Digitizing Public Institutions on the Example of the National Water and Electricity Company (NAWEC) of Gambia

Jim Secka[1], Joanna Wiśniewska[2], Ibrahim Ismailov[3]

Abstract:

Purpose: The study seeks to examine the barriers and drivers of digitization in a typical public organization, with promising potentials to improve service performance in Gambian public sector notably utilities.

Design/Methodology/Approach: Qualitative research method is used to analyze the case relying both on primary and secondary source of data. A literature review was conducted to understand factors that influence digitization in public institution. Due to its scientific relevance, the secondary sources used mainly came from scientific journals. Staff of the institution were also engaged in retrieving firsthand data as to key drivers and barriers of digitalization in NAWEC.

Findings: The findings show that National Water and Electricity Company is constraint with numerous challenges in its digitalization ques. The challenges are handful, but the following stand out, inadequate finance, inadequate skills(digital) personnel, and lack of modern digital tools and equipment. Key to the drivers found include management such as the decision-making structure of the organization, technology, and digitalization interest of customers.

Practical Implications: To support digitization, NAWEC must quickly adopt new processes, adopt agile and operational methods, and new organizational structures. In a nutshell, digitization in the public sector has emerged to rethink existing processes and services and create better user experiences for citizens and businesses, which are at the heart of these efforts.

Originality/Value: To support digitization, NAWEC must quickly adopt new processes, adopt agile and operational methods, and new organizational structures. In a nutshell, digitization in the public sector has emerged to rethink existing processes and services and create better user experiences for citizens and businesses, which are at the heart of these efforts.

Keywords: Digitization, digital transformation, public sector, digitization barriers, digitization drivers, digital government, and organizational change management.

JEL Classification: O31, O32, O33, O43.
Paper Type: Research article.

[1]*Doctoral School, Institute of Management, University of Szczecin, Poland*
Jim.secka@phd.usz.edu.pl;
[2]*Institute of Management, University of Szczecin, Poland, joanna.wisniewska@usz.edu.pl;*
[3]*Faculty of Economics, Finance and Management, University of Szczecin, Poland,*
235418@stud.usz.edu.pl;

1. Introduction

Increased accessibility, availability, and affordability are the most common demands from consumers in this modern-day period. This is a development that has gained a substantial base in the contemporary consumer request, whether the services lie in finance, water & electricity, health care, or transportation. The Internet, smartphones, and other technologies sprung from the digital age have helped people gain better experience in and mindfulness of what they anticipate from a service pro.

To this extent, public service, just like other diligence, also benefits from new technologies and digital inventions, as it seeks to drastically reduce our everyday lives challenges and help us produce more sustainable services for all citizens anyhow of their gender, race, or age. The use of different digital technologies tools can drive public organizations to contemporize and improve their internal processes and deliveries.

Public sector organizations need to redesign both their external and internal communication processes, with affordable and improved styles to upgrade information reach and to do effects that they couldn't else do. Thus, need to seek and provide answer to the research question; *Which drivers are central in digitalization as opposed to barriers in public sector organization, and how does these constraints affect its digitalization process*?

Notably, the everlasting issue of scholars and policymakers in establishment, and enhancement of information creativity could be realized. However, digitalization has theoretically challenged the decision-making processes of public organizations requiring more practical approach to new novelties. It has made service delivery more transparent, and citizens inclusive demand more from the state corporations.

The execution of digital technologies in public organizations has been delicate, and incomplete due to the way it's structured, which causes hindrances in their performance of undisrupted and affordable services. Equally, the rapid changes in other macro-environmental factors such as the development of technology and posterior changes in social trends produce a gap in the strength and capabilities of public sector organizations. Hence, this indicates the need for new organizational results to make this public service robust, flexible, and adaptive.

Within this complex and changing terrain, public service organizations continuously bear to modify how they operate to new realities. The operational modalities of many organizations, including that public sector associations, are being disintegrated by digital inventions. The public sector must make deliberate sweats to change its business execution to suit the digital technologies being espoused to be successful with digitalization. In substance, the public sector needs to introduce more convenient approaches suitable to digitalize the public service.

2. Literature Review

Digitization in the public sector is so different from the private sector that there are a few sources on how it should be defined. Based on expert interviews with 40 digitization and public service professionals in 12 different countries, Mergel *et al.* (2019), defined digitization/transformation in the public sector as a holistic effort to overhaul key government processes and services beyond traditional digitization efforts. It is evolving along a continuum of transition from analogue to digital towards a complete review of policies, current processes, and user requirements, leading to a complete overhaul of existing and the creation of new digital services.

The result of the digitization efforts focuses on the satisfaction of user needs, new forms of service delivery and the expansion of the user base, among other things. According to this definition, digitalization in the public sector means not only the conversion of analogue and manual tools into digital tools, but a comprehensive organizational transition to new tools, guidelines, work processes and procedures.

We will adopt this definition for this study as it fits both the case and the research question. One way to study digitization in the public sector is to use an institutional lens Dimaggio and Powell, (1983).

From an organizational perspective, the adoption of new technologies is constrained by institutional norms, agreements, rules, and modes of operation. However, the introduction of new technologies will in turn affect organizations Fountain, (2001). Therefore, barriers are defined to a large extent by the technological solutions and work processes that the organization is using at any point in time. Another way to look at it is to look at technology adoption from a change management perspective.

From this perspective, the political context of democracy and the legal context of legislation, rules and bureaucracy are likely to influence the digitalization process Kuipers *et al.* (2014). The context of the public sector is therefore relevant when it comes to obstacles to the digitization process. The process stages are relevant for considering the events involved in the transformation Pettigrew, (1987).

Meijer, (2006) defined the different phases of the innovation process as -idea generation, -idea selection, -idea testing, -idea promotion. It can be assumed that different contextual factors of the public sector will influence the transformation process in the different phases of the innovation process with different impacts.

When examining the public sector, it is important to note that the various public organizations are interdependent and serve other public institutions in the sense that they are all supposed to work together to provide efficient and reliable services to the public. This interdependence of public organizations is very different from what we observe in the private sector, where organizations tend to operate independently in competition with others.

In this research, for example, I would like to examine the influence of digitization on a public institution in Gambia.

Digitalization in the public sector affects the entire sector and thus change will take place simultaneously at societal, governmental, organizational and actor level Hartley *et al.* (2002). Pettigrew *et al.* (2001) named these different orders of change. The first order is subsystem change, the second order is organizational change, and the third order is sector change.

Studies on innovation barriers in general and on digitization have been extensively examined in the private sector (Grima *et al.,* 2023; Velinov *et al.,* 2023). Public sector studies were few and far between. Meijer defines a barrier as real or perceived features of the legal, social, technological, or institutional context that counteract digital transformation because they limit efforts to reconfigure access to information, people, and services in ways that made possible by ICT.

Considering previous research on transformation barriers in the public sector, we find that sector-level research points to characteristics of the political system, socioeconomic forces, elite decisions, and characteristics of the administrative system as barriers to change.

As mentioned above, the inheritance that public organizations have a multitude of stakeholders can make digitization more complex Perrott, (2009). At the organizational level, Kane *et al.* (2019) identified both behavioral and structural barriers that are driven by the organization's mindset and manifest in the organization's systems. According to institutional theory Dimaggio and Powell, there is reason to believe that this might be even more evident in public organizations since both systems and ways of thinking are institutionalized.

Furthermore, research shows that organizations find it difficult to combine innovation and day-to-day operations within the same organizational structure (Helfat, 2007; Pociovalisteanu *et al.,* 2010). The strategy proves to be an important driver for the transformation in the private sector. In the public sector, strategy is often developed at the government level, and this can pose a challenge for the public organization that needs to implement the strategy that is not created internally Buckley *et al.* (2015).

Finally, at the individual level, we have evidence that different types of leadership influence digitization. This applies to the cooperation between strategic top-level management and IT Hsu *et al.* (2018), Li *et al.* (2019), and Weill and Woerner, (2013).

Organizational transformation can be driven by new digital technologies, yet several barriers can arise and hinder change Moon, (2002). Based on the literature, the barriers are classified as follows: lack of qualified personnel, lack of material

resources, government, and management support. Similarly, the literature also identifies several factors that foster change: internal and external. Internal drivers analyze the presence in the organization that makes the change more urgent.

Table 1. *Identical obstacles and drivers of digitalization in public organization*

Barriers	Reference
1. Inadequate skilled personnel	Ebrahim & Irani (2005); Wirtz & Langer, (2017); Fountain & Osorio-Urzua, (2001).
2. Lack of key stakeholder support	Gascó (2003); Ashaye & Irani, (2019); Al-Emadi & Anouze, (2018).
3. Reluctant to change	Weerakkody et al. (2019); Nograšek & Vintar, (2014).
Drivers	**Reference**
Internal 1. Leadership strength 2. Bonuses and allowance expectation	Dunleavy et al. (2006); Fountain & Osorio-Urzua, (2001); Pedersen, (2018).
External *1.* External shareholders expectation and pressure	Meijer (2015); Mergel et al. (2018)

Source: *Own elaboration.*

3. Research Methodology

Digitization in the public sector has emerged to rethink existing processes and services and create better user experiences for citizens and businesses, which are at the heart of these efforts WB, (2016). This led to the introduction of the concept of e-government, which refers to the use of information and communication technologies (ICT) by public organizations to transform relationships with stakeholders WBIIS, (2016) and then to digital government, defined as a government that is adopting the use of digital data to optimize, transform and create government services Danila and Abdullah, (2014).

Through the adoption of digital technologies, public organizations aim to improve the social well-being and life of individuals as well as to provide more efficient and effective user-centric public services Zhang *et al.* (2015), Linders, (2012).

Furthermore, a consensus seems to be emerging that digitization not only makes service delivery more effective and efficient, but also fundamentally changes the way citizens and service users contribute to public services Castelnovo, (2013). However, the success of digitization needs to be evaluated by citizens and other stakeholders based on their perception of the value created Scott *et al.* (2016), Szeligiewicz-Urban, (2016).

After formulating research problems and questions, it is necessary to clarify the hypotheses. These are conjectures aimed at defining or explaining something that

needs verification, i.e., verification by appropriate studies applied in any science. Hypotheses are statements that are likely to provide an appropriate answer to a previously formulated research problem. No hypotheses have been formulated in this work, as they are not always justified and necessary IBM, (2010).

4.   Research Results and Discussion

This section presents all the important findings regarding digitalization from the National Water and Electricity Company LTD (NAWEC). As the only utility company in Gambia, NAWEC has the mandate to provide stable and affordable electricity supply across this tiny West African nation. Additionally, Water and sewerage services in Gambia are provided by the abovementioned company, a well-established public utility corporation that take care of the generation, and distribution of electricity as well as water production and distribution in addition to sewerage system.

The 1972 GUC Act, which was passed, created the National Water and Electricity Company (NAWEC). The former Water Works and Electricity Department and Gambia Utilities Corporation (GUC) were combined by this act. GUC was reorganized to form the holding corporation Utilities Holding Corporation (UHC) and the private company Management Services Gambia Ltd. (MSG) was the winning international bidder in 1993 for the 10-year lease and management of UHC's assets.

UHC took over the management of the electricity, water, and sewerage services after the Management Leasing Contract (MLC) was decided to be terminated after 19 months. The amended UHC act was revoked in June 1996, and NAWEC was established to operate as a private limited liability company in accordance with the Companies Act.

Currently a government-owned corporation, NAWEC is overseen by a Board of Directors and tasked with the duty of ensuring the affordable, safe, and effective provision of these services nationwide.

4.1 Digitalization Interest of NAWEC

The digitalization interest of staff from the above-mentioned public institution varies from department to the other. Central to the participants engaged, over 40% of the respondents have been collaborating with the corporation for more than ten years. While only 30% served within the range of a decade or less. There has been a fewer number for those with five years' experience and less, summing a total of 30%.

As can be seen from the chart above a greater percentage of the staff interviewed are long-serving employees with a decade minimum experience. Therefore, it can be qualified that respondents to be experienced in the organizational functions and thus

their input can be heavily relied on in accessing digitalization interest and its challenges in NAWEC.

Figure 1. *Digitalization interest of participant*
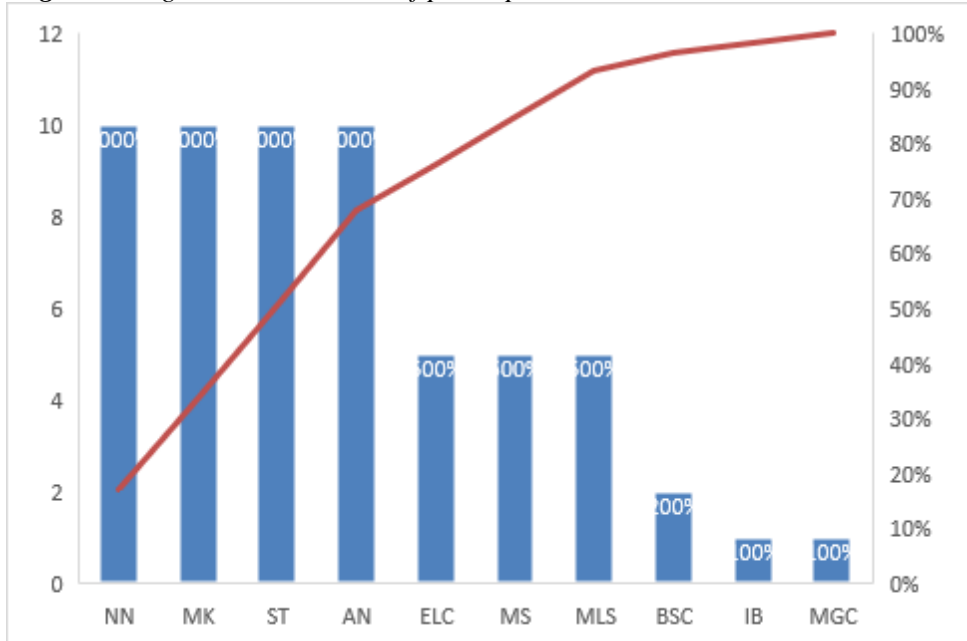
Source: *Own elaboration.*

Seeking to further understand respondents' interest in terms of digitalization from respective departments of the organization. Their responses clearly indicates that, staff of this public institution of the Gambia are a bit interested in digitalization as they understand its significant to their corporate functions and as well productivity.

However, the level of digitalization interest among the selected respondents seems almost equal as only six among the ten participants have strong interest in digitalization while remaining four participants only agreed with digitalization or shared a neutral opinion about the whole perspective. Equally, non among the participating staff share a zero interest in digitalization which further supports the above statement that staff of NAWEC are most definitely interested in digitalization and will compromise any traditional modalities to a more advance digital approach.

Which is vital in their efforts to continuously satisfy most importantly the electricity and water need of Gambians. In fact, in a more cost effective and convenient way thereby saving the organizational resources for more pressing and urgent utilities needs and wants.

Regardless of work experience, gender or even department in summary, digitalization is perceived as an important aspect of the organizational work in

providing efficient services to the general Gambian community. The sector in which it operates; energy and utilities is essential towards the wellbeing of all citizens contributing immensely towards the economic, social, and infrastructural development of Gambia.

Figure 2. *Participants level of digitalization interest*
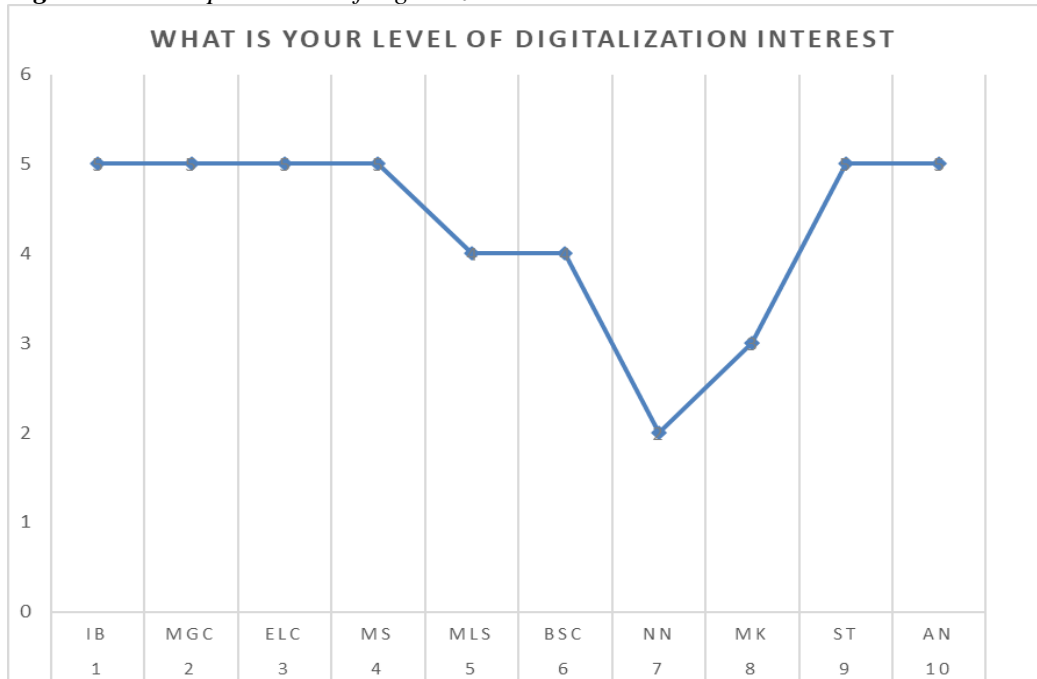
Source: Own elaboration.

4.2 Digitalization Key Drivers

There are numerous drivers of digitalization in many organizations. However, this study focuses on the most: Firstly, with respect to digitalization, management plays a key role in creating the enabling environment that sustains all digital tools and infrastructure for a more effective service delivery.

They provide employees with material tools, training, and supervision necessary for performance. Notwithstanding, management influence is not considered a significant driver by the respondents, yet it does promote the digitalization interest of NAWEC.

Additionally, customer desires are considered vital by nearly one-third of the participating respondents of the said organization. They consequence desires to be more important than the above-mentioned management and this is consistent with the famous saying in marketing that, 'customers are kings and queens' surely based on the fundamental principles of satisfying their needs and desires.

Due to that reason, NAWEC's approach towards satisfying customer desires has not been very excellent and that calls for a more digitalized system for better utilities delivery without many compromises or service lapses. This will surely guarantee continuous patronage from the public and as well cement the trust that is bestowed in the only state enterprise.

Figure 3. *Drivers of digitalization of NAWEC*
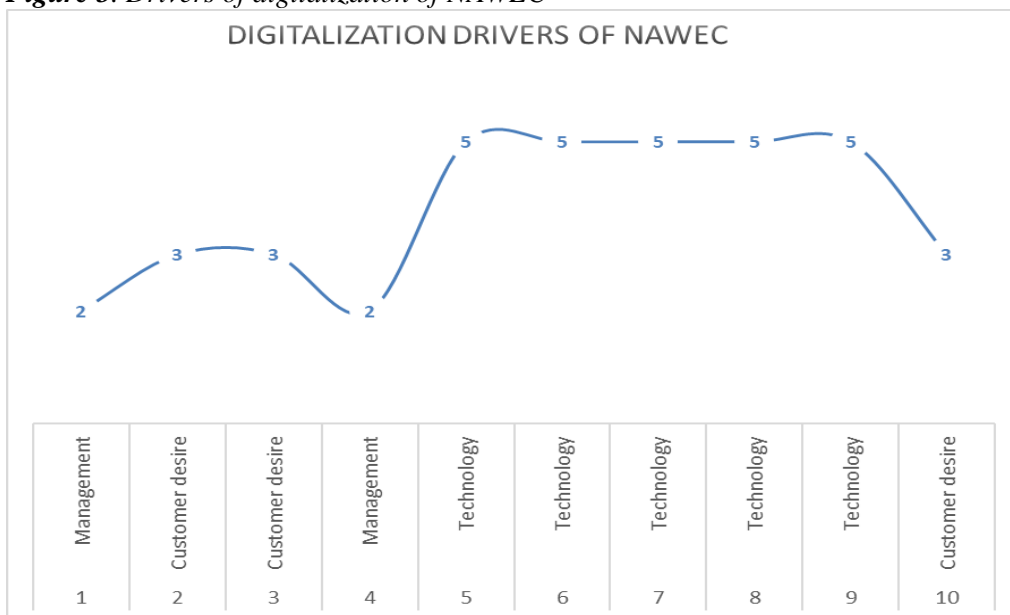
Source: *Own elaboration.*

Furthermore, the integration of digital technologies into all areas of the organizational functions can significantly change the way it operates and delivers values to citizens. Technology has been hugely rated by most of the participants as a fundamental driver in this modern day and age for any genuine state enterprise to do without.

In fact, 50% of the respondents agreed to this driver as the most important because of its role in helping the organization withstand the ever-evolving business environment influenced by macro factors like technology itself, politics, among others.

Finally, Digitalization has the potential to improve work in their organization, sixty percent strongly agreed to the relevance of digitalization towards improving their work standards and as well ease their daily functions. While the remaining forty percent only agree to the potential of digitalization improving their work-related activities in their respective departments.

Equally, a greater percentage of the participants respondents are of the view that

digitalization is not only ideal for improving work in NAWEC but equally served as an opportunity for efficient and effective employee performance.

4.3 Constraints to Digitalization of NAWEC

Digitization has enormously challenged public decision-making processes OECD (2016). This has made society more transparent and the population - citizens - demand more from the state than before. In addition, the implementation of digital technologies in the public sector has been difficult, partly due to its structure, which makes it difficult to implement Heifetz and Linsky, (2014). Also, rapid changes in technological development and subsequent changes in social trends create a gap in the available resources and capabilities of public sector.

NAWEC face several challenges when starting or expanding digitization. Some of these challenges are common to all levels of government, but the challenges are often greater because they tend to have tighter limits on human, physical, and financial resources, and the severity of such limits varies between public organizations. However, the following are the main challenges by participants.

4.3.1 Human Resource Constraints
The implementation and maintenance of digital systems, the requirements for digital skills also include comfortable use of system hardware and software components. And it can be used by non-IT personnel who rely on these technologies to perform their tasks for end users.

Complying with the latter requirements typically requires significant investments in staff training, and training costs should be sufficiently considered when planning a digitization strategy. The lack of relevant skills is a major obstacle to the successful digitization of this state enterprise, NAWEC.

For example, about 30% of the respondents of the organization considered the lack of skilled labor as a major limitation in the digitization of their organization. The need for concurrent management skills would require more management resources and skills if a public sector organization is to survive and thrive with digitization.

4.3.2 Material Tools and Infrastructure
Lack of proper digital infrastructure such as broadband services, secure databases, tools etc. can hinder digitization. Three out of ten respondents recognized the lack of infrastructure as another challenge hindering the digitization of NAWEC.

Specifically, the thirty trusted workplaces could be further enhanced with more digital infrastructure such as screens, broadband and other usable digital devices. In fact, it was stated that it would take forever to reload the desktop when it was unresponsive. He believed that this was due to the long life of the tool and had to be replaced for more efficient productivity.

System failure is another major problem that affects some employees, especially those in the business department. Because they are usually developed for sale and most often their systems experience slowdowns or complete slowdowns due to poor signal or even general connection.

4.3.3 Inadequate Finance

The most pressing challenge mentioned by most respondents is the lack of funding. The National Water and Power Corporation considers funding, a key part of most utilities, to be in short supply. However, their development and digitization were hindered by the lack of money, but more by the desire to ensure a comfortable and satisfactory supply of electricity and water to citizens.

Regarding this challenge, 60% of respondents agreed that it is key for NAWEC as it relies only on service fees and government subsidies to support costs. This is not always enough to cover all digital costs, as it requires a large investment to get up and running.

5. Conclusion

The background of this study was an overview of the most important challenges and drivers of digitization of the public sector, specifically the case study of the Gambia National and Water and Electricity Company (NAWEC). The aim is to improve understanding by examining the barriers and enablers of digitization in a typical public organization with promising opportunities for service and performance improvement in Gambia.

Digitization presents a great opportunity for many large and small state-owned enterprises whose success began in the pre-digital era. If digitization is not considered, these companies will fall behind the needs of their stakeholders. To support digitization, public enterprises must quickly adopt new processes, adopt agile methods, operational methods, and new organizational structures, and prepare employees for change. These are necessary factors that spearhead any digitalization agenda.

However, the finding from this study depicts the following drivers as great motivators in the digitalization efforts of the National Water, and Electricity Company, Gambia.

Management in the case of NAWEC is central to those that hold senior positions such directors and are primary responsible for crafting policies and making important digitalization decisions that affect the existence and operations of the organization. The staff believe more effort is needed in turning the organization into a more digitally friendly in terms of operation and services offered to citizens as an organization.

Additionally, and partly responsible for management is the technology being used by NAWEC. Technology according to this study includes both hardware and software component of digitalization.

This has so far been a better driver for digitalization in the company as it is equipped with some relevant technologies that are being used by staff in the execution of their daily duties. Technology is being considered as the most popular digitalization drivers among member of staff of NAWEC.

Security threats are also considered another important aspect of technology that needs revisiting to handle criminal intends and further secure company`s data and information.

Finally, key among the driver is need customer desire. In other words, need to satisfy the public service taste of citizens in a more accessible and convenient way adding more value to the company but as well fulfilling all utility needs of all stakeholders. Customer desire is the second most common driver of digitalization in NAWEC.

This is basically due to the ever-changing customer needs and desire causing the company to initiate and come up with better digitalization strategies to cope with the evolving desires. It required continuous research to understand the change in preference among key stakeholders and as well investment in tools to offer them genuine services that is next to none. Once the company fully seeks to understand and respond to this customer`s needs, it stands a chance of doing it right.

Furthermore, in its digitalization ques, the National Water and Electricity Company is also confronted with numerous challenges to digitally improve and offer standard services. However, the company often prioritizes in terms of its corporate goal and ensuring utility services are continuously provided to stakeholders with any interruption.

Material tools and infrastructure are another important challenge mentioned by some respondents. Devices such as monitors, drives, modems among other tools are essential aspects of the digitalization process, lack of such delay or even jeopardize the company`s strategic agenda.

According to M.S (respondent) certain of the above-mentioned tools are limited in some departments and other with some of these items have been into usage for quite a long time now and need to be change or perhaps upgraded to suit the ever-increasing digitalization functions of the organization.

Finally, more efforts are needed for NAWEC to improve on its digitalization drive especially on key drivers; technology, improving customer desire and more management involvement.

Capitalizing on these drivers can really help the company to stand a stronger ground in pursue of satisfying the ultimate utility desires of Gambians. Management commitment in this aspect is huge as it still falls behind among other digitalization drivers mentioned by the company`s staff.

NAWEC as an organization thus has some challenges to grow from and key among them is the inadequacy to finance most of its projects. Resources in an economic perspective are always scarce therefore the organization; NAWEC should prioritize its digitalization agenda to be more efficient in managing these challenges. The findings from this study are consistent with the literature related to organizational barriers to digitization and drivers supported by researcher Heifetz and Linsky (2014).

And some of the key recommendations includes, Improve the networking capability, and as well synchronization of the company's system into a single system that is dependable for its functional day-day operation and easily monitored by management. This system will rely greatly on good internet and a stable power supply which if coordinated properly can help departments across the company to interact with each other on work-related activities. Promote staff training and development especially digital tools utilization and troubleshooting.

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