

Digital transformation: An information technology tool for small and medium-scale enterprise development in Nigeria

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Abstract:

As businesses adopt cutting-edge technologies to remain competitive and relevant, there has been a noticeable trend in the last several years toward digital transformation (DT). Small and medium-sized businesses (SMEs) are essential for fostering economic expansion and development in many developing nations, including Nigeria. But in a fast-paced, aggressive business world, small businesses frequently encounter a variety of difficulties. This study investigates how important DT is as an information technology (IT) tool for the growth of SMEs in Nigeria. The study shows the possible advantages and opportunities that DT can present to SMEs through an in-depth investigation of the available literature, case studies, and empirical data. The study begins by examining the current situation of SMEs in Nigeria and highlighting the common barriers to their development and prosperity. The Imperative areas in exploring the Transformation of SME's in Nigeria were explored, with a focus on how it might improve customer experience, streamline company operations, and stimulate innovation. Additionally, the study probes particular IT tools and technologies with potential for SMEs in Nigeria. Cloud computing, data analytics, the Internet of Things (IoT), artificial intelligence (AI), and other tools are some of these. The report also discusses the difficulties and potential hurdles that SMEs may encounter when implementing DT. The Success factors for implementing DT in Nigerian SME's were highlighted for SME's development in Nigeria.

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1. Introduction

The dynamic nature of business environment with its rapidly advancing information technology (IT) capabilities opens up for new ways for enterprises to organize themselves in terms of business models, practices, and processes, how they communicate with their customers, deliver services, and perform product development etc. [1]. This constitutes the foundation of a digitally transformed society that brought about the massive use of different digital technologies, and serving different purposes with different strategic assets through digitalization [2]. The concept of digitalization is the process of introducing and enhancing digital technologies, within the context of business and value creation models. DT has become inevitable in organizations and society forcing diverse transformations to remain competitive [3]. It tends to describe the use of innovative technologies that can dramatically change a firm's performance, operational efficiency and offerings [4].

In general, DT describes the shift from traditional (often physical) creation and delivery of customer value, including the operational procedures related to this, into the

massive use of digital technologies which enhance or replace the traditional product with smart, connected product [5]. Effective adoption and use of transformational technologies requires an organization to have a flexible IT infrastructure that cause significant effects on productivity in all ramifications, which create big potentials in the development of industries and economies. DT generally affects the whole/part of the organizational structure, its Strategies, Technology, customers, People and culture that forms the Enterprise as illustrated in the Figure 1.

The above framework generally defines and describes each action field/dimension and reveals how different activities can support organizations on their DT. From the IT perspective: the IT solutions and application that are used at the enterprise are classified into Enterprise –IT (E-IT) and Product-IT (P-IT) [1]. The E-IT supports the functioning and operations of the enterprise, and is sometimes referred to as Enterprise Information Systems (EIS) that includes ERP components. While the P-IT refers to the use of smart and connected products that generates large amount of data via modern communication tools.

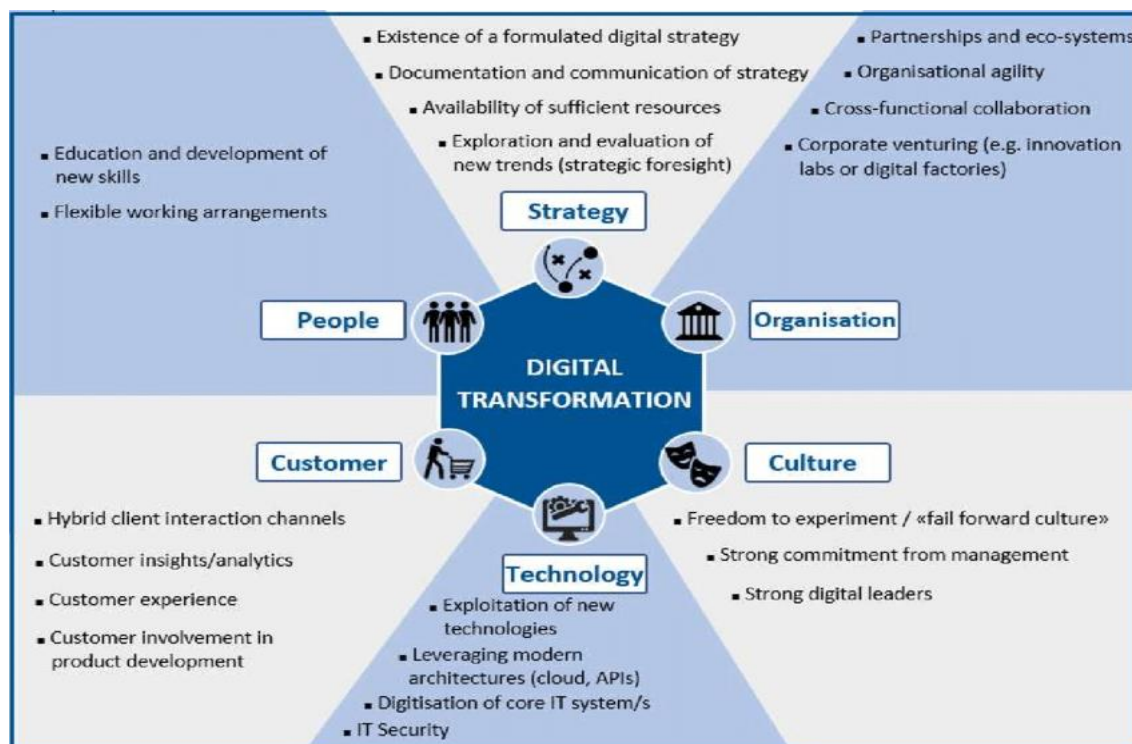


Figure 1: Effects of DT to the Organization [6].

These tools are usually IT-components built into products. Big data and analytics, cloud computing, mobile computing and social technologies are critical parts of the infrastructure in enterprise DT that provide profitability, higher revenues with expanded market valuation than competitors without a strong vision [7].

The lack of widespread adoption and efficient execution of DT in small and medium-sized firms (SMEs) in Nigeria is the issue this study attempts to solve. Despite the potential advantages that DT may bring, a lot of SMEs encounter difficulties when attempting to incorporate IT tools and technologies into their operational processes [8]. SMEs' three main resources on DT includes: digital technology, employee digital skills, and DT strategy affects SME performance, and the three resources are positively correlated with SMEs' DT [9]. This study intends to comprehend the issues impeding the adoption of the DT in Nigerian SMEs and identify solutions, thereby promoting the growth and development of these businesses in the digital era.

Although the volume of research on DT and its effects on businesses in industrialized nations is expanding, there is a large knowledge vacuum regarding the unique situation of SMEs in Nigeria [10]. There is a dearth of thorough study that addresses the particular difficulties and opportunities faced by Nigerian SMEs in embracing and utilizing the potential of IT for their development as a result of existing studies predominate focus on DT in large enterprises. Coupled with the new global project – "Going Digital: Making the Transformation Work for Growth and Well-being" launched by the organisation of economic cooperation and development (OECD) in an increasingly digital and data-driven" world [11].

2. Enhancing Nigerian SME's through DT

In Nigeria, the adoption of mobile phones, social media and internet technologies has reached new levels in recent years, with internet penetration increasing at about 10% every year, and active GSM subscriber lines growing from 145 million in 2017 to 184 million at the end of 2019 [12]. This makes the digitization and transformation of the business model crucial for building a competitive advantage and preserving the competitiveness of the local and international market for all organizations [7]. It is applicable in various sectors of Business, Finance, Agriculture, Education, ICT, fashion, real-estate, media entertainment, logistics services and insurance etc.

SME's play a crucial role in the economic development of any nation, it create jobs opportunity, boost economic activity, enhanced economic growth and development and are vital for nation wealth creation, despite their size and capital ventures [13]. While In Nigeria, they specifically contribute approximately 90 percent of number of business enterprises but contributing less than 10 percent to the country's GDP. In most developing countries, SME's have lower implementation as the core business functions and different challenges as compared to the SME's in developed countries [14]. The SME sector is widely recognized as a key driver of economic development and job creation in both developing and developed nations [15].

All the three levels of Management (Strategic, tactical and operations) are directly involved in the processes of DT due to the important role it performs in enterprise development. This role enhances the capability of SME's in Nigeria to achieve modernized process, Optimized workflow, Strengthen security and Increase profitability across the globe.

The transformation of SME's in Nigeria demands the use of numerous digital technologies with focus on development, such integration can be supported with unlimited possibilities of the technologies with a tactical strategy. The Success of DT for SME's development requires reengineering processes in the most unique appropriate way that fits into the organization and environment. The different phases of digital changes toward DT have important strategic imperatives for firms that specify their impacts on required digital resources, organizational structure, digital growth strategies, and metrics [16]. A single platform is required to integrate all business units in the organization, to achieve DT. According to Ifeoluwa, *et al.* [17] DT has urged non-tech micro, small, and medium enterprises (MSMEs) to adopt digitalization and technology to accelerate growth with Gross Domestic Product by N53 billion.

3. Imperative areas of transformation in SME's

The approach to exploring DT of SME's in Nigeria is the grouping of changes in robust and flexible strategic imperative areas. The imperative areas emanate from the drivers of DT in digital technology, digital competition, and digital customer behaviour [16].

3.1 Digital resources

Digital Resources represent a firm's ownership and control of assets and capabilities. The assets represent the enterprise resource from physical and intellectual view, while the capabilities usually focus in human, information, or organizational capital. Merging the resources together enable successful deployment. In pursuit of DT, the firm's re-define the way it creates and delivers value to customers by acquiring or developing new digital assets and capabilities. The most essential digital assets and capabilities needed for digital change includes digital assets, digital agility, digital networking capability and big data analytics capability [16].

3.2 Organizational structure

Apart from the digital resources needed to achieve DT, a key issue to consider is the organizational changes needed to adapt to digital change [18]. It specially regards to organizational structure that is flexible, and composed of separate business units, digital functional areas with agile organizational set up.

3.3 Digital growth strategies

There are different digital growth strategies for digital firms. The most prominent growth strategy involves the use of digital platforms that delineate the variety of growth strategies across DT phases. This indicates that platform strategies are more common for the more persistent phases of digital change. Digital growth strategies are unfolded in market penetration, product-based market development, platform-based market penetration and product development,

3.4 Metrics and goals

There is need for SME's to measure the performance improvements in order to explore the full potential of DT. The performance improvements are scaled based on key performance indicators (KPIs) to facilitate the improvements and update of the business model. Revenue generation, optimization of products and services, and improved investor value are the goal of new business models as generated by DT.

4. IT's in SME's digital transformation

The exploitation of new technologies, leveraging modern technology architectures (API's), Digitalization of core IT system/s and IT security are the main focus of IT technologies in DT of SME's, specifically in the following areas.

4.1 Cloud computing

This is a new and potential technology for the enterprises. Cloud computing is a model that enabled convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services). It can be rapidly provisioned and released with minimal management effort or service provider interaction. Most companies from diverse markets niche and sizes increasingly rely on public cloud services; though some differences may however be apply. The SME's benefits from cloud computing in:

- a. Expectable costs: cloud services are typically paid on a monthly basis or based on use with little or no upfront costs, thereby predicting the cost of services as expected.
- b. Reduced total cost: benefits of cloud services derived from economies of scale that a service provider can achieve.
- c. Access to the best and best technology: cloud services enable organizations to benefit from the best and latest technologies, without making any initial costs.
- d. Pay per use: in the model of cloud services, organizations pay for actual rather than maximum use.

It is predicted that by 2025 all ICT business solutions will be realized in a cloud, which means they will use cloud technology and cloud models. More than 85% of corporate applications will be located directly in the cloud [7].

4.2 Mobile technology:

Mobile technologies realize the goal of DT in SME's. It provides a seamless interaction between the customers at all touch points with businesses. The growth of a mobile digital business platform is primarily based on smartphones or tablets development that transform society and the global economy. The use of Mobile technologies improves productivity, portability, and work mobility. These further the integration and digital collaborations that provide profit to SME's.

4.3 The Internet of things (IoT):

This is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items. It is embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. The Global Standards Initiative on Internet of Things (IoT GSI) defined the IoT as "the infrastructure of the information society." IoT's in SME's allows objects to be sensed or controlled remotely across existing network infrastructure. It creates opportunities for more direct integration of the physical world into computer-based systems, and results to improved efficiency, accuracy and economic benefit in addition to less human intervention.

4.4 Bigdata and data analytics

The volume of business data is increasing by seconds, such data requires a medium of manage and analysis to extract insight. As a challenge, it's no longer efficient for data warehouses (DWs) to manage heterogeneous information loads. Therefore, pooling data resources in a cloud model allows for greater flexibility and faster innovation for dynamic business demand. Cloud computing has changed the parameters that have enforced the traditional relational database restrictions because it delivers dynamic resource allocation, virtualization, and dramatic economies of scale for managing large amounts of data. SME's fully extracts business insights from Business Intelligence (BI) tools like Google BigQuery web service for big data and Google CloudSQL for relational database.

4.5 AI and ML algorithms

Artificial Intelligence in the form of bots or Machine Learning algorithms come into play as information analysers and advisers in finance, health, recruiting, fast-moving consumer goods, logistics, insurance, land registration in government and agriculture with the intent of aggregating and making sense of big data repositories to introduce market efficiencies [19].

5. Barrier and key drivers for SME's DT in Nigeria

The main difficulties and obstacles to the digitization of SME's in Nigeria are not only technologies. The barriers and critical influencing factors which affect DT were identified through thematic analysis and categorized into technology, organizational and environmental factors presented as ten critical influencing factors [20].

5.1 Digital technology adoption costs

The deployment of DT infrastructures requires the deployment of new technologies and systems in organizations. An initial cost will be attached: which could include staffing cost, the cost of software, cost of hardware devices and general operational and maintenance costs. In the SBEs study, the average initial costs in the adoption phase were about 0.9m naira [20]. This constitutes a

sizeable investment that could deter a lot of SME's in Nigeria from embarking on DT initiatives.

5.2 Information technology skills/expertise

The deployment of Digital technologies requires specialist with IT skills, which are rarely present in Nigeria SME's. For any SME to effectively embark on DT initiatives, it will require professional third-party IT expertise. Most of the company staff will also need to be proficient in the use of IT resources and this is problematic in many Nigerian SMEs, where 90% of staff are semi-skilled and have little or no IT skills or experience.

5.3 Perceived benefits

With the limited resources in SME's it becomes difficult to adequately utilize those resources in areas where the business expects value to be delivered. There must be clear perceived benefit for it to be worth investing for SMEs to embark on DT initiatives.

5.4 Technology adoption

The adoption and use of digital technologies by SME's in a particular industry/ sector often trigger a key influence for new entrants and startups to deploy similar technologies. Likewise, when first movers or business partners utilize digital technologies for their core business processes. It serves as motivation to invest in the new technologies by the partner SME.

5.5 Owner's perspective to change

Most of the SMEs in Nigeria are run by one owner or at most, a partnership of two/few people. The key business decisions are made solely by the owner, whose perspective may thus critical to DT initiatives. The company leadership must be in favour of the deployment of digital technologies to improve efficiencies, outperform competition and improve customer experience. Lack of such leadership skill: buy-in or limited perception of the productivity gains that DT initiatives offer will likely lead to non-adoption by the SME.

5.6 Effective internet services

A Ubiquitous internet network infrastructure is required for SMEs in Nigeria to ultimately transform digitally. There is need for internet to be suitably available at the business premise: office and work locations at a suitable cost/rate. This remains one of the critical issues affecting DT in Nigerian businesses. A tight cost control of internet services is often of paramount importance; internet costs are particularly relevant in an SME environment.

5.7 Evolution of customer/consumer needs

Many SME's that engage in DT initiatives aim to improve customer experience, digitalize services and products. Customer and consumer views are essential to most aspects of SME operations, and in Nigeria they often influence the adoption and use of digital technology. The use of smartphones in by Nigerians is increasingly making users to expect delivery of digital services. Mobile-based

and web-based services are determined by focusing on retail sales in some industry sectors. The growing IT awareness and day-to-day familiarity with digital devices of a company's customers need is driving the adoption of digital technologies in SMEs in Nigeria.

5.8 Government policies and regulations

The government policies regarding the adoption of digital technologies by SMEs in Nigeria are at its infancy stage with less motivations. The move to digitally transform SMEs in Nigeria could be promoted and advanced through Government interventions, subsidies for appropriate technology investment, and support for skills development. Government agencies and ministries should digitally transform its functions to set examples as enablers to the SME's.

5.9 Trust/ security concern

Trust and Security concern are vital issues affecting DT in Nigerian SMEs. These issues can be seen as a multifaceted factor as it relates to staff trust, security and confidence in the digital technologies being used in the company. The customer/consumer trust in online payment systems, online purchases, and the technology regulatory environment security is relatively low.

5.10 Power availability

The availability of Power is paramount amongst the key issues influencing DT in Nigerian SMEs. On average, Nigerian businesses lose about 10 hours a week as a result of power loss [20]. This has a significant impact on businesses reliant on digital technologies and IT systems, making it very difficult to work productively in these periods. Many companies have sought alternative sources of power, such as the use of generators, solar panels and inverters which hinders DT progress in the SME's sector.

6. DT implementation in Nigerian SME's

To remain relevant and competitive in Nigeria economy today, an SME must embrace a DT strategy. The advantage of implementing the appropriate technologies in SMEs will enhance overall performance as twice as digital laggards [6]. To be successful, DT does not have to be complicated but rather concentrate on projects with the highest return on investment. According to Azevedo and Almeida [21], a DT expert opines three critical factors for every successful DT, this includes Strategy and mindset, skill and technology of which must have a perfect balance to achieve the success. To implement the strategies there is need to adhere to the following issues with regards to any SME development in Nigeria.

6.1 Organizational change management plan

To implement a successful organisation, change management, organizations should apply diverse strategies and actions. And should include Plans in prioritizing the strategies accordingly, emanate transformation from Top management levels, provide a roadmap to help employees to understand the aim of the

organizational interest, monitor and measure in order to evaluate the entire process continuously.

6.2 Up-skilling and recruitment of expertise:

The shortage or lack of expertise should be understood and devise means of investing in to human resources that make use of Digital resources. Further more employees should be trained to use new tools and adopt new trends for development. A key to digital success of organizations' is to begin the change with humans and not technology by involving the whole team from the beginning to the end.

6.3 Meeting customers need:

In order to meet customer's expectation and needs, organization should be updated with new trends, methods and technologies to enhance their experience.

6.4 Digital transformation security:

All security controls and policies should continuously be reviewed to preserve the integrity, confidentiality and availability of resources. Implement risk management techniques to safe guide the use of technology by users.

6.5 Digital transformation budget planning:

Organizations should imbibe a financial roadmap to facilitate the transformation process with priorities, timeline and plans. It should be prepared based on overall aim and should be flexible to accommodate future challenges.

6.6 Government intervention:

The government should improvise more soft policies with supportive environments for SME's in Nigeria. It should provide incentives to invest in the vast technology that would be of benefit. It would further encourage in-country production of appropriate hardware and software systems for utilization.

7. Conclusion

SMEs in Nigeria are looking for a good business environment that does not negatively affect corporate flexibility. One of the key success factors in the global business environment is for any company to be able to adapt quickly and effectively to changes. Such rapid changes are bundled with the right mindset, the right resources, and the right effort.

DT of SMEs is an objective process that responds to changing business environments. Its implementation requires a clear strategy and prioritization with investment into financial resources, digital leadership mindset and active participation/support of all employees in the organization. The speed of flow depends on the complexity and the implementation process of any transformation. Prompt development in DT with global connectivity is the current trend as the world economy is transforming into a digital economy with a proliferation into IT tools: cloud computing, big data and analytics, mobility and broadband connectivity, e-commerce, social media and the use of smart sensors and the Internet of Things. Therefore, this

DT piece of SMEs in Nigeria context serves as blueprint for transforming Nigeria's economy and societies. It is hoped the findings presented here may be of interest and value to those pursuing such initiatives.

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