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Exploring the effect of mobile apps on SMEs in Nigeria: a critical realist study

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Abstract.

An organisation's dynamic capabilities illustrate how the organisation renews its competencies in response to the evolving environment. This study explored the effect of mobile app usage on the dynamic capabilities (DCs) of SMEs in Nigeria from a critical realist viewpoint. Although literature suggests that mobile apps are used by SMEs, the elusiveness of mobile app usage in developing country contexts requires the investigation of the underlying mechanisms that explain how mobile apps enhance the DCs of SMEs. Using content analysis and retroduction, the study evaluated interview responses from 16 SMEs covering 5 states in Nigeria. The study revealed that mobile apps are used in SMEs in Nigeria (in the real domain) to carry out business processes (in the actual domain) using their DCs (in the empirical domain) for sensing business opportunities. The study suggests that despite the existence of government support for SMEs across Nigeria, these programmes are generally inaccessible and do not include the important ICT or mobile app elements. The study recommends the need for a contextual mobile app suited for SMEs in developing country contexts such as Nigeria.

Keywords: Small and medium enterprises, dynamic capabilities, mobile apps, critical realism.

1 Introduction

Small and medium enterprises (SMEs) play key roles in economic and social development in all countries worldwide. In this era of globalised economies, mobile apps arguably enable SMEs to drive the economic growth of developing countries [1]. Large organisations typically make intentional efforts to make the most of the technological advancements, but there is little research that shows the intentional efforts for SMEs more particularly in developing country contexts. There is nonetheless potential for SMEs to use mobile apps to sense new opportunities in rapidly changing environments. This paper draws on the theory of dynamic capabilities (DCs) to explore the effect of mobile app usage on the DCs of SMEs in Nigeria from a critical realist viewpoint. The DC framework is a strategic management paradigm that describes how organisations create, modify and/or recombine internal and external competencies to remain relevant in a rapidly changing environment [2]. The research investigated the role that mobile apps could be playing in enabling SMEs to function optimally within their contexts. Critical realism (CR), as a philosophical paradigm, aids in uncovering the underlying mechanisms that affect the DCs of SMEs in using mobile apps to sense opportunities. Specifically, the research aimed at answering the research question: *How does mobile*

app usage influence the dynamic capabilities of SMEs in Nigeria from a critical realist viewpoint?

The remainder of the paper is structured as follows: the literature is reviewed, followed by the research approach. The findings are then presented in the next section. Finally, inferences, areas for further research and limitations are described.

2 Literature review

2.1 Small and medium enterprises in Nigeria

According to the Central Bank of Nigeria (CBN), 96% of businesses in Nigeria are categorised as small and medium enterprises [3]. SMEs are defined by the National Council of Industries as businesses with 5 to 199 employees and total costs excluding land of not more than 500 million naira (equivalent of US\$1.30 million). A major characteristic of Nigeria's SMEs relates to ownership structure or base, which largely revolves around a key individual or family. The majority of the SMEs are either sole proprietorships or partnerships [4]. They tend to survive financially, provide for families and sustain their businesses due to their dynamism, innovations, efficiency and small size, which allows for faster decision making [5]. SMEs are beneficial to the growth of Nigeria's economy as they provide the breeding ground for the development of entrepreneurial and managerial talent, the critical shortage of which is often a great handicap to economic development. The continuous development of these highly skilled resources and strong information technology adoption are key to the sensing and seizing of new business opportunities. Oyelaran-Oyeyinka [6] states that the enabling factors that drive SMEs in Nigeria include a basic technology knowledge base, entrepreneurship, legal and regulatory structure, basic physical and technological infrastructure, and financial and incentive structures.

2.2 Mobile apps

Mobile apps have been a driving force in the success of some of the world's most valuable organisations, allowing them to operate a unique business model driven by seamless global operations [7]. Mobile apps have enabled organisations to serve their customers and win prospective business by mobilising their desk-based operations to increase business productivity and achieve market advantage [1].

According to Bezerra [7], the adoption of mobile apps can enable fast-growing SMEs to grow their revenue two times faster and add jobs eight times faster than their competitors. Mobile apps enable SMEs to seamlessly take effective decisions and planned and strategic risks while carrying out their business processes [8]. Mobile apps have changed the business landscape for SMEs, creating a new channel for communication, on-the-go customer engagement, promotion of products and services, point-of-purchases for products and customer service, and facilitating multitasking and effective decision making of SMEs. Mobile app usage has changed the way SMEs do business in Nigeria and achieve market advantage over competitors. The research therefore sought to provide answers to the following research sub-question:

SR1: *What mobile apps are predominantly used by SMEs in Nigeria?*

2.3 Dynamic capabilities

DCs are defined as the ability to achieve new forms of competitive advantage by integrating, building and reconfiguring internal and external competencies to address rapidly changing environments [2]. The DCs of SMEs can be harnessed to continuously create, upgrade and keep relevant SMEs' unique asset base by aligning their resources with market needs through the sensing of opportunities [9].

Sensing opportunities involves the ability of SMEs to identify how to interpret new events and developments, which technologies to pursue and which market segments to target [9]. SMEs need to continuously improve on their capabilities to sense new opportunities. They are able to gain competitive advantage in dynamic environments when they consistently develop and renew capabilities over time as new goals appear, in order to respond to opportunities [10].

Owoseni and Twinomurinzi [11] identify the following DCs among SMEs in Lagos: collaboration and product repackaging, repricing of offerings, customer feedback, referrals and usage of social media and the internet as adaptive DCs, imitation and adaptation of product offerings and product packaging and price adjustments of product offerings as innovative DCs. Teece [9] suggests that each of the above DCs dovetails into the micro-foundation of DCs: the ability to sense opportunities, which leads to business transformation. This paper focuses on the ability of SMEs in Nigeria, beyond Lagos, to sense business opportunities using mobile apps.

In the next section, the philosophical lens that guided the research, critical realism, is presented.

2.4 Critical realism

Critical realism (CR) is a realist meta-theoretical social paradigm by Bhaskar [12] to illustrate the significance of well-understood objectivity by distinguishing knowledge from existence. CR defends the critical and emancipatory potential of rational enquiry and was well suited to this research in exploring the DCs of SMEs while using mobile apps. CR can aid in uncovering the mechanisms behind mobile app usage whether these are empirically observable or not. In CR, the researcher is encouraged to use his/her own experience in a rigorous manner to assist in the development of plausible and defensible explanations [13]. The ideological perspective of CR illustrates that the world exists independently of what we think about it [14] by merging a realist ontology with a relativist epistemology to evaluate the underlying mechanisms and structures behind phenomena, to create theories that are not just concentrates of data [15].

CR served as the philosophical foundation to uncover the underlying mechanisms that enhance the DCs of SMEs in sensing opportunities using mobile apps in Nigeria. According to Bhaskar [12], an objective reality can be identified and described in three hierarchical strata of reality – the real, actual and empirical.

The *real* includes social structures, natural objects and powers that actually exist whether we like it or not, independent of our perception of them. Some are observable and others are not. Causal generative mechanisms emerge from the social structures in the *real* domain of CR [16]. These causal mechanisms produce the events which we wish to uncover in this study [17]. The *actual* domain of CR consists of observable events that occur as a result of the interactions of causal mechanisms (i.e. the *real*) [17]. The *empirical* is a CR domain where events occur through the observations of ‘experiences’, meaning the noticeable observations of the subjects being examined in this study [18]. This research therefore sought to find answers to the following research sub-questions:

SR2: *What are the causal mechanisms and structures in Nigeria that influence SMEs’ ability to sense opportunities?*

SR3: *What are the observed and unobserved events in Nigeria as a result of the ‘real’ events that influence SMEs’ ability to sense opportunities using mobile apps?*

SR4: *What are the events within SMEs in Nigeria that influence their ability to sense opportunities using mobile apps?*

Figure 1 below illustrates the relationship between the real, actual and empirical domains of CR. It shows how the structures and mechanisms in the *real* generate the events in the *actual*, and how the events that are experienced and observed through analytical methods are generated in the *empirical* domains of CR in SMEs [17].

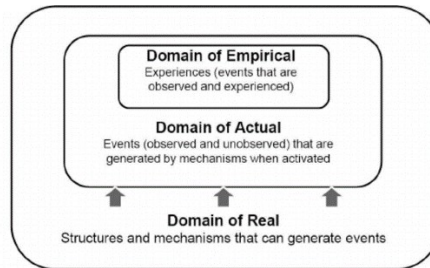


Fig. 1. Domains of CR [17]

2.5 Retroduction

Retroduction is the process of working backwards from the *empirical* to the underlying mechanisms in the *real*, critically aligning the structure and agency of SMEs in the layered ontology, for the purpose of probing, describing or even understanding the effect of mobile apps on the DCs of SMEs [19]. Structure and agency in CR involve the personal and socio-cultural factors in SMEs whose interactions enabled this research to apply retroduction as a mode of inference to investigate the conditions under which each causal mechanism will occur and be observed [20]. Retroduction enabled the critical investigation and discovery of how mobile app usage influences the capabilities of SMEs to sense new opportunities in Nigeria. Retroduction in this instance involved the observation and engagement of experiences of SMEs as decision makers and the real events of SMEs. In retroduction the researcher is encouraged to use his/her own experience in a rigorous manner to assist in the development of plausible and defensible explanations [13].

3 Research approach

This research adopted the qualitative research approach which focuses on exploring and understanding the meanings attributed to a social or human problem to enable a researcher to generate theories through observation [21]. Qualitative research involves questions and procedures to collect data in the participant's setting. The data is analysed inductively, building from particulars to general themes, and the researcher makes interpretations of the meaning of the research data.

3.1 Background of researchers

The primary researchers are practising software developers, with core expertise in operations and service management, process re-engineering and technology advisory services. They have 24 years' experience (combined) in the ICT and financial services sector. They are also managers in the Nigerian financial sector with responsibilities for organisational transformation initiatives, technology advisory management, process improvement and performance management.

3.2 Reliability and validity

The reliability and validity of a research study are essential criteria to determine the quality of research using a qualitative research approach based on credibility, neutrality, consistency and trustworthiness [22]. The researchers ensured that the research findings represented the information extracted from the data collected and were a correct interpretation of the participants' views [23]. Credibility of this research contributes to the trustworthiness of the data collected for the research. This was achieved through prolonged engagement of participants, persistent observations, referential adequacy and member checks [24]. The researchers ensured consistency by following the research methodology until the conclusion of the research, and they ensured neutrality by confirming that the research was free from bias.

In this study, the researchers took the following steps:

1. Critical review of existing subjects
2. Design of a research instrument based on dynamic capabilities
3. Approval of ethical clearance received from the host university
4. Adoption of consistent coding and categorisation methods
5. Review of identified codes and categories

3.3 Case study

A case study is a qualitative research method that investigates an existing phenomenon in its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident [25]. The intrinsic type of case study allows this research to gain a deeper understanding of a particular phenomenon [26]. It enables researchers to collect data using interviews, participant observations, questionnaires, checklists and analysis of recorded data [27].

3.4 Population and sample

The states of Lagos, Oyo, Abuja, Kano and Kaduna in Nigeria made up the population group of this research. SMEs were the unit of analysis. As such, this study used purposive (judgemental) sampling to identify 16 SMEs in the population group defined by SMEDAN [28] to participate in and provide feedback for interviews.

3.5 Data collection

The researchers collected data through fieldwork in the form of interviews. Interviews allowed the views, experiences and beliefs of SME participants on the research subject to be explored. The responses from participants were transcribed into text and analysed using applicable coding analysis methods on Atlas.ti. This data collection strategy enabled data to be generated, which was discussed and examined to provide answers to the research sub-questions.

3.6 Data analysis

Content analysis was used as the analysis method to uncover meaning from the data collected. It offered objective guidelines in the coding of the text and drawing inferences from the data collected [29]. The analysis involved the following steps [30]:

1. Information was extracted on the reasoning of SMEs from feedback received from participants by thoroughly reading through the interview transcripts.
2. Initial codes were generated and categorised by organising the data collected in a meaningful and systematic way. The coding was carried out using the descriptive and in vivo coding methods to assign codes to text and the codes were quantified or counted based on the code frequencies. Coding was carried out by categorising assigned codes based on their relationships to the research question.
3. Abduction reasoning was adopted to understand and analyse the causal mechanisms to generate new theoretical assumptions.
4. Retroduction was carried out to provide explanations on the data gathered and new theoretical assumptions using CR by identifying something significant about the research questions.
5. The theoretical assumptions were connected to generate specific contexts to explain the subjects of study.

4 Discussion of findings

4.1 Demography

The SMEs in this study included 16 business types that cut across 7 industries. The size of the SMEs ranged from 2 to 50 employees with an average business age of 7.5 years.

4.2 Content analysis: critical realist constructs of SMEs in Nigeria

The analysis was structured using the constructs of critical realism: real (causal mechanisms), empirical and actual. 414 unique codes in total were identified. The categorisation of the codes using their anchor codes and frequencies was used to group the codes into 112 real, 41 actual and 261 empirical (supplementary material) constructs.

Real (causal mechanism) constructs of SMEs in Nigeria

The *real* is described as the social structures, real objects and powers that exist independent of our perception of them, whether observed or not.

112 unique codes were identified as real. The unique codes were categorised into 3 groups based on the relationships of the unique codes, namely ICTs (mobile apps) (65), market limitations (5) and organisational constraints (42).

The frequency of codes suggests that mobile app objects exist as causal mechanisms within SMEs. The 16 SMEs that participated in this study used a total of 27 mobile apps with a total usage frequency of 65 and an average of 2 mobile apps per SME. The mobile apps were categorised into 5 categories: payment apps (4), e-commerce apps (3), social media apps (42), productivity apps (15) and custom apps (1). The code categorisation suggests that SMEs use social media apps primarily to sense business opportunities. The top 3 mobile apps used by SMEs were Facebook at 18.4% adoption, Instagram at 15.4% adoption and WhatsApp at 15.4% adoption. Some SMEs used custom-built mobile apps for sales and marketing, and productivity apps for accounting, communications and documentation purposes, while others used e-commerce apps for online sales.

This provides answers to the research sub-question: *What mobile apps are predominantly used by SMEs in Nigeria?*

Feedback received from participants on their usage of mobile apps includes the following:

“yes, we do that through our Facebook and Instagram page and few sponsored ads online through Facebook and Instagram sponsored ad, it is relatively okay in terms of price and it is readily available at any time.”

“diamond bank app, I use them for transferring funds to my suppliers”

“I use the WhatsApp for the WhatsApp status for posting my work and I use it for to interact with my clients my customer”

“Yes, I use LinkedIn mainly to get industry trends, hmmm to get information from other people in the business”

The code categorisations confirm that SMEs use mobile apps to run business operations but encounter unskilled human resource issues, lack of financial access, regulatory issues and taxation issues that affect their capabilities to sense business opportunities.

Actual (observed/unobserved events) constructs of SMEs in Nigeria

The *actual* is described as events that occur whether observed or not as a result of the causal mechanisms identified above. 41 unique codes were identified as actual. The unique codes were administrative operations (9), expenditure monitoring (10),

financial management (3), business reporting (2), create organisational policies (1), outsourcing services (1), project management (2), sales and marketing (5) and knowledge development (8). The frequency of the codes illustrates that various business processes exist as observed and unobserved events in SMEs. This research suggests that these business processes are influenced by the mobile apps used by SMEs to sense business opportunities.

Feedback from the SMEs was as follows:

“The finance being the backbone of the business is managed meticulously with respect to forecast and budget by increasing revenue (price and quality sold) and by judicious spending of expenses where necessary.”

“The human/personnel resources department are mainly the ones with the responsibility of knowledge development”

The events identified above provide answers to the research sub-question: *What are the observed or unobserved events in Nigeria that influence SMEs’ ability to sense opportunities using mobile apps?*

Empirical (observed) constructs of SMEs in Nigeria

These are described as events that are observed through formal, analytical and theoretical approaches [31]. 261 unique codes were identified and categorised into 10 groups. The frequency of the code categorisation illustrates that SMEs have various DCs: training and capacity development (52), sales and marketing (26), carry out market research (16), interaction and participation (63), product marketing and research (45), review operations (13), create new product ideas (11), carry out marketing strategy (17), access government SME programmes (7) and product branding (11). This study suggests that SMEs have the capabilities to run their business operations using mobile apps.

Feedback from the SMEs is as follows:

“yes, we do that through our Facebook and Instagram page and few sponsored ads online through Facebook and Instagram sponsored ad, it is relatively okay in terms of price and it is readily available at any time.”

“www.jakesbooksmed.com you can also go on konga and jumia and still have us there as part of our online, you click on jakes books medical equipment on konga, if you google it, it will bring out our shop. The same thing with jumia.”

“and social media of recent which we delve into. So, ICT has helped to showcase our new offering and to reach out to people who we think will need our services”

Other SME participants said:

“No, because I have not heard of such programme organized by government agencies”

“they are not fully up to task and it is a challenge to them even finding most of us and I will actually say they are not up and doing with their responsibility in terms of identifying the right SMEs and providing certain solutions to that problem. So they are not helping boost ability to grab new opportunity”

This study reveals that events generated through observation in the empirical domain of CR in SMEs in Nigeria are their capabilities to manage product sales and marketing, create new product ideas, manage product branding, attend training and

access government programmes. This identifies their existing competencies to gain competitive advantage. The events identified above provide answers to the research sub-question: *What are the events within SMEs in Nigeria that influence their ability to sense opportunities using mobile apps?*

4.3 Retroductive reflection

Retroduction is the process of working backwards from the empirical to the real, attempting to describe the relationships that result in the observable events.

The findings in this study showed that SMEs have the dynamic capabilities despite having to sacrifice in using freely available ICT (mobile apps). The mobile apps enable SMEs to carry out their business processes to sense new business opportunities. These business processes are, however, hampered by market limitations and organisational constraints such as unskilled human resource issues, lack of financial access, regulatory issues and taxation issues. SMEs are therefore forced to learn to use ICT in ways which work for them.

Further, this study reveals that SMEs use ICT to access general market information that is not localised for their environment using the internet. This is not effective for sensing new business opportunities. This leads to SMEs' inability to have adequate information on SME programmes to receive the necessary capacity development and funding support.

The capabilities of SMEs are a result of the usage of different ICTs (mobile apps) as shown in Figure 2 below.

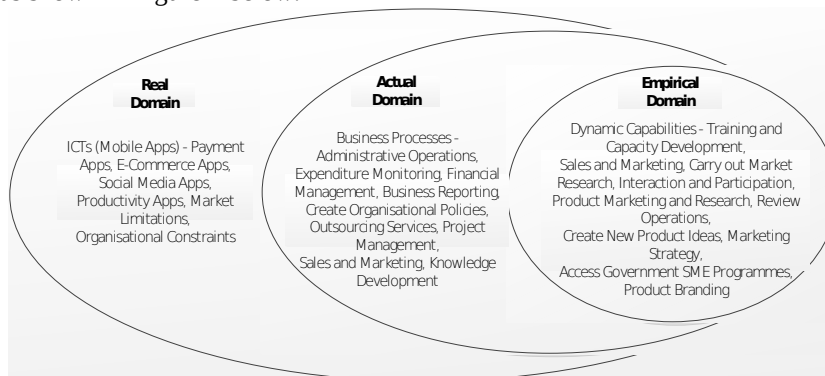


Fig. 2. CR domains of SMEs in Nigeria

They use different types of ICT tools – this indicates the opportunity to create an SME ICT artefact, i.e. mobile app, that improves the DCs of SMEs to overcome the market limitations and organisational constraints in Nigeria. Also, the artefact should integrate with SME government agencies to enable SMEs to easily access localised information on market trends, developments and SME programmes. The artefact should allow SMEs to enhance their capabilities to carry out business processes effectively in sensing new business opportunities.

5 Implication of research findings

This research positioned itself within the CR perspective to understand how mobile apps influence the capabilities of SMEs to better sense opportunities in changing market dynamics through reproduction. In this study, the real constructs of CR in SMEs suggest that causal mechanisms and structures that affect SME capabilities to sense business opportunities in Nigeria are ICTs (i.e. mobile apps), market limitations and organisational constraints. The actual constructs of CR in SMEs suggest that the observed or unobserved events in Nigeria that influence SMEs' ability to sense business opportunities are their business processes. The generative mechanisms identified in this research are the ICTs (mobile apps) used in SMEs in Nigeria, namely payment, e-commerce, social media and productivity apps.

In Nigeria, the unstable policy environment and the ineffective policy implementations by critical government agencies have impacted on economic growth and development [32]. This has raised the need for SMEs to constantly look for alternative ways of exploring new business opportunities [33].

Conclusions were drawn about how the use of mobile apps can influence the capacity of SMEs to sense business opportunities in Nigeria. Based on the findings stated above, there is a need for SMEs to use mobile apps to easily access government programmes, attend training, manage projects, carry out research on markets and products, access market reports and provide customer support.

6 Contribution of study

This research presents a critical realist investigation of the real, actual and empirical domains of CR in SMEs in Nigeria. The result of this research serves as a methodological and practical contribution to knowledge which can be adopted by SMEs to use mobile apps effectively to sense new business opportunities. This study also provides details for solution requirements to develop an SME contextual mobile app to enable access information on government programmes, renewal of organisational processes, allocation of resources, knowledge development and transfer, and effective decision making.

7 Conclusion

This study examined the effect of mobile apps in SMEs to sense new business opportunities in Nigeria. The research was conducted using a qualitative research approach from a critical realist viewpoint. The study suggests that despite the existence of government support for SMEs across Nigeria, these programmes are generally inaccessible and do not include the important ICTs or mobile apps.

This study confirms that ICTs (mobile apps) (real domain) are used by SMEs to carry out business processes (in the actual domain). These are influenced by their DCs such as (empirical domain) sensing new business opportunities in Nigeria. SMEs in

Nigeria satisfies with free apps for banking, e-commerce, social media, productivity for their sales and marketing, collaboration and payment operations.

There is an opportunity to develop an ICT artefact (preferably a mobile app) that is better suited for SMEs to enhance their capabilities to carry out business processes effectively.

8 Limitations of the study

This research focus was limited to DCs in Nigerian SMEs. Further research should be considered to identify the adaptive, absorptive and innovative DC manifestations of SMEs in Nigeria and how mobile apps influence the DCs.

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