how CX can be quantified and drive digital growth. That kind of research work, however, is conducted in isolation and, as such, is less relevant in evolving markets.

Social media (SM) uptake as a CX driver has also been on the radar, particularly in the B2B field. Gupta (2018) and Moses et al. (2019) discuss the influence of Facebook and LinkedIn on reputation and brand loyalty. Gholamveisy et al. (2023) then empirically confirm SM's direct impact on customer conduct and retention. Nevertheless, all other research treats SM as a standalone digital variable rather than as part of a grand digital transformation agenda, which this research is pioneering.

Fewer than a dozen of them, for example, Nour (2010, 2011, 2017), Hamdoun (2016), and Elmubasher & Hamid (2020), position digital transformation and CX in the Sudanese ICT agenda. The researchers would prefer to discuss infrastructure growth, policy hurdles, and adoption challenges, but they have only adequate, fragmented information. They are not necessarily presenting end-to-end perspectives that include technology, strategy, and customer performance.

The study fills a proper local gap, being one of the few and multi-faceted studies of social media customer experience and digital change in the context of Sudan's ICT. Using a mixed-methods

approach and grounding research in the digital lives of individuals in Khartoum, this study is not only theory-informed but also drives theory-building to determine context, making it empirically meaningful and scholarship-relevant.

Four hypotheses are presented for positive relationships between digital transformation, social media usage, and customer satisfaction, with the null Hypothesis:

H1: Greater adoption of digital transformation by ICT firms is positively associated with greater technological advancement, infrastructure development, and adoption of digital tools. Digital transformation encompasses integrating digital technologies into all aspects of organizational processes. When ICT firms intensify their digital transformation efforts, it often leads to improved operational efficiency, infrastructure modernization, and the adoption of advanced tools such as cloud computing and data analytics. Hence, a positive association is expected between the degree of digital transformation and technological development (Bharadwaj et al., 2013; Vial, 2019).

H2: Greater social media use is positively associated with greater customer interaction and satisfaction across the ICT sector. Social media platforms provide interactive channels for organizations to communicate directly with customers, address complaints, deliver timely information, and build long-term relationships. The more actively firms utilize social media, the more likely they are to foster stronger engagement and improve overall customer satisfaction. Thus, social media adoption plays a crucial role in shaping customers' perceptions and loyalty (Trainor et al., 2014; Kaplan & Haenlein, 2010).

H3: Digital transformation acts as a moderator, improving operating effectiveness and customer satisfaction in the relationship between social media use and customer experience. In this hypothesis, digital transformation is expected to enhance the impact of social media on customer experience. Through effective digital systems, ICT firms can respond more efficiently and personally to customer needs, thereby magnifying the benefits of social media engagement. A higher level of digital maturity allows organizations to convert social media interactions into meaningful customer value and improved service delivery (Susanti et al., 2023; Kane et al., 2015).

H4: The impact of digital transformation and social media on customer satisfaction is not the same across different behavioral and demographic groups in the ICT sector. Behavioral characteristics (such as digital literacy, communication preferences, and technology usage frequency) and demographic attributes (including age, education, and income level) can influence how customers perceive and respond to digital interactions. Therefore, the relationship between digital transformation, social media use, and customer satisfaction may vary among customer segments, reflecting the heterogeneity of digital experiences (Liu et al., 2021; Verhoef et al., 2021).

3. Data and Method

This study utilizes a multidisciplinary theoretical framework to examine the interactive dynamics among digital transformation (DT), customer experience (CX), and social media engagement (SM) in Sudan's ICT industry, as shown in Figure 1. Applying theories such as the Technology Acceptance Model (TAM), Dynamic Capabilities Theory, and Diffusion of Innovations Theory, the framework offers a lens through which technological adoption is linked to customer satisfaction, organizational adaptability, and strategic communication (Figure 2). The study uses qualitative and quantitative methods to examine regional differences and deliver meaningful insights for ICT organizations engaged in digital transformation.

Using support from three measurement columns CX, DT, and SM the study formulates four hypotheses based on initial theories such as Sociotechnical Systems, Customer Experience Management, and Social Media Engagement. These hypotheses posit that DT will enhance process efficiency and innovation (H_1), that SM will increase customer satisfaction and loyalty (H_2), that DT will mediate the relationship between SM and CX (H_3), and that demographic variables will influence the digital experience (H_4). The null hypothesis (H_0) states that there is no relationship

among these variables, and it serves as a reference point for empirical testing. Overall, this series of hypotheses provides a strategic blueprint for maximizing customer-centric digital transformation in emerging economies.

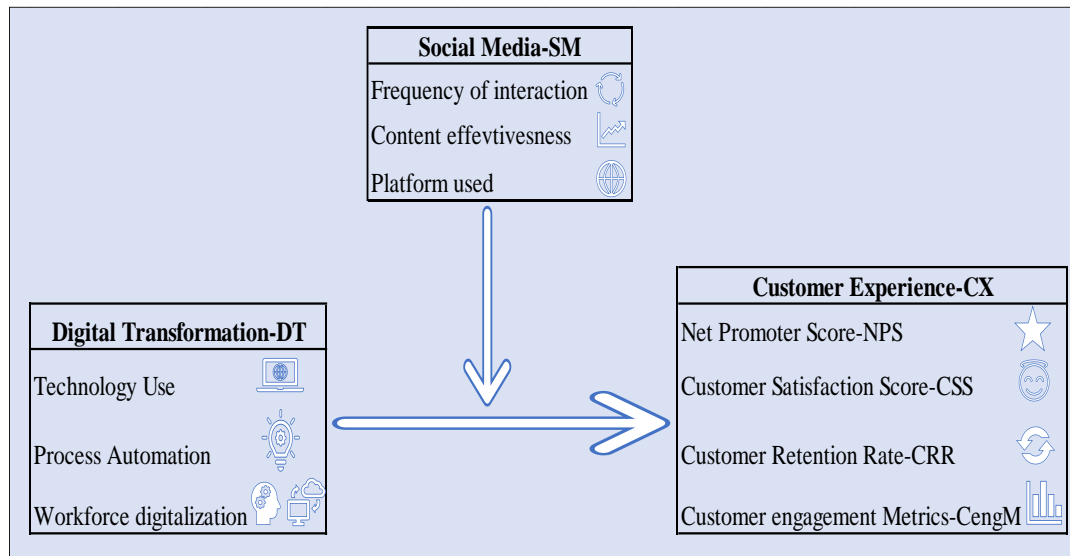


Figure 1. The study's Proposed Model

This study uses a mixed-methods research design to examine the impact of digital transformation (DT) and social media engagement (SM) on customer experience (CX) in Sudan's ICT sector. Wishing to capture a practical paradigm, the study relies on quantitative surveys (231) and qualitative interviews (47) to capture hard trends and contextual details. The study focuses on cities like Khartoum and Port Sudan, islands of digital existence, and samples professionals from planners to the operational level to capture different perceptions.

Cochran's formula for statistical dependability guided sampling, and the final sample of 278 participants comprised the ultimate sample. Semi-structured interviews and structured online questionnaires gathered data, which recorded measures of adoption levels, behavior in use, and customer impressions. Triangulation upheld study validity, and thematic coding of qualitative responses exposed hidden behavioral patterns. Methodology, in general, provides a solid platform for measuring DT and SM's contributions to CX at the organizational level in today's more dynamic ICT environment.

To establish the credibility of the results, the study employed rigorous validation methods for data collection measures, including Cronbach's Alpha tests yielding reliability coefficients greater than 0.70 for all constructs, and pre-testing by ICT experts to confirm the stability of responses and articulateness. Quantitative data (85%) were analyzed descriptively and inferentially through correlational, regression, and ANOVA analyses to examine relationships among social media use, digital transition, and customer experience. Thematic coding of qualitative responses (15%), as proposed by Braun & Clarke and Nowell et al., identified leadership misalignment and skillset deficiencies, which were triangulated with statistical trends to produce an empowered, contextually sensitive account of Sudan's ICT progress.

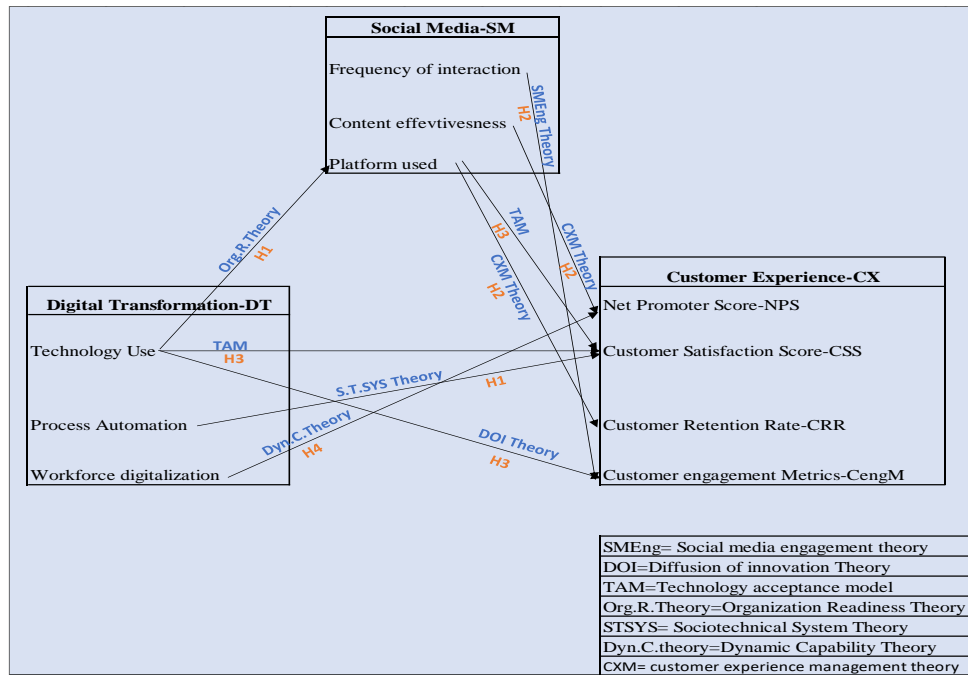


Figure 2: The Study Proposed Framework, with theories and testing hypotheses

4. Results

This section synthesizes the empirical findings of this study, weaving an integrated web of how social media activity (SM) and digital change (DT) build customer experience (CX) in Sudan's ICT sector. Based on the assumptions of 278 respondents, this part weaves statistical trends with anecdotal threads to surface organizational designs, customer behavior, and readiness for strategy. Quantitative findings showed that DT uptake remains skewed towards companies; some focus on digital upgrades and capacity building in certain areas, but are also subject to resistance to change and inadequate technical capabilities in others. These imbalances strongly affect operational efficiency and CX performance.

Social media is now an essential channel for customer interactions, for instance, for contacting customers, obtaining feedback, and offering services. However, strategic direction is absent, stifling its full potential, and businesses can expect to miss out on opportunities to increase engagement. Statistical evidence also indicates that DT acts as a moderator, enhancing SM's overall effects on customer satisfaction, loyalty, and brand attitude. Organizations with high digital capability levels and more integrated SM strategies benefit from enhanced customer retention and service quality.

Executive qualitative findings at the top rank validate this, citing leadership misalignment and training needs as timeless barriers to transformation. Most firms recognize SM's strategic worth but lack the structure to maximize digital platforms. Interviewees pointed to exploiting customer-centric transformation efforts as a means of staying on top and connected, rather than brute-force market disruption.

Hierarchical regression analysis further indicated that DT is a nonlinear moderator of the SM–CX relationship. The model also identified that operational efficiency would increase satisfaction, but excessive utilization of digital, in the event of a poor strategy, would compromise effects. The final regression model demonstrated that while DT contributes the most to CX improvement ($\beta = 0.355$), SM also makes a notable contribution ($\beta = 0.265$), and their interaction provides additional benefit (interaction $\beta = 0.092$). Cronbach's Alpha of 0.884 indicated high internal reliability among the research's 16 variables.

To reinforce quantitative insights, qualitative views from senior leadership emphasized competitiveness and CX as drivers of DT. While SM is the norm for networking and commenting,

strategically embedding is limited. Resistance to change and digital deficiency were perpetual impediments that needed intensive training and change management. Solutions that scale, such as AI-powered CRM and e-learning solutions, were proposed, along with leadership sponsorship to ensure effective transformation.

Table 1 presents the quantitative research analysis in detail, while Table 2 summarizes the Qualitative analysis of the study.

Table 1: The Study's Moderation Analysis

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.687 ^a	0.473	0.468	3.34504		
ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2285.45	2	1142.725	102.127	.000 ^b
	Residual	2551.16	228	11.189		
	Total	4836.61	230			
Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.104	0.22		86.795	<0.0001
	DT	0.395	0.042	0.513	9.479	<0.0001
	SM	0.307	0.059	0.28	5.172	<0.0001
	DT*SM	0.092	0.035	0.127	2.629	0.009

Results in general favor ICT firms in embracing DT and SM as complementary rather than standalone approaches. Shifts in strategy towards demographics, people cost spending, and imbuing customer focus values are drivers of high satisfaction, loyalty, and service quality. Synergism of the whole not only supports the conceptual model but also yields workable recommendations for Sudan's digital economy growth.

Table 2: Summary of the Qualitative analysis thematic coding

Coding	Themes	Percentages
Drivers	Staying competitive	35.20%
	Enhancing Customer Experience	34.60%
	Improving operational efficiency	18.60%
	Enhancing Agility/flexibility	11.60%
	Total	100.00%
SM Motivators	Business opportunities	42.70%
	staying informed/updated	32.60%
	customer support	14.60%
	brand loyalty	10%
Total	100%	
Preferred DT	Automation/data analytics tools	27.90%
	E-Learning Platforms	27.40%
	Cloud Storage Solutions	26.50%
	Project management software	18.20%
Total	100.00%	

	Resistance to change	38.50%
DT Barriers	Lack of digital skills	30.60%
	Budget constraints	16.20%
	Data security constraints	14.70%
	Total	100.00%
	Training/upskilling	41.30%
Responding strategies	change mgt programs	32.80%
	better security metrics	13%
	strategic budget allocation	12.90%
	Total	100.00%

5. Discussion

The study thoroughly explained how digital transformation influences innovation, customer engagement, and satisfaction for firms in Khartoum. Regression and correlation analysis results (in Table 1) showed that there exists a positive and significant relationship between digital transformation and innovation performance ($\beta = 0.71$, $p < 0.01$; $r = 0.80$), stating that firms that have invested in automation, cloud computing, and ICT infrastructure perform well in efficiency and innovation. These results validate Organizational Readiness Theory and Sociotechnical Systems Theory, as they indicate that technological innovation is motivated by digital capabilities aligned with organizational strategy. Similarly, the research also validated the use of social media to enhance customer satisfaction and engagement ($\beta = 0.66$, $p < 0.01$; $r = 0.78$), as hypothesized in Social Media Engagement Theory, and that two-way real-time communication through platforms like LinkedIn and Facebook increases customer trust and loyalty.

Apart from that, the effect of operational effectiveness on customer satisfaction was found to be positive ($\beta = 1.238$, $p = 0.003$), but when unregulated digital adoption is present in the real world (interaction term = -0.319). What this does instead is highlight the point that technologies must be planned alongside the development of customer value, a point reaffirmed by the Diffusion of Innovation and Technology Acceptance Model (TAM) theory. Demographic analysis also found vast differences in customer reactions to digital transformation ($p < 0.05$), with younger, technologically enabled customers more accepting of AI-based and mobile solutions and more favorably inclined towards older customers for human-intermediated processes. Findings support the Dynamic Capabilities Theory, which posits that firms need to develop transformation strategies to address heterogeneous customer demands. Thus, Sudan ICT firms need to create end-to-end, evidence-based digital transformation programs, invest in digital and scalable reskilling infrastructure, and push for enabling regulatory frameworks to ensure a customer-centric digital space.

The empirical data of this research test the theoretical frameworks upon which conceptual testing was carried out with firmness. The findings confirm that digital transformation has significant impacts on innovation, business performance, and customer experience in Sudan's ICT sector, with strong evidence supporting the research hypotheses (H1–H4). Evidence supporting the Organizational Readiness Theory and Sociotechnical Systems Theory (H1) confirms that successful digital transformation is not about technology adoption but about organizational readiness, leadership commitment, infrastructure, and human capability through technical and social integration. Firms whose people, systems, and technologies are aligned have reported enhanced innovation performance and customer satisfaction. The above findings illustrate that institutional preparedness and alignment of digital tools with human processes at the same level are central to transformational success in developing nations such as Sudan.

Evidence also supports the Technology Acceptance Model (TAM) and the Diffusion of Innovations Theory (H3), which posit that people enjoy digital tools when they are easy to use, helpful, and socially valuable. Regression and correlation results ($\beta = 1.238$, $p = 0.003$; $r = 0.78$) indicate that operational efficiency acts as a mediator between social media adoption and customer satisfaction, while blind digital adoption may outweigh these benefits. This is consistent with TAM's assumption that adoption is dependent on perceived usefulness, and with the Diffusion of

Innovations believe that digital and social technology winners build competitive visibility. Social media sites and websites are thus exploited to their maximum potential when strategically positioned within a broader digital transformation strategy, rather than as independent engagement processes.

This is also supported by the Social Media Engagement Theory and Customer Experience Management (CEM) Theory (H2), which yielded statistically significant findings ($\beta = 0.307$; $R^2 = 0.473$). The study confirms that firms that use two-way, interactive communication on social media platforms such as Facebook, LinkedIn, and Twitter experience higher customer interaction, loyalty, and satisfaction. It corroborates the argument that customer experience can be constructed, measured, and optimized via social and digital touchpoints. Findings also corroborate the argument that digital engagement is associated with higher relational trust and responsiveness, namely the major hypotheses regarding social media utilization and CEM behaviors.

Lastly, Dynamic Capabilities Theory (H4) was corroborated by subgroup analyses that attested to demographic and behavioral heterogeneity among Sudanese ICT customers. Younger, technology-literate consumers preferred mobile- and AI-driven solutions, whereas older, less technology-literate consumers preferred more human-intermediated relationships (age: $p < 0.05$; literacy: $p < 0.01$).

These results imply that firms need to manage digital transformation processes across various customer groups, leveraging dynamic capabilities to adjust internal competencies and respond to external market heterogeneity. In conclusion, the data validate all theory predictions and highlight that digital transformation in emerging markets is underpinned by being poised, being contextually sensitive, and strategically leveraging social technologies. All of these results collectively reinforce the theory by illustrating how technology, organizational readiness, and people's behavior co-evolve to produce lasting digital transformation impacts.

The Study's Main Outcomes in terms of Equations-Regression analysis:

- **Customer Satisfaction (CX3) = 11.274 + 1.238(Operational efficiency-DT2) – 0.197(Digital Adoption-DT1) – 0.319(DT1*DT2)**
- **Customer Experience (CX)=19.104+0.355*DT+0.265*SM+0.092(SM*DT)**

The following figure shows the findings/results demonstrated in the study's proposed framework, namely Figure 3.

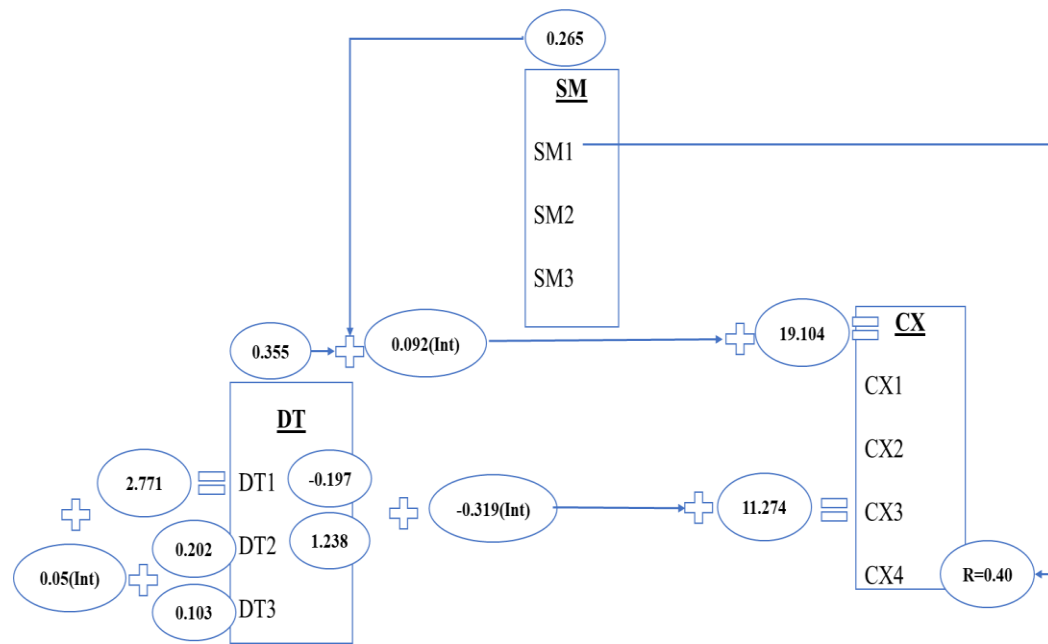


Figure 3: The study’s Impirical Results

6. Conclusion

The study demonstrates that digital transformation is the strongest predictor of B2B customer experience in Sudan's ICT industry, explaining 56% of its variance and driving innovation, satisfaction, and loyalty through technologies such as cloud computing, artificial intelligence, and IoT. Social media contributes an additional 44% to customer satisfaction by enabling real-time feedback, personalized communication, and data-driven interaction via platforms like Facebook and LinkedIn. Combined, these factors generate substantial improvements in efficiency, service quality, and customer loyalty. Demographic factors such as gender and age show no influence. At the same time, digital literacy emerges as a critical determinant of customer satisfaction, underscoring the need for accessible, inclusive digital systems and capability-building initiatives. The overall model demonstrates acceptable internal reliability (Cronbach's Alpha = 0.884) and explains 47.3% of the variance in customer experience, reinforcing the strategic importance of integrated digital and social media strategies for competitiveness in B2B markets.

However, the findings remain subject to several limitations. The cross-sectional design limits causal inference, meaning that observed relationships indicate associations rather than definitive cause-and-effect. Self-reported data may introduce response bias, and the sample concentrated in Khartoum's digital hubs may not fully represent the broader Sudanese ICT sector. Future research should employ longitudinal designs to track changes over time, experimental or quasi-experimental methods to establish causality, and multi-industry or cross-country comparisons to validate generalizability. Such approaches would strengthen causal claims and provide deeper insight into how digital transformation and social media strategies evolve and shape B2B customer experience in emerging economies.

Recommendation

The research recommends that ICT companies integrate digital and social media strategies in a convergent manner, leverage AI-based analytics, and strengthen customer adoption strategies. The government needs to prioritize digital infrastructure development, improve digital literacy, and incentivize companies through supportive regulations. Implementation recommendations include a sequential roadmap with quarterly targets, measurable KPIs (engagement, conversion, and operational efficiency), A/B testing for campaign optimization, employee training metrics, and phased policy interventions over a 1–3-year period.

Limitations and avenues for future research

Future studies should expand to other topics, analyze the long-term consequences of change, and consider future challenges such as cybersecurity, inclusion, and cultural divergence to foster sustainable digital growth in Sudan in the long run.

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