From Traditional to Digital: Enhancing B2B Customer Experience in the Sudanese ICT Sector

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Abstract

The effectiveness of digital transformation provides an improved customer experience depends on several factors including infrastructure preparation, strategic adoption and makes the social media influences for customer views. The current study aims to investigate the level of social media and digital transformation affect B2B client satisfaction and involvement along with the challenges and possibilities that they use in the Sudan's ICT sector. Data were collected from 278 ICT experts in Khartoum to determine the level of digital transformation adoption and to the result connects to B2B customer experience. The results show that while the majority of ICT businesses are rapidly implementing digital transformation systems, infrastructural, labor force preparation and capital access limitations limit overall implementation. It also reveals social media platforms like Facebook and LinkedIn have a major impact over consumer views and commitment to a company. The study verifies current theories such as the Technology Acceptance Model (TAM), Dynamic Capabilities Theory and Diffusion of Innovations Theory provides actual proof suggests the achievement of digital trans-formation based on requirement and strategic planning for the B2B client. This research focuses on digital transformation within the system of Sudan's ICT industry and also provides data on businesses can utilize the possible benefits of social media in developing B2B customer interactions. This will help Sudanese ICT enterprises function in the virtual world, encourage innovation and increase consumer satisfaction with increased interdependent global economy.

Keywords: Social media, Digital Transformation, ICT, Customer Experience, Business-to-business (B2B) Firms, Operational Efficiency, Customer Engagement.

1. Introduction

In modern age, the customer experience (CX) is a critical need and not an operational issue during the period of business change acceleration. Technology has made it possible to change the way business interacts with customers and it is now capable of customizing interactions, making communications easier and developing trust. CRM solutions, AI platforms and analytics enable organizations to gather data and deliver customized services. Social network platforms also allow companies can be used to develop and trust in company and CX has the differences. Achievement in Digital Transformation (DT) requires infrastructure, leadership and customer cultural alignment compared to tools [1-5].

With greater connectivity and mobile penetration, the information and communication technology (ICT) industry in Sudan is still based on traditional customer service practices. Non-strategic and isolated digital destroys the B2B customer experience for an example of Khartoum, where digital initiatives are predominantly localized. Technology adoption is not the primary cause, but the lack of a shared vision and leadership for these initiatives. This article investigates increase of digital transformation, when combined with social media interaction (SM), will improve CX scores and provide guidance need for Sudanese ICT businesses to become modern and competitive [6-9].

This study aims to quantify the rate of adoption of DT, establish the impact of SM on customer satisfaction, and quantify the impacts of such digital drivers on CX by demographics and behavior 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 common, utilization of digital channels and tools continues to play an increasingly important role in business innovation and customer trust. Based on comparative analysis of interviewee responses to survey questionnaires, this paper provides practical suggestions for the complete rollout of technology and developing B2B customer relationships [6, 10-12].

Finally, this research contributes to the academic understanding and industry practice. This paper presents a new marketplace in emergence and has implications for ICT vendors, policymakers and re-searchers. From the investments in infrastructure to regulation reforms and digital inclusion initiatives, the paper faces issues and provides a CX quality. Positioning the intersection of DT, SM, and customer satisfaction on a modernized globe, research supports AI, cybersecurity, and digital policymaking studies in Sudan and other emerging markets. [6,

13-14]. This study defines the company from previous DT-CX models by separating from DT into adoption and efficiency components, modeling DT as a moderator compared to a direct predictor, and combining qualitative and quantitative data to produce a more detailed CX mechanism after addressing the Sudanese context.

Cybersecurity and data privacy were not included as constructs in the empirical model since the re-search tool was created to be simple to prevent survey fatigue among respondents. However, their strategic value for B2B digital trust is fully recognized and an annotation has been included by identifying these as critical characteristics to be integrated into future model modifications

2. Related Work

New research focuses even more on the effects of digital transformation (DT) and customer experience (CX) on business success, particularly in ICT-related businesses. Research by [15,16] consistently shows that digital solutions increase service quality, flexibility and customer interaction. The works are focused on marketing automation and innovation heavy models but mostly focus on developed economies. [1, 15-17].

A growing number of research projects examine the intersection between DT and consumer-driven digital capabilities. For example, website based digital investment to company achievement through customer-driven innovation and show the CX can be quantified and contribute to digital growth. This kind of research in isolation, lacks the setting and hence is not as useful in changing market-places. [18,19].

A comparison table 1 has been included to explain the key contributions, contexts, techniques and limitations of previous research on digital transformation (DT), social media engagement (SM) and customer experience (CX). This table illustrates the authority of research in developed countries, the need to analyze SM or DT in isolation compared to integrated models and the lack of moderation analysis such as DT and SM in previous work. It also demonstrates that few studies include the B2B ICT industry in emerging economies, suggesting the necessity for the current research.

The use of social media (SM) as a CX generator has also been discussed, particularly in the B2B sector. Research [19, 20] discussed the impact of Facebook and LinkedIn on reputation and brand trust. Another research experimentally proved SM's direct influence on

customer behavior and retention. However, every previous study transfers SM into digital form as an independent variable and not under a larger digital transformation plan makes this study represents the first to achieve. [20-22].

Table 1. Summary of Prior DT, SM and CX Studies and Their Limitations

Study	Focus Area	Context / Sector	Method	Key Findings	Limitations Relevant to This Study
[15]	Digital transformation & service quality	ICT firms	Quantitative	DT improves service quality and agility	Does not examine CX or SM; conducted in developed settings
[16]	Digitalization & customer experience	Telecom & services	Case-based	Digital tools enhance CX consistency	Does not model SM; lacks emerging market perspective
[18]	Customer experience management	General B2B	Quantitative	Strong CX drives performance	No DT or SM variables; no interaction or moderation effects
[19]	Social media & engagement	B2B SM usage	Survey	SM increases engagement & loyalty	Treats SM alone; no DT link or CX integration
[20]	Social media & brand loyalty	Industrial marketing	Quantitative	SM enables relationship building	No customer experience measurement; no DT consideration
[21]	SM & retention	Multi-sector	Survey	SM positively	No connection to DT; not specific to ICT

				influences retention	
[22]	ICT development in Sudan	National digital ecosystem	Descriptive	Provides overview of digital capacity	No CX framework; not focused on organizational DT
[23]	ICT adoption challenges	Sudanese enterprises	Qualitative	Identifies adoption barriers	Does not include SM or CX; lacks statistical modeling
[24]	Digital readiness of ICT firms	Sudan ICT	Survey	Highlights readiness gaps	No integrated DT–SM–CX modeling; no moderation testing

Research from [22-24] prioritize digital transformation and CX on the Sudanese ICT platform. The researchers wanted to explore infrastructure expansion, regulatory challenges and adoption is-sues have sufficient however inconsistent data. They may not always provide end-to-end viewpoints that include technology, strategy and customer performance. [6, 23-24].

The study addresses a valuable local vacuum representing one of the rare and diverse studies on social media customer experience and digital change in Sudan's ICT. Using a combined approach and integrating research in the reality of individuals' internet usage in Khartoum, this research drives theory towards establishing context, making it practically relevant and applicable to scholarship [9].

3. Proposed Work
3.1 Framework Overview

This study provides a comprehensive theoretical system focused on investigating the dynamic communication between technologies used in Sudan's ICT business showed in figure 1. This system provides prism based connection used for technology to provide organizational

adaptability, customer satisfaction and communication used theories like Technology Acceptance Model (TAM), Dynamic Capability Theory (DCT) and Diffusion of Innovation (DoT) theory. This study based on qualitative and quantitative methodologies to handle the regional variations and provides significant results for ICT companies involved in digital transformation. DT is represented as moderator and the level of development will affect the enterprises to integrate social media interactions into improved client experiences.
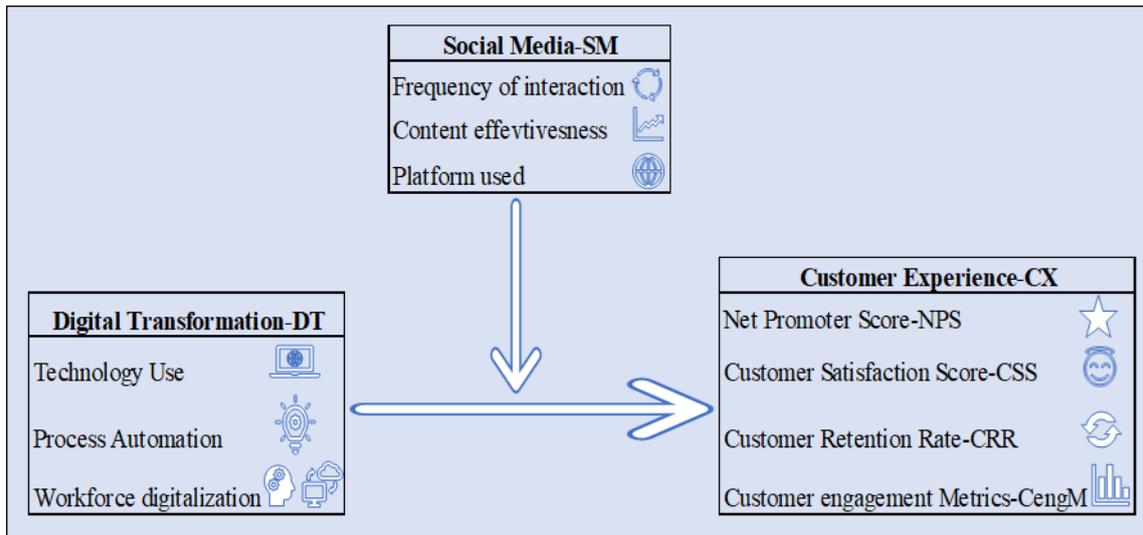

Figure 1. Proposed Model for ICT Business

This study develops four theories based on concepts such as customer experience management, sociotechnical systems and social media engagement using three measurements like DT, SM and CX. The hypotheses suggest DT improves process efficiency and innovation, SM increases client satisfaction and commitment, DT connects SM and CX and demographics impacts the digital experience. The null hypothesis assumes no connection between these variables and serves as reference point of data from experiments. Overall, this collection of hypotheses serves as a method for optimizing customer-focused digital transformation in developing countries. These hypotheses revised to design the variables used in regression model. Each hypothesis directly related to measures used in statistical analysis. Table 2 explains the contrast operationalization.

Table 2. Construct Operationalization (survey/device summary)

Measures	Operations	Scale	Applications
SM	Response speed; support via SM; content utility	Likert	Engagement intensity

DT1	Cloud/automation/AI adoption breadth	Likert	Technology adoption breadth
DT2	Process integration; cycle-time	Likert	Efficiency/outcome-oriented
CX	Satisfaction; responsiveness; loyalty/relational quality	Likert	Aggregated CX index

The explanations and measurements for each element shown in figure 2 describes the improvement of overall requirements. The DT measures adoption breadth and operational efficiency which measures techniques used in organizations and improvements within the procedures, service consistency, reduced cycle-time and available infrastructure. The social media engagement defines the constant, responsive and strategic use of applications like Facebook and Linkedin for consumer contact, data distribution and assistance. The consumer experience measured using established standards of connection quality, satisfaction, dependable service and responsiveness for both standard and digital communications. This will ensure the design alignment with precised variables used in statistical models improved the internal coherence of the conceptual system and research.
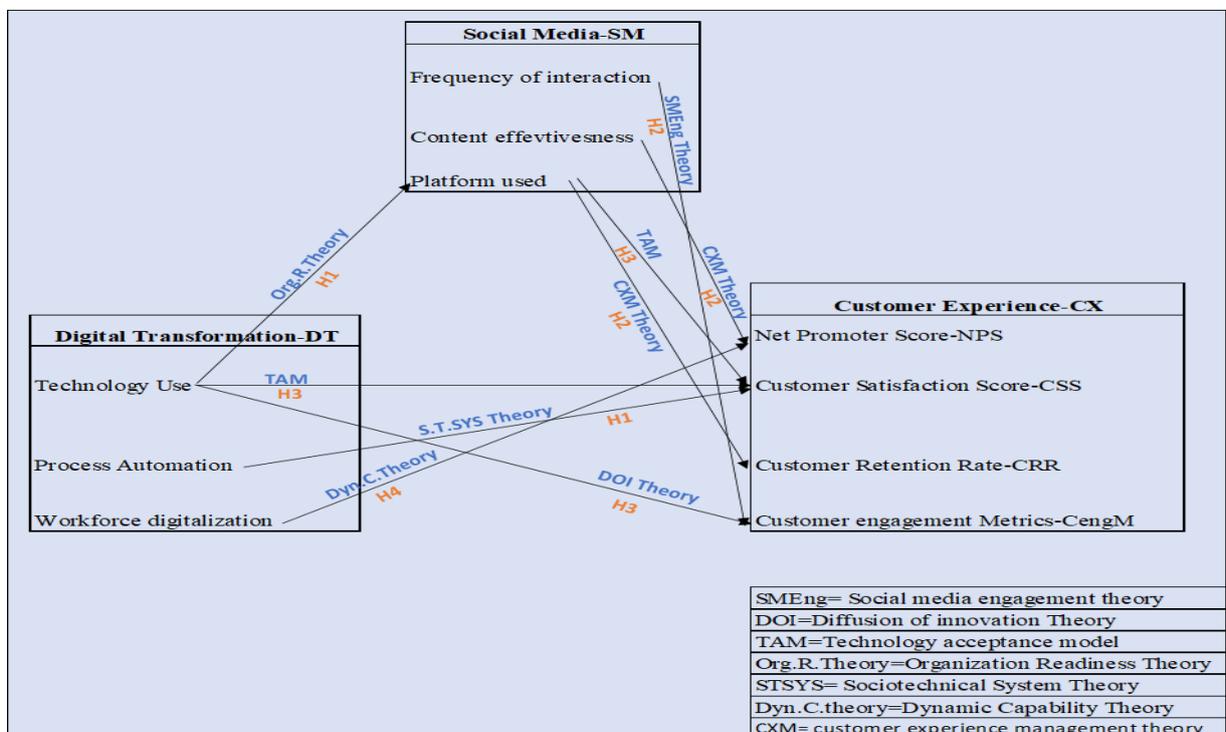

Figure 2. The Study Proposed Framework with Theories and Testing Hypotheses

3.2 Methodology

This work used a design for combined methods to analyze the effects of digital transformation, customer experience and social media engagement in Sudan's ICT industry. It depends on quantitative survey (231) and qualitative interviews (47) provide specific patterns and contextual data to represent accurate model. This research focuses on cities like Khartoum and port Sudan are the digital islands and it surveyed on people to make a perception of different views. The combined strategy uses quantitative data to establish statistical connections as qualitative results shows organizational and environmental factors impact DT, SM and CX connections.

Sampling was influenced by Cochran's statistical dependability method and the final sample includes 278 people. The data collected using semi-structured interviews and structured online surveys includes measurement of adoption level, usage behavior and consumer evaluations. It supports research validity and coding of quality data shows hidden behavioral patterns. Additional details included explained level of accuracy used in qualitative conceptual coding methods. The Braun and Clarke's six-phase techniques reviewed interview scripts several times for preparation before the code developed. After the code developed, it will be organized into candidate categories for evaluation, modification and confirmation for continuous comparison of transcripts to ensure internal coherence and external differentiation. The un-biased reviewer evaluated the coding system and certain sections of interviews, debating errors will be resolved to improve the accurate analysis. A review report was created to include code decisions, reflecting notes and achieved theme development to verify transparency. These modifications increase the qualitative components of analytical precision and connect with qualitative results.

The methodology provides an effective measuring of DT and SM contribution to CX at the organizational level is more dynamic in ICT environment. The study has the validation methods to measure the data collection include Cronbach's Alpha test provides reliability coefficients higher than 0.70 for developed questions and pre-tested by ICT experts to promote stability of response clarity establishes the result. Quantitative data (85%) studied systematically and indirectly using the correlation, regression and ANOVA for evaluating social media use, digital transformation and customer experience. Analytical categorization of qualitative responses (15%) established misalignment of leadership patterns and issues in ability combined to produce enabled and spatially relevant analysis of Sudan's ICT

performance. The CX sub-dimensions were integrated into a single value by normalizing and balancing the component values. Equal weighting was used to prevent subjective weighing systems while maintaining transparency. Future studies can investigate weighted approaches like CFA or PCA.

4. Results and Discussion

This section includes the results that developed a web of combined social media activity and digital transformation affects the customer experience in Sudan's ICT industry. This section based on the pre-dictions of 278 individual people used statistical patterns to highlight the organizational designs, consumer behavior and overall preparation. Most companies recognize the SM method but lacks to increase the digital platform structure. The participants recommended using the customer-based transformation activities remain connected to the market compared to the complete market disruption. Hierarchical regression identified DT is moderator interaction effect the SM-CX in a nonlinear pattern. The model also identified operational efficiency will increase satisfaction but using digital makes the effects. The final regression model demonstrates DT contributes the improvement in CX ($\beta = 0.355$), SM makes a notable contribution ($\beta = 0.265$) and the interaction provides additional benefits (interaction $\beta = 0.092$).

The high internal reliability between research variables ensures Cronbach's Alpha 0.884. The combined effects of DT and SM explained conditional slopes compared to raw coefficients. The simple slopes evaluated for low, medium and high DT values to process interactive factors affects the marginal impact of SM at different DT levels. The presence of inversely signed coefficients is explained between DT adoption and DT operational efficiency. Adoption breadth introduces the redesign complexity and reduce CX where efficiency improves. The following Tables 3, 4 and 5 show the research quantitative analysis in detail, while Table 6 illustrates the summary of the Qualitative analysis of the study.

Table 3. Study on Moderation Analysis between DT and SM

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.687ᵃ	0.473	0.468	3.34504

a. Predictors: (Constant), DT, SM	

Table 4. Study on Regression Analysis for DT and SM

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			
a. Dependent Variable: Customer Experience						
b. Predictors: (Constant), DT, SM						

Table 5. Study on End-Results Analysis based on the Proposed Framework

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
a. Dependent Variable: Customer Experience-CX						

Table 6. 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%
DT Barriers	Resistance to change	38.50%
	Lack of digital skills	30.60%
	Budget constraints	16.20%
	Data security constraints	14.70%
	Total	100.00%
Responding strategies	Training/upskilling	41.30%
	change mgt programs	32.80%
	better security metrics	13%
	strategic budget allocation	12.90%
	Total	100.00%

The study explains the digital transformation affects the innovation, customer engagement and satisfaction for Khartoum-based companies. Tables 1, 2 and 3 shows a significant connection between digital transformation and innovation performance ($\beta = 0.71$, $p < 0.01$; $r = 0.80$). This suggests that companies invest in automation, cloud computing and ICT infrastructure improves the efficiency and innovation. These results will validate organizational readiness theory and sociotechnical systems theory indicate that technological innovation motivates by digital capability related to organizational method. Similarly, this research validated using social media that increases the customer satisfaction and engagement ($\beta = 0.66$, $p < 0.01$; $r = 0.78$) hypothesized in social media engagement theory and real-time communication using platforms like LinkedIn and Facebook increases the customer trust.

The operational effectiveness affects customer satisfaction was found to be positive ($\beta = 1.238$, $p = 0.003$), but when unregulated digital adoption in real-time (interaction term = -0.319). Demographic analysis also found differences in customer reactions to digital transformation ($p < 0.05$), where younger age group technologically enabled customers were

found acceptable to AI-based and mobile solutions for human-intermediated processes. Results support the Dynamic Capabilities Theory, based on firms would need to develop transformation strategies for heterogeneous customer demands. Thus, Sudan ICT firms need to create end-to-end, evidence-based digital transformation programs, invest in digital and scalable infrastructure and enable regulation to ensure a customer-centric digital space.

The findings confirm that digital transformation has impacts on innovation, business performance and customer experience in Sudan's ICT sector with better evidence to support the research hypotheses (H1–H4). Evidence support for the Organizational Readiness Theory and Sociotechnical Systems Theory (H1) confirms by achieving digital transformation is an organizational, leadership commitment, infrastructure and human capability using technical and social integration. The above findings illustrate institutional preparedness and digital tools alignment with human processes on the same level are based on transformational achievement in developing nations such as Sudan.

Evidence also supports the Technology Acceptance Model (TAM) and Diffusion of Innovations Theory (H3) of human beings using the digital tools when these are easy to use, useful and of social worth. Regression and correlation results ($\beta = 1.238$, $p = 0.003$; $r = 0.78$) show that operational efficiency is a mediator that lies between social media adoption and customer satisfaction. This is consistent with TAM's assumption that adoption is dependent on perceived usefulness and belief of Diffusion of Innovations that digital and social technology build competitive visibility. Social media websites are utilized for their maximum potential when strategically positioned within a broader digital transformation strategy, compared to independent engagement processes.

This is supported by Social Media Engagement Theory and Customer Experience Management Theory with significant results ($\beta = 0.307$; $R^2 = 0.473$). This study confirms the business with two-way, interactive communication using social media websites like Facebook, LinkedIn and twitter experiences the higher customer interaction and satisfaction. It supports the customer experience that can be developed, assessed and optimized using social and digital interactions. It also equates the higher relational trust and responsiveness like major hypotheses of social medial usage and CEM behaviors. Finally, the study demonstrates the demographic and behavioral variation among Sudanese ICT users validated the dynamic capability theory. The technologically aware customers value the mobile and AI-driven solutions with low technological educated customers will prefer human-based interactions (age: $p < 0.05$; literacy:

p<0.01). These results show organizations must manage the digital transformation activities across numerous clients based on their capacity to change their internal skills and external market variability. The statistics support all theoretical predictions highlights the digital transformation in developing countries is based on preparation, specifically aware and effectively using social technologies. These data confirm the hypothesis due to the technology, prepared organization and people behavior to achieve the long-term digital transformation benefits.

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)

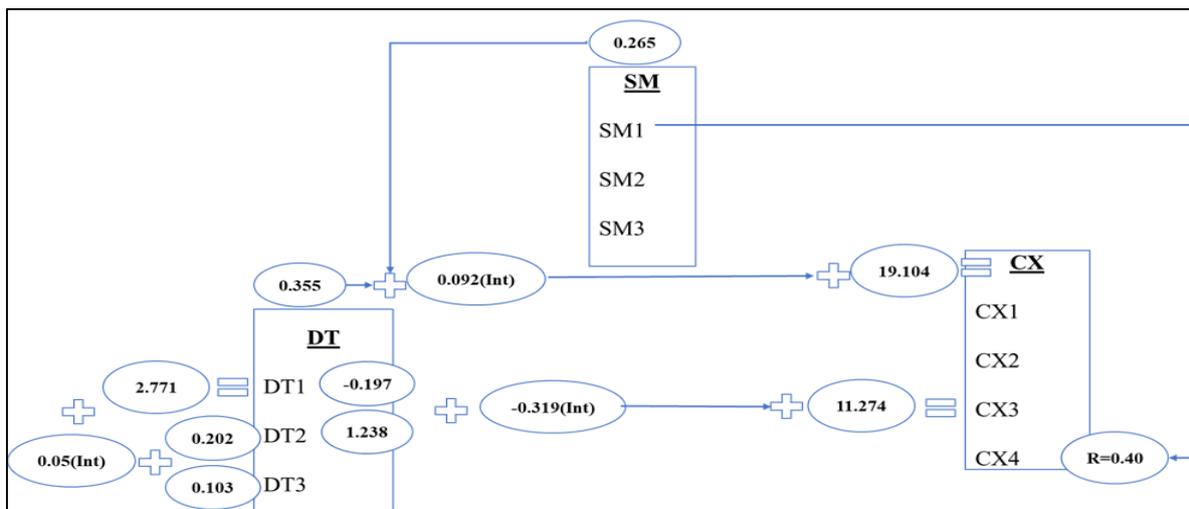The following figure 3 shows the results being demonstrated in the study's proposed framework

Figure 3. Study Outcome for the Proposed Framework

Managerial Roadmap Summary

Table 7 illustrates a roadmap translating constructs into steps, process, techniques and metrics, enabling ICT man-agers to operationalize the findings

Table 7. Managerial Roadmap Derived from the Model

Steps	Process	Technology	Measure
1. Baseline	Audit SM response times; map pain points	CX/Support Lead	Avg. first response (min)
2. Process first	Improve core processes (routing, SLAs) before adding tools (DT2↑)	Ops Lead	Case cycle time; SLA hit-rate
3. Smart SM	Enable service via LinkedIn/Twitter; integrate with CRM	Digital Lead	% tickets via SM; CSAT (SM)
4. Close the loop	Connect SM insights to fixes; publish updates	Product/Ops	Defect fix lead time
5. Explain & assure	Provide XAI-style status; document privacy/security	Compliance/CISO	Privacy incidents; trust score
6. Retrain	Upskill agents on omni-channel playbooks	HR/L&D	Time-to-proficiency
7. Monitor	Track SM×DT uplift and recalibrate quarterly	Analytics	ΔCX index; retention

5. Conclusion

The research explains the social media uses and digital transformation makes significant contributions to customer experiences in Sudan ICT companies. According to the statistical data, the digital transformation provides 56% of variance in B2B customer experience, innovation, satisfaction and engagement. The cloud computing, Internet of Things (IoT) and Artificial Intelligence (AI) are combined to increase the efficiency and service quality. This will recommend the technologies and processes to satisfy the consumer requirements and company goals. It also represents the simplified process-based interpretation of system to facilitate management application. This paper explains the ICT management to implement DT and SM improvements in CX results.

Social media has the highest value resulting with 44% of consumer satisfaction. Facebook and LinkedIn websites provides real-time feedback, customizing communication and

receiving machine-learning in-put. The results demonstrated implementing digital transformation and effective social media marketing leads to more sustainable connections and the satisfaction of clients. Demographic research revealed the gender and age. The digital literacy has the significant impacts on consumer satisfaction. The results will be improved consumers' digital competences and creating inclusive accessible process is the key to maximizes the modified changes.

Overall, the model has acceptable statistical validity (Cronbach's Alpha = 0.884) and predictability was able to account for 47.3% of the variance in customer experience. The effects of digital and social media methods are critical for creating the B2B connections and competitiveness. The research recommends a unique digital and social media method, AI-driven analysis and client adoption plans for ICT companies. The policymakers prioritize the development of digital infrastructure, literacy and support to increase the advancement and standards. In future, the research will be developed to overcome the other issues. It will make long-term changes and handles the issues using cybersecurity, diversity and cultural differences in society makes a sustainable growth in Sudan.

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