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DIGITAL TRANSFORMATION AND CUSTOMER LOYALTY AMONG SUPERMARKET CUSTOMERS IN ANAMBRA STATE, NIGERIA

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Abstract

The impact of digital transformation on retail competition and customer relationships remains underexplored in emerging and resource-constrained markets. This study examines how mobile commerce, social media engagement, and personalization influence customer loyalty among supermarket customers in Onitsha, Nnewi, and Awka, Anambra State, Nigeria. Grounded in Relationship Marketing Theory, the study adopted a cross-sectional survey research design. The population comprised customers of selected supermarkets in the three cities. Using the Taro Yamane formula, a sample size of 396 was determined and increased to 495 to account for non-response. A multistage sampling technique was employed: supermarkets were selected using simple random sampling, and customers were approached on-site at random for questionnaire administration. Data

were collected using a structured questionnaire, yielding 397 valid responses for analysis. Instrument reliability was confirmed, with Cronbach's alpha coefficients ranging from 0.768 to 0.968. Data were analyzed using OLS multiple regression in SPSS version 31.0.1.0. Results show that all three indicators positively and significantly influence customer loyalty. Social media engagement had the strongest effect ($B = 0.324$, $p < 0.05$), followed by mobile commerce ($B = 0.254$, $p < 0.05$) and personalization ($B = 0.135$, $p < 0.05$). The model was statistically significant ($F = 72.137$; $p < 0.05$) and explained 35.5% of the variance in customer loyalty ($R^2 = 0.355$). The study concludes that active social engagement and reliable mobile shopping channels are key drivers of customer loyalty in supermarkets in Anambra State, while personalization remains comparatively underdeveloped. The study recommends strengthening these digital capabilities in supermarkets to enhance customer loyalty.

Keywords: *Digital Transformation; Mobile Commerce; Social Media Engagement; Personalization; Customer Loyalty*

Introduction

Digital technologies are reshaping how retail firms create value and compete. Organizations with higher digital maturity report superior revenue growth, improved margins, faster time-to-market, and better customer metrics because digital capabilities enhance operational efficiency and customer experience (Deloitte, 2020; Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022). In retail specifically, the rise of omnichannel commerce has changed consumer expectations: shoppers increasingly demand consistent, convenient, and personalized interactions across physical and digital touchpoints (Tyrväinen, Karjaluoto, & Saarijärvi, 2020; Molinillo, Aguilar-Illescas, R., Anaya-Sánchez, R., & Carvajal-Trujillo, 2022). Customer loyalty, encompassing repurchase intentions, resistance to switching, and advocacy, is a central indicator of retail performance, and it is sensitive to the quality of digital customer experiences (Dávila, Reina-Paz, & Sevilla, 2023).

Three interrelated digital levers evidenced in the literature as critical for building and sustaining loyalty are mobile commerce (m-commerce), social media engagement, and personalization. Mobile commerce extends transactional capability to consumers' mobile

devices and can reduce search and payment frictions, increasing purchase frequency when usability and reliability are adequate (McLean, Osei-Frimpong, Al-Nabhani, & Marriott, 2020; Molinillo et al., 2022). Social media engagement enables two-way communication, community building, and electronic word-of-mouth that strengthen affective attachment and advocacy (Dávila et al., 2023). Personalization uses customer data to deliver tailored recommendations and offers across channels; when properly implemented, it raises perceived relevance and satisfaction but can also create privacy concerns if mishandled (Aguirre, Mahr, Grewal, de Ruyter, & Wetzels, 2015; Tyrväinen et al., 2020).

Despite growing global evidence that digital initiatives enhance retail outcomes, adoption and impact remain uneven in developing-country contexts. In Nigeria, although expanding mobile networks and fintech have increased access to digital commerce, implementation varies by firm size and resource capacity; larger firms are more likely to deploy advanced digital solutions, while smaller retailers face infrastructural, financial, and capability constraints (Olurinola, Osabohien, Adeleye, Ogunrinola, Omosimua, & De Alwis, 2021). Consequently, findings from resource-rich environments may not readily generalize to local retail markets characterized by institutional limitations and operational challenges. Anambra State, particularly Onitsha, Nnewi, and Awka, provides a relevant context for examining how mobile commerce, social media engagement, and personalization improve customer experience and loyalty in resource-constrained environments.

Existing empirical studies often examine m-commerce, social media, or personalization in isolation, use firm-level respondents rather than customers, or focus on sectors other than supermarkets. This leaves important questions about the individual and combined effects of these three levers on customer loyalty in low-resource retail environments. This creates uncertainty for managers seeking to prioritize digital investments that drive loyalty and sustained performance in such environments. To address these gaps, the present study assesses how mobile commerce, social media engagement, and personalization influence

customer loyalty among supermarket shoppers in Onitsha, Nnewi, and Awka, using on-site customer-level survey data.

In theory, supermarkets that effectively integrate these digital tools should experience higher customer satisfaction, repeat patronage, and superior performance. However, many retailers in Anambra State remain largely dependent on traditional face-to-face sales and have yet to implement integrated omnichannel strategies. Persistent constraints, including poor infrastructure, limited financial capacity, low digital awareness, fears of fraud, and weak institutional support, continue to hinder the effective adoption and utilization of digital technologies (Olurinola et al., 2021; Anetoh, Ndubisi, Obiezekwem, & Eboh, 2021). Thus, retailers seeking to adopt or enhance digital solutions need clear empirical insights into how specific digital initiatives improve customer experience and loyalty locally, and which initiatives are most effective.

Objectives of the Study

The broad objective of this study is to critically examine the effect of digital transformation on customer loyalty among supermarket customers in Anambra State, Nigeria. Specifically, the study seeks:

1. To examine the effect of mobile commerce on customer loyalty in supermarkets in Anambra State, Nigeria.
2. To evaluate the effect of social media engagement on customer loyalty in supermarkets in Anambra State, Nigeria.
3. To assess how personalization affects customer loyalty in supermarkets in Anambra State, Nigeria.
4. To ascertain the combined influence of mobile commerce, social media engagement, and personalization on customer loyalty in supermarkets in Anambra State, Nigeria.

Research Hypotheses

1. H_{01}: Mobile commerce has no significant effect on customer loyalty in supermarkets in Anambra State, Nigeria.
2. H_{02}: Social media engagement has no significant effect on customer loyalty in supermarkets in Anambra State, Nigeria.
3. H_{03}: Personalization has no significant effect on customer loyalty in supermarkets in Anambra State, Nigeria.

Review of Related Literature

Digital Transformation

Digital transformation refers to the deliberate deployment of modern digital technologies, such as mobile platforms, artificial intelligence, cloud computing, blockchain, and the Internet of Things, to drive substantial business change aimed at improving customer experiences, streamlining operations, and enabling new business models (Warner & Wäger, 2019). It also encompasses the application of digital tools to reshape organizational processes, structures, and relationships with both internal and external stakeholders (Plekhanov, Franke, & Netland, 2022). These perspectives position digital transformation as a strategic and purposeful initiative rather than a purely technical upgrade, emphasizing technology as a means to reconfigure how firms compete and deliver value.

Beyond technology adoption, digital transformation is conceptualized as a process that produces deep and lasting changes in organizational properties through the integration of information, computing, communication, and connectivity technologies (Vial, 2019). Such changes may alter business models, product offerings, and organizational structures, thereby affecting how value is created and captured (Hess et al., 2016, as cited in Nadkarni & Prügl, 2020). From this standpoint, isolated digital initiatives are insufficient;

transformation requires coordinated, organization-wide adjustments that align digital capabilities with strategic objectives and operational processes.

Scholars further stress that digital transformation reshapes ways of working, roles, and business offerings, demanding new routines, competencies, and organizational designs (Parviainen et al., 2017, as cited in Kraus et al., 2022). It often entails a comprehensive overhaul of operations and value creation logic that can fundamentally redefine a firm's market positioning (Vărzaru & Bocean, 2024). Importantly, these changes extend beyond systems and infrastructure to include people, mindsets, and skills, underscoring that successful transformation depends on leadership, workforce capabilities, and cultural readiness as much as on technological investments (Schilirò, 2024).

Taken together, the literature converges on four interrelated elements: the strategic use of digital technologies as tools for change; deep, structural shifts in processes and business models; adjustments in roles and ways of working; and the central role of human and organizational capabilities in converting technology into improved performance. Accordingly, digital transformation is best understood as the intentional, organization-wide integration of digital technologies to enhance value creation, operational efficiency, and competitive advantage.

Mobile Commerce (M-commerce)

Mobile commerce (m-commerce) represents an extension of electronic commerce that enables consumers to conduct commercial transactions through wireless, handheld devices such as smartphones and tablets, thereby providing continuous, location-independent access to retail services (Mollick, Cutshall, Changchit, & Pham, 2023; Thangavel & Chandra, 2023). Conceptually, it is a subset of e-commerce distinguished by the device and network infrastructure used for transactions, with activities executed over wireless

telecommunications systems rather than fixed desktop environments. This portability allows customers to browse, purchase, pay, and interact with retailers while on the move, expanding the temporal and spatial boundaries of consumption beyond traditional in-store or desktop-based contexts (Thangavel & Chandra, 2023).

Unlike conventional e-commerce, m-commerce is shaped by distinct technical and usage characteristics that influence both service design and consumer behavior. Constant connectivity and real-time access create opportunities for location-based offers, instant updates, and spontaneous purchasing, while simultaneously raising expectations for speed, convenience, and simplicity (Dastane, Goi, & Rabbanee, 2023; Omar, Mohsen, Tsimonis, Oozeerally, & Hsu, 2021). These conditions necessitate interfaces optimized for small screens, touch-based navigation, and on-the-go interactions, suggesting that merely replicating desktop platforms on mobile devices is inadequate. Consequently, effective m-commerce requires purposeful design adaptations rather than technological downsizing.
Adoption of mobile commerce is influenced by technological, social, and psychological factors. Perceived usefulness, ease of use, security, social influence, and consumers' inclination toward innovation encourage continued usage, whereas concerns about trust, privacy, and value perception may hinder participation (Mollick et al., 2023; Shaw & Sergueeva, 2019; Hillman & Neustaedter, 2017). This duality highlights that the success of m-commerce depends not only on technical functionality but also on building consumer confidence through secure payment processes, transparent value communication, and social validation.

Overall, mobile commerce can be understood as a distinct, mobility-driven form of digital retailing characterized by immediacy, portability, and wireless connectivity. It extends the capabilities of e-commerce by enabling anytime and anywhere transactions, and by supporting features such as real-time interaction and location-aware services. Accordingly,

mobile commerce is defined in this study as the use of portable, internet-enabled devices to conduct retail transactions and customer interactions over wireless networks, thereby facilitating seamless and continuous engagement between consumers and retailers.

Social Media Engagement

Social media engagement refers to the active involvement of followers with a brand across social platforms, encompassing what users think, feel, and do when interacting with brand-related content (Aldlimi, Priporas, & Chang, 2025; Dessart, 2017). It includes observable activities such as reading posts, reacting, commenting, sharing, and creating content, as well as less visible forms of interaction where individuals pay attention to or feel connected with a brand without publicly responding (Syrdal & Briggs, 2018). Engagement is therefore not limited to overt participation; it also reflects internal psychological and emotional connections that shape how users relate to brand communications.

Conceptually, engagement is widely understood as multidimensional, comprising affective, cognitive, and behavioral components. Affective engagement captures emotional responses to brand content, cognitive engagement reflects attention and mental involvement, and behavioral engagement denotes visible actions such as liking, sharing, or posting (Dessart, 2017; Aldlimi et al., 2025). This tripartite structure suggests that engagement extends beyond measurable metrics and includes deeper attitudinal states that precede or accompany behavior. Consequently, relying solely on visible interactions may underestimate the true level of customer involvement.

Engagement levels are shaped by both content-related and user-related factors. Content that provides value, stimulates interest, fosters interaction, and creates a sense of presence is more likely to elicit participation (Smith & Gallicano, 2015). At the same time, individual characteristics, such as product involvement, attitudes toward online

communities, and willingness to participate digitally, influence responsiveness (Dessart, 2017). Engagement also varies across social media platforms, as each has features that facilitate certain types of interactions (Xia, Robinson, Zahay, & Freelon, 2020).

Overall, social media engagement is best understood as a multidimensional and context-dependent process integrating emotional attachment, cognitive attention, and observable behaviors. It reflects how customers connect with, respond to, and co-create value around brand content within online communities. Accordingly, social media engagement can be defined as a multi-level process through which retail customers interact with brand-related content and communities, expressed through both visible actions, such as likes, shares, and comments, and deeper emotional and participatory involvement.

Personalization

Personalization is conceptualized as a targeted, individual-level marketing approach in which firms use customer data and digital technologies to tailor content, products, or services to specific customer needs and preferences (Aguirre et al., 2015, as cited in Riegger, Klein, Merfeld, & Henkel, 2021). It involves delivering the right content to the right person at the right time to capture immediate and future business opportunities (Tam & Ho, 2006, as cited in Aguirre et al., 2015). Within digital commerce, personalization extends beyond generic segmentation by enabling firms to customize interactions at scale and measure their effectiveness using technological tools (Kaptein & Parvinen, 2015). These perspectives position personalization as a strategic mechanism for enhancing relevance and improving customer experience.

A central feature of personalization is its firm-driven and data-dependent nature. Organizations systematically collect and analyze behavioral and transactional data, match insights with tailored offers, and employ technologies that allow tracking, testing, and optimizing individual responses (Kaptein & Parvinen, 2015). The effectiveness of personalization, therefore, depends on the availability of quality data, appropriate

analytical tools, and the capacity to scale individualized experiences across many customers. Integrating new technologies and data sources strengthens firms' ability to align offerings with customer preferences while maintaining reliable interactions (Chhabria, Gupta, & Gupta, 2023). Consequently, personalization is best understood as an ongoing, learning-oriented system rather than a one-off recommendation process.

However, personalization entails a critical trade-off between relevance and privacy. While tailored communications can enhance satisfaction and adoption, they may also generate feelings of vulnerability or surveillance, thereby reducing customers' willingness to accept personalized services (Riegger et al., 2021; Aguirre et al., 2015). Customers value useful and meaningful offers but simultaneously expect autonomy, control, and protection of their personal information (Canhoto, Keegan, & Ryzhikh, 2023). This tension underscores that the success of personalization depends not only on technical sophistication but also on ethical data practices and customer trust.

Overall, personalization represents a data-driven, technology-enabled strategy through which firms design individualized experiences that balance relevance, scalability, and privacy considerations. Effective implementation requires careful alignment between customer expectations, organizational capabilities, and responsible data use. Accordingly, personalization may be defined as the deliberate use of customer data and digital technologies to deliver tailored content, products, or services that meet individual needs while respecting customers' comfort, control, and privacy.

Customer Loyalty

Customer loyalty is widely conceptualized as a combination of attitudinal and behavioral components that jointly reflect customers' psychological attachment to a brand and their repeated purchasing actions. Dick and Basu (1994, as cited in Sundström & Hjelm-Lidholm, 2020) define loyalty as the linkage between favorable beliefs or feelings and consistent patronage behavior. Similarly, loyalty has been described as a customer's

commitment to repurchase and recommend a brand (Kirillova & Zyk, 2023) and as attitudes and purchase behaviors that consistently favor one seller over competing alternatives (Watson, Beck, Henderson, & Palmatier, 2015). Dimitrieska (2024) further emphasizes the emotional dimension, portraying loyalty as a positive, long-term relationship between customers and firms. Together, these views position loyalty as both affective commitment and observable behavioral support.

The attitudinal–behavioral framework underscores that neither dimension alone sufficiently captures true loyalty. Positive attitudes without repeat purchases may not translate into meaningful outcomes, while repeated buying without favorable attitudes may merely reflect convenience or habit rather than commitment (Srivastava & Kaul, 2016; Dick & Basu, 1994, as cited in Sundström & Hjelm-Lidholm, 2020). Consequently, robust assessments of loyalty integrate both psychological predispositions and behavioral manifestations. Practical indicators commonly include intentions to repurchase, actual retention or repeat purchasing, and referrals or word-of-mouth advocacy, which together provide a comprehensive representation of customer commitment (Borishade, Worlu, Ogunnaike, Aka, & Dirisu, 2021).

Beyond its conceptual significance, loyalty carries clear economic implications. Retaining existing customers is typically more cost-effective than acquiring new ones, and loyal customers contribute to stable, long-term revenue streams through sustained patronage and positive recommendations (Dimitrieska, 2024; Keshavarz, Ansari, & Arandi, 2024). Such customers not only generate repeat sales but also act as advocates who influence others' purchase decisions, thereby amplifying a firm's market reach and reducing marketing costs (Kirillova & Zyk, 2023). These benefits position loyalty as both a relational outcome and a strategic asset.

Overall, customer loyalty emerges as an interconnected emotional and behavioral process that strengthens enduring bonds between customers and brands. It develops through

positive attitudes, emotional attachment, and satisfaction that translate into consistent repurchasing and advocacy. Accordingly, customer loyalty can be defined as the lasting emotional connection and repeated patronage that lead customers to consistently prefer, repurchase from, and recommend a brand over competing alternatives.

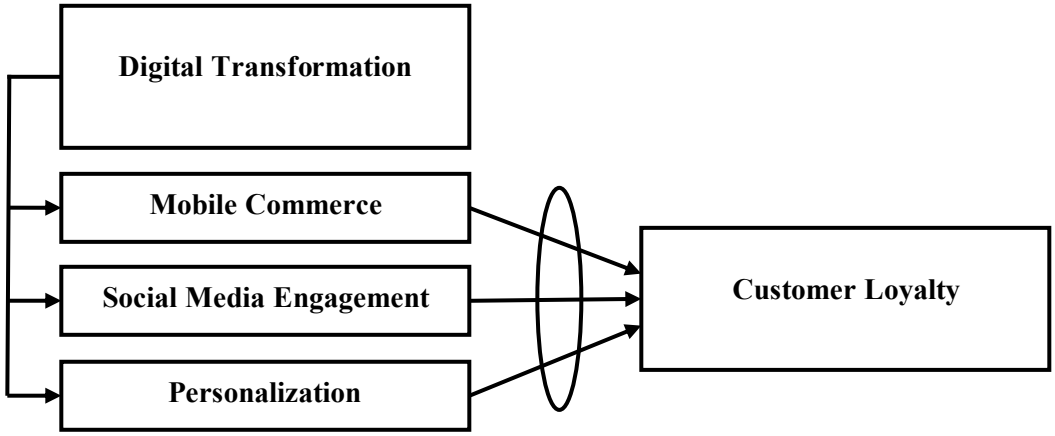


Figure 1: Conceptual framework of digital transformation and customer loyalty

Source: Author's construct, 2025

Digital transformation serves as the independent variable, represented by simpler variables: mobile commerce, social media engagement, and personalization. The diagram illustrates that the study aims to evaluate the individual and combined effects of digital transformation variables on customer loyalty.

Theoretical Framework: Relationship Marketing Theory

Relationship Marketing Theory (RMT) started in early services marketing research but became widely recognized as its own approach in the 1980s. Leonard L. Berry first used the term "relationship marketing" in 1983 to emphasize the importance of building long-term relationships with customers (Morgan & Hunt, 1994). Its central mechanism was formalized in the Commitment–Trust framework by Morgan and Hunt (1994), which argues that trust and commitment reduce uncertainty and opportunism, encourage

cooperative behavior, and thereby produce superior relational outcomes such as loyalty, repeat purchases, and positive word-of-mouth.

Later contributions extended the perspective beyond discrete transactions to an ongoing value-creation process. Grönroos (1994; 1996) emphasized continuous value creation through experience and service-quality management, while Sheth and Parvatiyar (1995) stressed that relationship marketing involves many stakeholders, not just the firm and the buyer, and that the goals of relationship marketing extend beyond simple exchanges to include mutual benefit, trust, and a long-term perspective. Empirical evidence shows that relationship marketing improves firm performance, particularly when relationship quality and perceived relational benefits are strong mediators (Palmatier, Dant, Grewal, & Evans, 2006), and that digital technologies enable personalized, omnichannel engagement while preserving the theory's core constructs (Steinhoff, Arli, Weaven, & Kozlenkova, 2019).
RMT provides a relevant framework for understanding how firms cultivate loyalty through trust, commitment, and perceived value, particularly as digital capabilities reshape how relationships are initiated, maintained, and strengthened (Palmatier et al., 2006; Steinhoff et al., 2019). Mobile commerce, social media engagement, and personalization can thus be understood as relational mechanisms that operationalize trust, perceived value, and commitment in technology-mediated environments, making RMT a suitable lens for examining customer loyalty outcomes in modern retail contexts.

Empirical Review

Nduji, Orji, Oyedele, and Oriaku (2023) examined the relationship between e-business and organizational performance in Nigeria, focusing on Jumia Ltd, Lagos. Anchored on the Technology Acceptance Model (TAM), the study adopted a descriptive survey design, using a sample of 158 employees of Jumia Ltd selected through Taro Yamane's formula. Data were gathered using structured questionnaires and analyzed with multiple regression

techniques. The study assessed e-trading, e-marketing, and mobile commerce as independent variables, with organizational performance as the dependent variable. Results showed that all three dimensions of e-business had statistically significant and positive effects on performance: e-trading (β=0.454, p=0.000), e-marketing (β=0.333, p=0.001), and mobile commerce (β=0.518, p=0.000). The model accounted for 85% of the variation in organizational performance ($R^2 = 0.85$). The study concluded that e-business if properly accorded a maximum attention by Jumia Ltd, Lagos, would improve the organization's marketing and objectives.

McLean et al. (2020) examined consumer attitudes toward retailers' m-commerce apps in the United Kingdom using a longitudinal design comparing initial adoption (1 month) and continued use (12 months). Grounded in TAM, UTAUT, and Expectancy Confirmation Theory, the study analyzed perceived ease of use, usefulness, enjoyment, customization, subjective norm, attitudes toward the app and brand, loyalty, purchase frequency, and smartphone screen size as a moderator. Data were collected through two-wave online surveys from 689 respondents at Time 1 and 474 at Time 2, and analyzed using Structural Equation Modelling and Confirmatory Factor Analysis. Results showed that perceived ease of use and usefulness influenced app attitudes at both stages, while enjoyment and customization became more important during continued use; subjective norm mattered only at initial adoption. Positive app attitudes later predicted brand attitudes, loyalty, and purchase frequency, with larger screen sizes strengthening these effects. The study concluded that continued use strengthens favorable consumer attitudes and behavioral outcomes toward m-commerce apps.

Umoru and Umole (2025) examined the effect of social media business strategy on SME performance in Edo State, Nigeria, focusing on Auchi, Abudu, Benin City, and Ekpoma. Anchored in Social Exchange Theory, the quantitative survey sampled 584 SMEs from a population of 2,995 using the Borg and Gall formula. Data collected via structured

questionnaires were analyzed using percentages and multiple regression in SPSS v21. Social media strategy was measured through customer engagement, business accessibility, and business interaction, while performance was assessed using information accessibility, financial performance, cost reduction, customer relations, and marketing performance. Results showed that customer engagement significantly improved information accessibility ($t = 16.431$, $p < 0.05$), business accessibility enhanced financial performance ($t = 22.613$, $p < 0.05$), and business interaction positively influenced cost reduction ($t = 17.959$, $p < 0.05$). The study concluded that social media business strategies significantly enhance SME performance in Edo State.

Palladan, AbdulKadir, Ahmed, and Abubakar (2023) examined the effects of social media adoption on SME performance in Nigeria, emphasizing the moderating role of business strategy. Grounded in the Technology–Organization–Environment (TOE) framework, the quantitative cross-sectional study analyzed 316 valid responses from SMEs in Nigeria's North-East zone using PLS-SEM. Technological, organizational, and environmental factors significantly influenced social media adoption, which in turn positively affected SME performance. Business strategy (cost leadership and differentiation) significantly moderated the adoption–performance relationship. The study concluded that social media adoption enhances SME visibility, customer engagement, and performance, particularly when aligned with effective business strategies.

Onuorah, Ojiaku, and Olise (2022) examined the effect of social media marketing on customer brand engagement in the Nigerian banking sector. Anchored in the Social Media Marketing Model, the quantitative survey analyzed 224 valid responses collected online using structured questionnaires. Social media marketing was measured through entertainment, personalization, interaction, eWOM, and trendiness, while customer brand engagement was assessed using cognitive, emotional, and behavioral dimensions. Regression results showed that entertainment, personalization, and eWOM significantly

enhanced customer brand engagement, whereas interaction and trendiness were not significant. The study concluded that social media marketing efforts in the banking sector enhance customer-brand engagement when the content is entertaining, personalized, and encourages customers to share their experiences, but not when focused solely on interactivity or trendiness.

Akisanmi, Alabi, Egwuatu, Okeke, Ayittey, Onma, and Chukwumezie (2025) examined the impact of AI-powered personalization on customer engagement and purchase conversion in Nigerian e-commerce firms across major urban and semi-urban centers. Using a quantitative cross-sectional survey of 400 online shoppers selected through stratified random sampling, data were analyzed with regression, ANOVA, and SEM in SPSS and AMOS. AI personalization was measured through satisfaction, recommendation relevance, and privacy concerns, while engagement and conversion were the outcome variables. Results showed that satisfaction and relevance significantly increased purchase likelihood, whereas privacy concerns reduced it. Customer engagement mediated the personalization–conversion relationship, with higher-income consumers reporting greater satisfaction. The study concluded that AI-driven personalization can substantially enhance e-commerce performance in Nigeria when innovation is balanced with ethical data practices.

Methodology

This study adopted a cross-sectional survey research design to examine the effect of digital transformation on customer loyalty among supermarket customers in Anambra State, Nigeria. The cross-sectional approach was appropriate because data were collected from respondents at a single point in time to capture their perceptions and experiences regarding digital transformation practices in retail settings. The study was conducted in three major commercial cities in Anambra State (Onitsha, Nnewi, and Awka) selected for their high

concentration of formal retail activities and diverse customer bases. The population of the study comprised customers who patronized selected supermarkets in Onitsha, Nnewi, and Awka. Only customers who had shopped at the selected supermarkets within the past six months were considered eligible to participate. The six-month purchase window helps ensure recall accuracy about recent digital interactions and shopping behavior. The estimated total population of supermarket customers across the nine selected supermarkets was 45,000, based on monthly customer figures obtained from the managers of the supermarkets. Using the Taro Yamane sample size determination formula at a 5% level of precision, a sample size of 396 was derived. To account for possible non-response and incomplete questionnaires, the sample size was increased by 25%, resulting in an adjusted sample size of 495 respondents. A multistage sampling technique was employed. First, three supermarkets were randomly selected from each of the three cities using simple random sampling based on official lists obtained from the Ministry of Trade and Commerce, Anambra State. Second, the adjusted sample size was proportionately allocated to each selected supermarket according to its estimated customer population to ensure representativeness. Within each supermarket, eligible customers were randomly approached after completing their purchases and invited to participate in the study until the allocated sample size for each outlet was achieved. Data were collected using a structured, self-administered questionnaire. The questionnaire consisted of two sections. Section A gathered basic demographic information, while Section B measured the study constructs: mobile commerce, social media engagement, personalization, and customer loyalty. Each construct was measured using five items adapted to the supermarket context. Responses were recorded on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The validity of the instrument was established through expert review and pilot testing. Three academic experts assessed the questionnaire for clarity, relevance, and adequacy in measuring the study constructs, thereby ensuring face and content validity. In addition, a pilot study involving 30 supermarket customers was conducted to test the

practicality and clarity of the instrument. Feedback from the experts and pilot respondents informed minor revisions to improve item wording and overall clarity. Reliability was assessed using Cronbach's alpha, and coefficients ranged from 0.768 to 0.968 across constructs, indicating satisfactory internal consistency. Data collection was carried out on-site at the selected supermarkets during business hours with the assistance of trained research assistants. Participation was voluntary, and respondents were assured of confidentiality and anonymity. An interviewer-assisted approach was used where necessary to help respondents who required clarification, thereby improving response completeness and accuracy. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS version 31.0.1.0). Ordinary Least Squares (OLS) multiple regression was applied to evaluate the individual and combined effects of mobile commerce, social media engagement, and personalization on customer loyalty. Multicollinearity was assessed using tolerance and Variance Inflation Factor (VIF) values, while the independence of errors was examined using the Durbin–Watson statistic. Model fit was evaluated using R^2 and the F-statistic. The analysis was carried out within the standard OLS assumptions commonly applied in cross-sectional survey-based studies.

Data Analysis and Discussions

Response Rate and Sample Characteristics

A total of 495 questionnaires were distributed across nine supermarkets located in Onitsha, Nnewi, and Awka. Of these, 397 were properly completed and returned, yielding a high response rate of 80.2%, which is adequate for reliable statistical analysis. Gender representation was fairly balanced, with 208 males (52.4%) and 189 females (47.6%), enhancing the representativeness of the sample.

Location	Distributed	Completed	Non-response
Onitsha	203	164	39
Nnewi	154	120	34
Awka	138	113	25
Total	**495**	**397**	**98**

Table 1: Questionnaire distribution

Source: Field Survey, 2025

Descriptive Statistics of Study Variables

All constructs were measured on a five-point Likert scale. Using the midpoint benchmark (3.0), mean scores above 3.0 indicate agreement. The results indicate generally favorable customer perceptions of digital transformation practices. Customer loyalty recorded the highest mean (3.85), suggesting strong patronage intentions among respondents. Social media engagement (3.57) and mobile commerce (3.44) were moderately rated, while personalization (3.21) showed the weakest perception, indicating relatively underdeveloped implementation.

S/N	Mobile Commerce	SD (1)	D (2)	U (3)	A (4)	SA (5)	Mean
1	The supermarket's mobile shopping platform is easy to navigate.	33	45	24	284	11	3.49
2	Using my mobile phone to make purchases from this supermarket saves me time.	40	43	26	177	111	3.70
3	Transactions made through the supermarket's mobile platform are reliable.	41	65	37	139	115	3.56
4	The supermarket's mobile platform provides real-time information about product availability.	47	88	17	183	62	3.31
5	I frequently use my mobile phone to make purchases from this supermarket.	50	83	59	178	27	3.12
Overall Mean							**3.44**

Table 2: Summary of responses on mobile commerce items

Source: Field survey, 2025

S/N	Social Media Engagement	SD (1)	D (2)	U (3)	A (4)	SA (5)	Mean
1	The supermarket's social media pages provide relevant updates about their products.	31	36	56	174	100	3.70
2	I actively interact (like, share, comment) with the supermarket's social media content.	19	38	137	152	51	3.45
3	The supermarket acknowledges or responds to my comments or feedback on social media.	32	86	35	142	102	3.49
4	I feel emotionally connected to this supermarket through its social media presence.	39	61	28	144	125	3.64
5	The supermarket's social media activities make me feel part of its customer community.	40	60	23	175	99	3.59
Overall Mean							**3.57**

Table 3: Summary of responses on social media engagement items

Source: Field survey, 2025

S/N	Personalization	SD (1)	D (2)	U (3)	A (4)	SA (5)	Mean
1	The supermarket sends me messages that match my shopping interests.	36	112	32	163	54	3.22
2	I receive product recommendations that are relevant to my choices.	43	84	42	222	6	3.16
3	I feel that this supermarket understands my individual shopping needs.	66	90	34	136	71	3.14
4	Special offers from the supermarket make my shopping more enjoyable.	50	98	19	168	62	3.24
5	The supermarket uses my personal data responsibly to enhance my shopping experience.	58	81	26	143	89	3.31
Overall Mean							**3.21**

Table 4: Summary of responses on personalization items

Source: Field survey, 2025

S/N	Customer Loyalty	SD (1)	D (2)	U (3)	A (4)	SA (5)	Mean
1	I am satisfied with the supermarket's services overall.	16	43	21	261	56	3.75
2	I intend to continue shopping at this supermarket.	14	47	36	49	251	4.20
3	I would recommend this supermarket to friends or family.	18	40	37	210	92	3.80
4	I consider this supermarket my first choice for purchases.	17	42	27	232	79	3.79
5	I am willing to pay slightly more to continue buying from this supermarket.	15	32	31	286	33	3.73
Overall Mean							**3.85**

Table 5: Summary of responses on customer loyalty items

Source: Field survey, 2025

Regression Analysis and Hypotheses Tests

Ordinary Least Squares (OLS) regression was employed to examine the influence of mobile commerce (MC), social media engagement (SME), and personalization (PERS) on customer loyalty (CL). The general regression model is specified as:

$$CL_i = \beta_0 + \beta_1 MC_i + \beta_2 SME_i + \beta_3 PERS_i + \varepsilon$$

where CL_i represents the customer loyalty score of respondent i; MC_i, SME_i, and $PERS_i$ denote mobile commerce, social media engagement, and personalization scores, respectively; β_0 is the intercept; β_1, β_2, *and* β_3 are the regression coefficients; and ε is the error term capturing unobserved factors.

The regression results show that the model (combination of mobile commerce, social media engagement, and personalization) explains 35.5% of the variance in customer loyalty (R^2 = 0.355), indicating moderate explanatory power. The overall model is statistically significant (F = 72.137; p < 0.001). All three predictors exert positive and significant effects on customer loyalty. Social media engagement is the strongest predictor (B = 0.324, p < 0.001), followed by mobile commerce (B = 0.254, p < 0.001) and personalization (B = 0.135, p = 0.006). Accordingly, the null hypotheses were rejected, confirming that mobile

commerce, social media engagement, and personalization significantly enhance customer loyalty.

Furthermore, the collinearity statistics showed that all tolerance values were well above the minimum acceptable threshold of 0.10, while the Variance Inflation Factor (VIF) values were below 2, indicating that multicollinearity was not a concern in the model. This was further supported by the collinearity diagnostics, as the condition indices were all below the critical value of 30 and the variance proportions were reasonably distributed across dimensions, confirming the absence of serious multicollinearity among the independent variables. The residuals statistics revealed that the residuals had a mean close to zero and were symmetrically distributed within acceptable limits, with standardized residuals largely within ±3, suggesting that the assumptions of normality, linearity, and homoscedasticity were reasonably satisfied and that the model provided unbiased and reliable estimates.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.596[a]	.355	.350	.78082	2.239

a. Predictors: (Constant), PERS, SME, MC

b. Dependent Variable: CL

Table 6: Model summary

Source: Researcher's computation using SPSS, 2025

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	131.941	3	43.980	72.137	<.001[b]
	Residual	239.604	393	.610		
	Total	371.545	396			

a. Dependent Variable: CL

b. Predictors: (Constant), PERS, SME, MC

Table 7: ANOVA Table

Source: Researcher's computation using SPSS, 2025

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics
		B	Std. Error	Beta	t	Sig.	Tolerance
1	(Constant)	1.392	.172		8.081	<.001	
	MC	.254	.049	.259	5.132	<.001	.644
	SME	.324	.047	.326	6.856	<.001	.726
	PERS	.135	.049	.144	2.739	.006	.592

Table 8: Coefficients table

Source: Researcher's computation using SPSS, 2025

Key Findings

This study examined the effects of mobile commerce, social media engagement, and personalization on retail performance in Anambra State, measured through customer loyalty among supermarket customers. The key findings are summarized as follows:

1. Mobile commerce has a positive and statistically significant effect on customer loyalty (B = 0.254; $p < 0.05$), indicating that accessible and efficient mobile shopping channels meaningfully enhance loyalty among supermarket customers.
2. Social media engagement is the strongest predictor of customer loyalty (B = 0.324; $p < 0.05$), showing that active interaction and communication on social media platforms play a critical role in strengthening customer–supermarket relationships.
3. Personalization also exerts a positive and significant effect on customer loyalty (B = 0.135; $p < 0.05$), though its influence is weaker than that of mobile commerce

and social media engagement, suggesting limited optimization of personalization practices.

4. The model (combination of mobile commerce, social media engagement, and personalization) explains 35.5% of the variance in customer loyalty ($R^2 = 0.355$), indicating substantial explanatory power while acknowledging the influence of additional factors beyond the model.
5. The regression model is statistically significant ($F = 72.137$; $p < 0.05$), confirming that the combined effects of the three digital transformation indicators significantly predict customer loyalty.
6. Descriptive results show higher customer perceptions of social media engagement (mean = 3.57) and mobile commerce (mean = 3.44) than personalization (mean = 3.21), suggesting that supermarkets have adopted personalization practices but not as extensively or effectively as the other indicators.

Discussion of Findings

The finding that mobile commerce significantly influences customer loyalty aligns with Nduji et al. (2023), who reported positive effects of mobile commerce on organizational performance through improved convenience and transaction efficiency. This is further supported by McLean et al. (2020), who showed that perceived usefulness, ease of use, enjoyment, and customization of mobile apps strengthen customer attitudes, loyalty, and repeat purchasing. Together, these studies reinforce the present finding that mobile commerce plays a meaningful role in loyalty formation by enhancing customer satisfaction and accessibility.

Social media engagement emerged as the strongest predictor of customer loyalty, consistent with Umoru and Umole (2025), who found that engagement strengthens customer relationships and performance outcomes. Palladan et al. (2023) similarly demonstrated that social media adoption improves SME performance when aligned with

business strategy, while Onuorah et al. (2022) showed that personalization and entertainment features enhance brand engagement. These findings collectively support the view that active social media engagement fosters emotional connection, effective communication, and brand loyalty, as observed among supermarkets in Anambra State.

Personalization also had a positive but weaker effect on customer loyalty. While prior studies agree that personalization improves performance outcomes but emphasize privacy concerns as a limiting factor (Aguirre et al., 2015; Riegger et al., 2021; Akisanmi et al., 2025), this study shows a slightly different pattern. Customers indicated that supermarkets generally use their data responsibly to improve their shopping experience, though their confidence that they receive data-driven personalization was relatively low. This suggests that the weaker impact observed in this study may not be due to data misuse, as suggested in previous literature, but rather to limited personalization. The moderate mean score for personalization, along with its weaker influence on customer loyalty, suggests that supermarkets in Anambra State may still be in the early stages of implementing robust, data-driven personalization systems.

The model explained 35.5% ($R^2 = 0.355$) of the variance in customer loyalty, indicating that while the digital transformation indicators substantially contribute to customer loyalty, other factors not captured in this study also play important roles in shaping loyalty outcomes. For example, Roosta, Sadjadi, and Makui (2025) identify additional influences, such as shopping experience, service quality, and socio-economic and cultural variables, that significantly affect customer loyalty in omnichannel retailing.

In summary, the study's findings align well with existing research, confirming that digital transformation initiatives are crucial in strengthening customer loyalty and enhancing retail performance. The notable impact of social media engagement emphasizes the growing role of online interactions and customer involvement, while the weaker effect of personalization suggests a need for more investment in data-driven personalization strategies. Overall, the

results showed that supermarkets in Anambra State are benefiting from digital transformation but still have room to expand their digital practices to achieve more sustainable customer loyalty and better performance outcomes.

Conclusion, Limitation, and Recommendation

Conclusion

This study examined the effects of mobile commerce, social media engagement, and personalization on customer loyalty among supermarket customers in Onitsha, Nnewi, and Awka, Anambra State. Findings show that all three digital transformation indicators have positive and significant effects on customer loyalty, with social media engagement as the strongest predictor, followed by mobile commerce and personalization. The regression model was statistically significant and explained 35.5% of the variance in customer loyalty, indicating that while digital transformation substantially contributes to loyalty outcomes, other factors also play a role.

Overall, the results confirm that digital transformation is a key driver of customer loyalty in supermarkets in Anambra State. Supermarkets that strengthen social media engagement, ensure reliable mobile commerce platforms, and adopt structured personalization strategies are better positioned to enhance customer satisfaction, deepen relationships, and sustain long-term loyalty in Anambra State.

Recommendations

Based on the objectives and findings of this study, the following recommendations are made to help retail businesses in Anambra State strengthen customer loyalty through digital transformation:

1. Supermarkets should deepen their use of mobile commerce platforms by improving mobile app functionality, simplifying the purchase, checkout, and delivery processes, and ensuring fast and secure payment options. Customers should be

encouraged to use mobile channels more frequently to enhance convenience and strengthen their loyalty.

2. Supermarkets should invest more in social media engagement, as it showed the strongest influence on customer loyalty. This includes creating interactive content, responding promptly to customers' comments and feedback, and maintaining consistent communication.
3. Personalization efforts should be improved and better structured. Supermarkets should adopt deep data-driven approaches to deliver more relevant product recommendations, personalized promotions, and tailored messages.

Limitations of the Study

1. The study focused only on supermarkets located in Onitsha, Nnewi, and Awka in Anambra State, limiting the generalizability of the findings to other retail sectors or geographical regions.
2. The research relied on self-reported data collected through structured questionnaires, which may be influenced by respondent bias or subjective interpretation of survey items.
3. The study adopted a cross-sectional design, capturing responses at a single point in time, thereby limiting the ability to assess changes in digital transformation practices and customer loyalty over time.

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