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Consumer engagement dynamics through SST and IoT innovations in diverse markets.

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Abstract

Purpose - This study aims to examine the impact of IoT and self-service technology on consumer engagement by analyzing the mediating role of satisfaction, quality of alternatives, relationship investment, customer emotions on commitment with perspectives from Nigeria and USA.

Design/methodology/approach – An exploratory qualitative approach was adopted. Data was collected from 40 interviews from USA and Nigeria and 100 online reviews.

Findings – The results reveal that investment in self-service technology plays a pivotal role in positively engaging consumers through new technology in Nigeria and USA. Of particular interest is that the quality of investment and commitments on self-service technology significantly influence the level of engagement with these services. The major themes extracted revolve around satisfaction, quality of alternatives and commitment.

Originality/value – The research demonstrates a favorable correlation between consumer engagement via self-service technology and the crucial variables of investment and commitment among service users. Self-service technology emerges as a pivotal form of new technology affecting consumer engagement. The paper offers discussions and managerial implications based on these findings, along with additional insights for further potential research avenues.

Keywords – Self Service Technology, Consumer Engagement, Investment, Commitment, New Technologies.

Statement of Key Contributions

This study makes a triple contribution to existing literature. First, it broadens the existing understanding of SST and IoT in emerging markets, with special emphasis on Nigeria. This moves away from existing literature which predominantly focuses on SST's perspective from developed markets alone (Sharma et al., 2021) and provides insights from developed and developing markets with different cultural values (Singh et al., 2017). Second, employing the RI framework, we conduct a comparative analysis of customer satisfaction levels across various stages of SST and IoT adaptation, considering diverse customer profiles. This comparative examination provides nuanced insights into customer satisfaction dynamics during different phases of technology adoption (Tran et al., 2019). Third, we present preliminary conceptual proposals for practitioners and researchers, offering insights on enhancing CE through the utilization of IoT and SST-enabled devices outside the standard domains of retail outlets (Sharma et al., 2021).

Introduction

As technology continues to rapidly advance, service firms are increasingly integrating new technologies into their operations. This incorporation is leading to a transformation of the services

industry (Amin et al., 2019). Self-Service Technologies (SST) are gaining significant attention as a type of emerging technology that is increasingly integrated into consumers' daily lives. This reflects the ongoing impact of technology on various aspects of consumers' routines and experiences (Djelassi et al., 2018; Gummerus et al., 2019).

The concept of SST as an enhancer of IoT has largely revolutionized over the years. The concept which was originally introduced by Dabholkar (1994) as the Technology-Based Self Service (TBSS) (Amin S. et. al., 2019), further experienced a significant acceleration in the adoption rate due to the COVID-19 pandemic (Zimmerling A, et al., 2021). This was mainly influenced by the need for social distance, contactless transactions, or technology-driven deliveries (Wang. et al. 2020). SSTs are a mixture of technology and self-service that can be defined as an interface that enables service rendition to customers without any reliance or direct involvement of employees (Lee and Lyu, 2016; Meuter et al., 2000; Duarte P. et al., 2022)

A handful of services are now overtaken through the introduction of SSTs notably self-checkout machines, mobile wallets (Singh and Singh, 2020), artificial intelligence (Pillai et al., 2020), handheld self-scanning devices (Marzocchi and Zammit, 2006), and automated social presence through robots (Van Doorn et al., 2017). SST also traditionally serves as a major differentiating factor for hypermarkets (Duarte P. et.al., 2022) and supermarkets such as Amazon that introduced the Amazon Go that uses deep leaning and automated purchase, checkout, and payment steps to enable grocery transactions through customer apps (Ives et al., 2019). Besides launching fully automated stores like AmazonGo, Amazon has expanded its services to include faster grocery delivery through Amazon Fresh and Whole Foods (Bonetti F. et al., 2022).

As a service process, SST exists for many years (Klier et al., 2016; Nijssen et al., 2016), however the bundle of technological solutions has evolved much further, by means on eliminating

any interface with human support (Kim & Yang, 2018). While the concept of SST has been extensively studied, primarily focusing on its initial adoption in developed markets (Lin and Hsieh, 2006; Curran et al., 2003), there has been comparatively less attention given to the understanding of customer satisfaction and post-usage evaluation (Bhattacherjee, 2001; Djelassi et al., 2018; Robertson et al., 2016). This gap is particularly notable in sub-Saharan Africa countries such as Nigeria, where SST is still considered a novelty (Ugwuanyi et al., 2022). Additionally, due to the dynamic and wide range application of SST, the advancement in SST via the impact of IoT towards a digital economy, warrants further empirical research and comprehensive studies that represent emerging economies (Safaeimanesh et al., 2021). This study also aims to evaluate and compare the advancements of SST through IoT in the USA and cross reference with findings from emerging markets like Nigeria. In other words, it seeks to access how CE is impacted by the advanced adoption of SST in a country like the USA and, in parallel, to analyze the present status of SST, which is in its initial stages of development in Nigeria.(Safaeimanesh et al., 2021)

Customer Engagement with Self-Service Technologies

The concept of CE has garnered considerable attention in recent decades as a pivotal metric for assessing and steering customer relationships (Pansari & Kumar, 2017; Hollebeek, Sharma, et al., 2022; Hollebeek, Sprott, et al., 2022). Numerous authors have endeavored to present an expansive definition of CE, with noteworthy contributions from scholars like Van Doorn et al. (2010), Brodie, Hollebeek, Juri´c, and Ili´c (2011), Hollebeek (2011a, 2011b), Vivek, Beatty, and Morgan (2012), and Rosado-Pinto and Loureiro (2020). Hollebeek (2011a, p10) conceptualized CE as "the extent of a customer's cognitive, emotional, and behavioral dedication to brand interactions." Despite variations in definitions, CE is commonly understood to encompass various

characteristics (Hollebeek L. et al., 2023). CE having an interactive nature (Kumar et al., 2019; Vivek et al., 2014), CE as an investment in brand interactions (Hollebeek et al., 2014, 2019; Kumar & Pansari, 2016), CE as a multidimensional construct (Calder et al., 2009; Harrigan et al., 2017).

The influence of technology on CE has become a focal point within constantly evolving technological landscapes (Ostrom et al., 2015). New technology's efficacy across various marketing phases, like segmentation, targeting, and positioning processes, has significantly impacted CE with brands, influencing and potentially transforming elements within the marketing mix (Hollebeek et al., 2014). Consequently, technology is swiftly altering the dynamics of how customers interact with both brands and firms (Hollebeek et al., 2019). Technological advancements have facilitated engagement processes by enabling immediate two-way interaction, exemplified through platforms like social media, online brand communities, and crowdsourcing, fostering real-time engagement (Rosado-Pinto & Loureiro, 2020).

The rapid advancement of new technology in CE is causing significant shifts, resulting in changing dynamics in the relationships between customers and companies or brands (Hollebeek et al., 2019). This evolution aligns with the assertions made by Pansari and Kumar (2017: p1) that "the objective of organizations has shifted from relationship marketing to engaging customers through diverse approaches." To fully harness the advantages of leveraging new technologies for augmenting CE, SST has emerged as a pivotal mechanism. SST is acknowledged for its potential to enhance understanding and awareness of both CE and new technologies. It provides empirical insights that surpass mere conjecture and prevalent narratives commonly associated with emerging and trending technologies (Beatson A., et. al., 2006). In today's swiftly changing business landscape, any opportunity to reinforce CE with brands through innovative and adaptable processes provides a competitive edge to such firms.

Experience with Self-Service Technologies

As previously described, SSTs are classic examples of marketspace transactions with minimal or no possibilities of personal contact (Meuter et al., 2000). The positives (convenience, speed of service, limited interactions, greater control, and engagement of users) and negative effects (lack of social relationship and interpersonal contact, frustration from inexperienced customers, technological glitches, negative influence on customer loyalty) of SST have been extensively discussed by previous researchers including Dabhoikar (1992); Meuter, Ostrom, Roundtree, Bitner, et al., (2000); Sharma et al., (2021). Advancements in information technology have changed the way customers experience a service encounter and their relationship with service providers (Scherer et al., 2015). Especially technology-based self-service channels have found their way into the 21st century service economy.

A handful of services are now overtaken through the introduction of SSTs notably self-checkout machines, mobile wallets (Singh and Singh, 2020), artificial intelligence (Pillai et al., 2020), handheld self-scanning devices (Marzocchi and Zammit, 2006), and automated social presence through robots (Van Doorn et al., 2017). Most research on SST has been predominately centered on the retail sector (Orel and Kara, 2014; Demoulin and Djelassi, 2016; Fernandes and Pedrose, 2016) which has so far been adopting SST to enhance service quality and provide shoppers with speed service at checkouts (Cho and Fiorito, 2010). The implementation of SSTs is now also visible in sporting stores, beauty, and cosmetics, restaurants, hotels, or leisure (Lesonsky, 2017; IHL, 2019; Binns, 2017; Marino-Nachison, 2018; Gilliland, 2016). Commercial

transportation companies have also adopted SSTs through self-service ticket vending machines (Cheng & Huang, 2013). This has had significant benefits for customers and service providers alike. With obvious advantages that are often faster and more affordable alternatives for customers hence, the feeling of independence, self-empowerment, and perceived quality comes across strongly (Ostrom, Roundtree, & Bitner, 2000; Oyedele and Simpson, 2007).

SST significantly boosts customer satisfaction and enhances perceptions of brand quality. A recent interview with the CEO of First Equity Group highlighted that the improvement of service quality heavily relies on the accessibility of SSTs utilizing AI, machine learning, and automated advisors, empowering customers to independently address their needs. This aligns with findings from a USA survey indicating that 62% of respondents prefer SST over face-to-face interactions (Elliot M., 2023). Moreover, the survey underscored that younger generations, with 84% of Gen Z and 76% of millennials, exhibit a strong inclination towards utilizing technology-driven kiosks and checkouts.

With the innovative advancement in the applications of SST across different sectors and countries poses new challenges in proper adaptation and integration. The capability of businesses to enhance their consumer experience profoundly influences the quality of received reviews. Since the introduction of SST, the dynamics between customers and customer service representatives have undergone fundamental changes and the relationships between customers and brand have been significantly altered (Duarte et al., 2022; Chun Liu & Kam Hung, 2022). Compared to traditional service encounters, there is high level of customization and personalization (Wang et al., 2013), impacting customer satisfaction, human interaction, and potentially, firm success (Chun Liu & Kam Hung, 2022; Kandampully et al., 2018; Mohr & Henson, 1996). SSTs commonly

introduce increased novelty, safety, privacy, convenience, control, freedom, and encourage a sense of participation (Liu & Hung, 2020).

In this exploratory qualitative research study, we have adopted the Relationship Investment Theory (Rusbult 1980). This theory posits that an individual's long-term commitment to a relationship plays a crucial role in its persistence. We have chosen to apply the Relationship Investment (RI) Theory to guide our qualitative investigation due to its capacity to identify an individual's commitment to maintaining a relationship, particularly when satisfaction is present. Additionally, RI has demonstrated predictive capabilities for satisfaction and commitment across diverse sample sizes. Moreover, it allows us to explore how variables within the investment model may evolve over time (Petrick X. et al., 2008). Despite the extensive application of the RI model, particularly in relationship studies (Rusbult, 1983), our study represents a novel approach as, to the best of our knowledge, this theory has not been previously applied to analyze SST and IoT. However, we believe it holds significant potential to provide new insights in these technological domains.

Antecedents to customer engagement with SST: The role of investment and commitment

The concept of investment and commitment is rooted in Rusbult's relationship investment (RI) theorical framework by Rusbult (1980). RI model is based on the principles of interdependence theory which is a viable framework for understanding the dynamics of dyadic interaction (Kelley et al., 2003; Kelley and Thibaut, 1978; Rusbult and Buunk, 1993; Rusbult and Van Lange, 2003; Thibaut and Kelley, 1959). The theory suggests that the long-term persistence of an individual in a relationship is mediated by the commitment attached to it. The concept was originally developed in social psychology to understand human interpersonal relationships

(Breivik and Thorbjornsen, 2008; Huang, Cheng, and Farn, 2007; Sung and Campbell, 2009). It has also been regarded as one of the most prominent and influential theories that explains commitment in relationships (Tran et al., 2019). The model proves to explain the outcome of personal relationship because of exchange of rewards and cost with relationship partner (Rusbult, 1983). The model has been used to describe the dispositional and contextual factors leading to specific patterns of interdependence (Kelley et al., 2003).

As an extension of the interdependence theory which has been expansively used to explain how and why relationships are aided (Ogolsky, 2016). RI model affirms that commitment is impacted by the outcome values of the current relationship and alternative, as well as the investment size (Rusbult, 1980a; Rusbult et al., 1998). This model assumes that commitment is used as an indication to show interest and intention to remain in a relationship (Rusbult, 1983; Rusbult and Buunk, 1993).

Research revealed that the RI model has been expanded to explain the relationship between employees and employers, individual's commitment to their hobbies, brand's commitment e.t.c, (Farrell and Rusbult, 1981; Gable and Hunting, 2001; Geyer et al., 1991; Koslowsky and Kluger, 1986; Rusbult and Farrell, 1983; Sung and Choi, 2010). According to Tran et al., (2019) it has also been recently applied to other domains including web site use (Li, Browne, and Chau, 2006), buyer–seller relationships (Moon and Bonney, 2007), loyalty to brands (Li and Petrick, 2008), relationships with the natural environment (Davis, Le, and Coy, 2011), and mentor–mentee relationships (Gettings and Wilson, 2014). Dibble J. et al. (2014) also employed RI model in examining a study involving college students utilizing computerized technologies. This research uncovered that individuals are utilizing widely adopted computer-based technologies, such as Facebook and text messaging, for communication with their "back burners". To the best of the

authors knowledge, this is the first research applying RI in the IoT space to evaluate the relationship with SST at different levels of adoption of SST across different countries.

The RI model admits that commitment is a mediating factor that that attaches satisfaction, quality of alternatives and investment size on relationship persistence (Rusbult, 1983; Rusbult, Martz, and Agnew, 1998). It has been established that an individual's commitment to a relationship increases to the extent that he or she is satisfied with the relationship, has unattractive alternatives, and has invested significantly in the relationship (Breivik and Thorbjornsen, 2008; Huang, et al., 2007; Rusbult, 1983; Sung and Choi, 2010). Invariably, satisfaction and investment have a positive effect on commitment while the quality of alternative has the opposite effect (Zainol et al., 2017).

The significance of RI as a strong determinant to test relationship strength has been highlighted by Circles (2010) and McEwen (2004) and strengthened by marketing scholars as a strong basis for the development and sustainability of consumer brand relationship (Bowden, 2009b; Brodie, Hollebeek, Juric, and Ilic, 2011; Brodie, Ilic, Juric, and Hollebeek, 2013; Sashi, 2012; van Doorn et al., 2010; Verhoef, Reinartz, and Krafft, 2010).

This study therefore enriches application of RI framework through a qualitative approach that reveals some additional insights (Safaeimanesh et al., 2021) and comparative analysis of customer satisfaction levels across various stages of SST and IoT adaptation, considering diverse customer profiles and assessing their impact on CE. This enables unprecedented leanings to brand owners on strategies to increase engagement across different markets.

Methodology

This empirical research adopted a qualitative research method to address the research objectives. Aside from specifically charging future research to deviate from the standard quantitative

approach, Safaeimanesh et al., (2021), advocated for more qualitative research on SST with the intention of generating some interesting fundings on the phenomenon. Qualitative research has been recognized for its effectiveness in uncovering timely and actionable data, particularly in investigations conducted within challenging contextual circumstances (Vindrola-Padros et al., 2020). It focuses on exploring the varying perspectives or viewpoints that individuals or groups might hold regarding reality (Hancock et al., 1998). We opted for a qualitative study approach as it allows researchers to delve into both the descriptive and interpretive aspects of experiences derived from the collected qualitative data (Kirillova, 2018). Our aim was to gain a comprehensive understanding of the motivations and obstacles associated with these variables.

The interviews were conducted using an open-ended interview guide to collect feedback from participants. These discussions were recorded (with participant consent), transcribed and lasted approximately 40-60 minutes each, aiming to ensure data accuracy during transcription (Patton, 1990). The collected data underwent text analysis using the inductive method, analyzed on MAXQDA 2020 software (Strauss and Corbin, 1990). MAXQDA software functions as a valuable tool for analyzing qualitative data for research purposes. Its suite of tools designed for qualitative data and text analysis simplifies the organization, structuring, and examination of extensive volumes of text or other types of data. It aids in managing the resulting interpretations and assessments effectively (Strauss and Corbin, 1990). MAXQDA enables the interpretation and assessment of data by categorizing materials into groups, utilizing a hierarchical coding system, defining variables, presenting tabular summaries, and assigning colors and weights to segments of text. It allows iterative coding and aids the iterative process of trial and error until logical theories are derived.

Data collection was specifically targeted at interviewees from Nigeria and the United State. Sequel to previous assertions that studies on SST has been predominantly domiciled in advanced and developed markets (Sharma et al., 2021), as further reaffirmed by Djelassi et al., (2018); Robertson et al., (2016); Bhattacherjee, (2001); Ugwuanyi et al., (2021) who noted that SST studies from emerging country perspectives with an emphasis on the sub-Sahara Africa are yet to be webbed into this key research areas. This study attempts to provide insights from Nigeria which represents the largest country in Africa. Findings from emerging markets such as this, have stronger test for conceptual model and could help provide stronger basis for generalizations of findings (Sharma et al., 2021). As a basis for more concrete generalization of findings, we identified the USA due to advanced IoT adoption, different cultural background, different market realities and diverse consumer behavior (Singh et al., 2017).

Considering the findings and the recognized need for further research, this study shifts its focus to the transportation industry, departing from the typical retail outlets that have traditionally been the primary focus of most SST research (Sharma et al., 2021). Notably, SST implementation in the retail landscape of Nigeria is almost non-existent, primarily due to the prevalence of cash-based transactions. However, substantial infrastructural changes in the transportation industry have spurred the adoption of SST across various transportation modes, gaining widespread acceptance. Emerging countries like Nigeria undergo significant transformations in their urban infrastructure (Pojani and Stead 2017) and typically harbor a large informal economy, necessitating daily travel and exerting pressure on public commercial transportation infrastructure, with roads being the most prevalent (Nwafor and Onya 2019). Obi (2018) suggested that commuters in Lagos, Nigeria,

lose as much as 75% of their weekly working hours due to traffic congestion and a poor transportation system. This underscores the importance of examining the role of smart transportation in enhancing accessibility and mobility for these populations (Hussain, R. et al., 2017).

A total of 20 customers were interviewed in each country (total 40) which comprise 27 males and 13 females between the ages of 23 and 40 with the experience of recent usage of SSTs. The age categorization was deliberate due to the technological competence of Gen Y and high purchasing power (Pantano & Priporas, 2016). Respondents must have made use of the technology for an average of one year consistently to provide inputs. The sample of respondent is representative of different background, educational and professional qualifications.

Before participants could participate in the interviews, two key criteria were established. Firstly, individuals had to be recent users (i.e., those who used SST within the last 1 year) of SSTs in the transportation industry and must have used any of the following for commercial transactions: Apple Pay, Marta Card, or Cowry Card. Marta Card is a stored value smart card that passengers use as part of an automated fare collection system in the USA. Similarly, Cowry Card is used to make micro-payments easily and faster for different transportation modes in Nigeria. While Apple Pay enables commuters to make payments in person, in iOS apps, and on the web. It digitizes and can replace a credit or debit card chip and PIN transaction at a contactless-capable point-of-sale terminal (Apple 2014c). These cards are pre-loaded either online (using banking app) or offline (either at the train station or at different sales point). The ticket is swiped through an IoT device before accessing the transportation service without any human intervention. Commuters could equally access the service via their app's digital wallet and make use of a QR code for automatic

deductions. The machine automatically confirms adequate balance and standard fare charge to the commuter's destination. In the case of Cowry cards, commuters are required to tap back before highlighting for appropriate charge from either the train, bus, ferry, or tram system.

Participants were selected through non-probability purposeful sampling (Patton, 2002; Eisenhardt and Graebner, 2007), and the number of participants was determined based on data saturation (Guest et al., 2006; Baker et al., 2012). The interviews began by inquiring about the respondents' use of public transportation and their overall experiences. Subsequently, interviewees were asked about the specific types of technologies they used within the public transportation system. The questions further delved into their perspectives on how technology influenced the level of CE.

The collected reviews underwent a systematic investigation, resulting in the identification of seven distinct themes from the interviews. These themes served as the basis for coding the data. Additionally, online reviews from social media platforms concerning Cowry Card and Apple Pay were extracted and analyzed (Stottinger & Penz, 2015).

Results

This research expands the literature on the impact of SSTs on CE by providing a unique perspective of comparing findings from both developed and developing markets across different industries. Previous studies on SSTs have extensively investigated SSTs under different conditions (Sharma et al., 2021), our research investigated the level and depth of CE focusing on factors that positively influence CE through deliberate commitment to invest by brand owners. Our findings portray the willingness of adopting these new technologies, the conditions upon which consumers will not use SST and the variations in perspective due to the level of technology and how it impacts the

connectedness of the consumers for utilizing these services. Our findings provide a comprehensive view of how SST despite debates of replacing face-to-face interactions, plays an important role in influencing CE within the transportation industry and its impact on consumers from diverse backgrounds despite different levels of SST usage.

Limitations

The learnings from this study, though ample and exploratory, is without limitations. The study is mainly approached from a qualitative perspective with the idea of having a deeper understanding of the psychology of the customers using SSTs across different geographical locations and culture. We propose future studies should employ quantitative study for obtaining deeper understanding of the phenomenon. Additionally, the sample size while sufficient for the purposes of this study (Sandelowski M 1995; Thorogood N et. al., 2004), we propose future studies consider a wider geographical spread and larger audience.

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