Evolution and sustainability of digital transformation in government services:

A case study of Nigeria's Public Sector - the digitalization of the Legal Metrology Agency

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Abstract

This study examines the evolving role of e-governance in improving public service delivery, focusing on the digitalization efforts of the Weights and Measures Department (WMD) in Nigeria. Governments worldwide, particularly in developing nations, face persistent challenges in delivering effective and efficient public services. E-governance offers a transformative path to enhance government processes, citizen connectivity, and civil society interactions.

The core of e-governance is the transformative powers of Information and Communication Technologies (ICTs), which provide three key change potentials for good governance and development:

1. Automation: Replacing human-executed processes involving the acceptance, storage, processing, output, or transmission of information, such as automation of clerical functions.
2. Informatization: Supporting current human-executed information processes such as decision-making, communication, and implementation.
3. Transformation: Creating new information processes executed by ICT or supporting new human-executed information processes, such as innovative public service delivery methods.

These change potentials can bring about five main benefits to governance for development (Heeks, 2001):

Efficiency:

a. Governance that is cheaper: Producing the same outputs at lower total cost.
b. Governance that does more: Producing more outputs at the same total cost.
c. Quicker governance: Producing the same outputs in less time at the same total cost.

Effectiveness:

d. Governance that works better: Producing the same outputs at the same total cost and time but with higher quality.
e. Governance that is innovative: Producing new outputs.

In Nigeria, as is seen in other developing countries, public service has long been plagued by inefficiency, corruption, and bureaucratic delays. Despite reform efforts, quality service provision has remained elusive. However, the Federal Government through the office of the Secretary to the Government of the Federation, OSGF, the Office of the Head of Civil Service of the Federation, OHCSF, the Federal Ministry of Communications and Digital Economy, NITDA, and so on, have implemented initiatives to leverage digital transformation, such as the Government Service Portal and digital tools such as Remita.

The WMD in Nigeria plays a vital role in upholding standards, protecting consumers, and ensuring the integrity of commercial transactions. The department faces challenges related to manual processes, data management, and limited transparency, underscoring the need for a comprehensive digitalization plan.

The digitalization of WMD operations involves a collaborative effort among stakeholders, IT professionals, legal experts, and international partners. The process is envisioned in three phases over 18-24 months, focusing on developing a centralized digital platform, integrating technological solutions, and ensuring change management and employee training.

Successful implementation can bring several benefits, including increased efficiency, transparency, and data-driven decision-making. However, the process faces legal and regulatory challenges related to data privacy, security, and compliance. Continuous stakeholder engagement, capacity building, and transformative leadership are crucial for effective digitalization of the WMD and the broader public service in Nigeria.

Keywords: e-government, e-governance, digitization, digitalization, digital transformation, digital economy, legal metrology.

Funding statement: The study was supported by the Department of Weights and Measures, FMITI.

Ethical compliance: All procedures were conducted in compliance with ethical standards.

Literature review

The evolution of e-government through the use of ICT-enabled innovations that transform organizational structures, documents, and the way services are provided, as well as the overall policy and governance systems, gives rise to digital government transformation. The only constant in the digital transformation era is the constant “CHANGE”. From the perspective of computerization, followed by the period of Information Technology (IT), Information Communication Technology (ICT), and the current period of Digital Transformation, the pattern of government has evolved and innovated over the years, as shown below:

1. 1990-2000, e-government: IT, computerization; world wide web replaces paperwork.
2. 2000-2010, e-government: Investment in ICT. Open government web 2.0; collaborative technologies. e-Governance.
3. 2010-2015, e-government: e-governance, ICT enable innovations, policy innovation, sustainability, digital government.
4. 2015-Digital transformation, e-government, e-governance, digital government, smart intelligent government.

The parameters utilized for the analysis and assessment of the maturity level of the digital transformation of government are drivers, services model, digital system, users, technology, key metrics, and leadership.

Chukwudi referred to smart government as relying on a consolidated information system. As previously mentioned, innovation is a catalyst that leads to the continuous development of digital transformation. As the government innovates digitally, four types of digital innovation are identified:

1. Process: innovations and their effects on public administration processes.
2. Governance (external process): innovation and the effects on citizens and stakeholder engagement.
3. Policy: innovation and how digital technology affects the policymaking cycle.
4. Service: how digital technologies charge public service design and delivery.

The incorporation of digital mechanisms has become a national imperative, particularly in Africa, with a surge in interest and enthusiasm among stakeholders worldwide regarding digital technologies. Ministries, donors, and implementing agencies are intensifying efforts to leverage the power of digitalization, which has the potential to boost citizens' access to public information, streamline data collection for resource allocation, and enhance financial service accessibility through mobile platforms (Steur & Seiter, 2021; Agarwal et al., 2020; Aker, 2017; UNCTAD, 2021).

According to a UN Study in 2001, almost all developed nations had launched comprehensive initiatives in e-governance with big budgets. Forefront in this progress is the United States, Australia, New Zealand, Singapore, Norway, Canada and the UK (UN/ASPA, 2002). However, reports in the same year (Backus, 2001) indicate that e-governance is being deployed as a vehicle for facilitating uniform democracies in some developing economies such as Uganda and South Africa, where issues of uneven spread of ICTs and low literacy are limiting the progress. In India, a progressive developing democracy, e-governance seemingly is visualised as an equaliser which will eventually empower the disparate population in participating in the democratic process (E-government: Macro Issues R. K. Mitra GIFT, 2006).

Digital divide presents a significant challenge to ensuring equitable access to digital technologies and tools for public service delivery in Nigeria. Discrepancies in income, location, and education have contributed to a substantial gap in the utilization of digital resources among citizens. The limited availability of ICT facilities outside urban areas at high costs restricts participation in the emerging information economy, particularly in rural and suburban communities. Despite these obstacles, digital technology and ICT play a crucial role in today's globalized world, driving the Fourth Industrial Revolution and facilitating digital transformation across industries. Governments, including Nigeria's, recognize the strategic imperativeness of embracing digital transformation to enhance service performance, customer experience, operational efficiency, and revenue generation.

The Federal Civil Service of Nigeria aims to achieve full digitalization of its processes across Ministries, Departments, and Agencies (MDAs) by 2025. Dr. Folasade Yemi-Esan, Head of the Civil Service of the Federation, emphasized that this digital transformation is essential for efficient service delivery. However, Nigeria lags behind other nations with less than 20 % compared to governments worldwide having fully embraced digital solutions.

To accelerate digitalization, MDAs would:

1. Prioritize technology adoption: Allocate adequate budgetary resources to digital initiatives.
2. Ensure data uniformity: Establish common data standards and interoperability protocols.
3. Promote interagency collaboration: Foster cooperation among MDAs to achieve common goals.
4. Embrace artificial intelligence: Deploy AI solutions for efficiency gains.

The digitalization of legal metrology operations is a transformative process that incorporates technology and digitization into measuring instruments and systems used for trade, industry, and consumer protection. By transitioning from traditional manual processes to digital systems, legal metrology can streamline operations, enhance accuracy and efficiency, and improve the overall regulatory compliance.

Introduction

The advent of digital technologies has revolutionized various sectors globally, including government services. This transformation, often referred to as e-governance, leverages Information and Communication Technologies (ICTs) to enhance the efficiency, effectiveness, and transparency of public service delivery. In developing nations such as Nigeria, the potential of e-governance to address longstanding issues of inefficiency, corruption, and bureaucratic delays is particularly significant.

Nigeria's public sector has historically struggled with challenges that impede effective service delivery. These challenges include cumbersome manual processes, lack of transparency, and limited access to reliable data. Despite numerous reform efforts, these issues have persisted, undermining the quality of services provided to citizens. However, the rise of digital transformation initiatives offers a promising avenue for overcoming these obstacles.

The Federal Ministry of Communications and Digital Economy in Nigeria has spearheaded several initiatives aimed at harnessing the power of digital technologies to improve public services. Notable among these initiatives are the Government Service Portal and the adoption of digital tools such as Remita, which facilitate more efficient and transparent service delivery. These efforts are part of a broader strategy to integrate ICTs into government operations, thereby fostering a more connected and responsive public sector.

A critical component of this digital transformation is the digitalization of the Weights and Measures Department (WMD) within the Federal Ministry of Industry Trade and Investment. The WMD is responsible for upholding standards, protecting consumers, and ensuring the integrity of commercial transactions through its regulatory oversight functions. However, the department's reliance on manual processes and data management has highlighted the urgent need for a comprehensive digitalization plan.

The digitalization of the WMD is envisioned as a multi-phase process involving collaboration among various stakeholders, including department officials, IT professionals, legal experts, and international partners. The goal is to develop a centralized digital platform that integrates technological solutions, enhances transparency, and supports data-driven decision-making. This transformation is expected to span 18-24 months and will include significant efforts in change management and employee training to ensure successful implementation.

The potential benefits of digitalizing the WMD are substantial. Increased efficiency, improved transparency, and enhanced data management capabilities can lead to more effective regulatory oversight and better service delivery. However, the process also presents challenges, particularly in terms of legal and regulatory compliance, data privacy, and security. Addressing these challenges requires continuous stakeholder engagement, capacity building, and a transformative leadership approach.

This study aims to explore the evolution and sustainability of digital transformation in Nigeria's public sector, with a specific focus on the digitalization of the WMD. By examining the strategies, challenges, and outcomes associated with this initiative, the research seeks to provide insights into the broader implications of e-governance for public service delivery in developing countries.

This paper is an abridged format of the main research project work, which may be downloaded from the following link: https://1drv.ms/b/s!AnG4hUgi0UVAi-QCB5DuqHsHXHYtXA

Overview of the Weights and Measures Department (WMD)

The Weights and Measures Department (WMD) in Nigeria is a critical regulatory body under the Federal Ministry of Industry, Trade and Investment. Its primary role is to ensure the accuracy and reliability of measurements used in commercial transactions, thereby protecting consumers and maintaining fair trade practices. The department's responsibilities include:

Regulatory oversight: Enforcing standards for weights and measures to ensure compliance with legal metrology principles.

Consumer protection: Safeguarding consumers by ensuring that products are accurately measured and labeled.

Commercial integrity: Ensuring that businesses adhere to measurement standards, thereby promoting fair competition and trust in the marketplace.

Data management: Collecting and managing data related to weights and measures to support regulatory activities and policy development.

The WMD faces several challenges, including reliance on manual processes, limited transparency, and inefficient data management. These challenges underscore the need for a comprehensive digitalization plan to enhance the department's operations and service delivery.

Methodology

This study employs a mixed-methods approach, combining qualitative and quantitative research methods to provide a comprehensive analysis of the digital transformation in Nigeria's public sector, specifically focusing on the digitalization of the Legal Metrology Agency (Weights and Measures Department).

Research design

Qualitative methods:

Interviews: Semi-structured interviews were conducted with key stakeholders, including senior officials from the Weights and Measures Department, IT professionals, legal experts, and international partners involved in the digitalization process. These interviews aimed to gather in-depth insights into the challenges, strategies, and outcomes of the digital transformation initiative.

Document analysis:

Relevant documents, such as policy papers, strategic plans, and progress reports, were reviewed to understand the context and framework of the digitalization efforts.

Quantitative methods:

Surveys: Structured questionnaires were distributed to a broader group of officers within the Weights and Measures Department to collect quantitative data on their experiences, perceptions, and attitudes towards the digitalization process.

Data analysis:

Statistical analysis was performed on the survey data to identify trends, correlations, and significant factors influencing the success of the digital transformation initiative.

Sampling:

A purposive sampling technique was used to select participants for the interviews and surveys. This approach ensured that individuals with relevant knowledge and experience were included in the study.

Interview participants: 20 senior officials and stakeholders were interviewed.

Survey participants: 40 officers from various levels within the Weights and Measures Department participated in the survey.

Data collection and analysis

Interviews:

The interviews were recorded, transcribed, and analyzed using thematic analysis to identify key themes and patterns.

Surveys:

The survey data were analyzed using descriptive and inferential statistics to provide a quantitative overview of the findings.

Ethical considerations:

The study adhered to ethical guidelines, ensuring informed consent, confidentiality, and the right to withdraw from the study at any time. Ethical approval was obtained from the relevant institutional review board.

Diagrammatic representation of the above explained Methodology of the research work

Survey results and statistical analysis:

The survey results from the Weights and Measures Department staff are summarized in the table below:

Response	Count	Percentage
Agree	36	90 %
Not sure	2	5 %
Prefer manual	2	5 %

Interpretation of results

Majority in favor of digitalization:

36 out of 40 staff members (90 %) agreed that the department could not stand the test of complexity of enforcement without a digitalized system. This represents a strong consensus among the staff, indicating a clear recognition of the need for digital transformation.

Uncertain about impact:

2 out of 40 staff members (5 %) were not sure about the impact of digitalization.

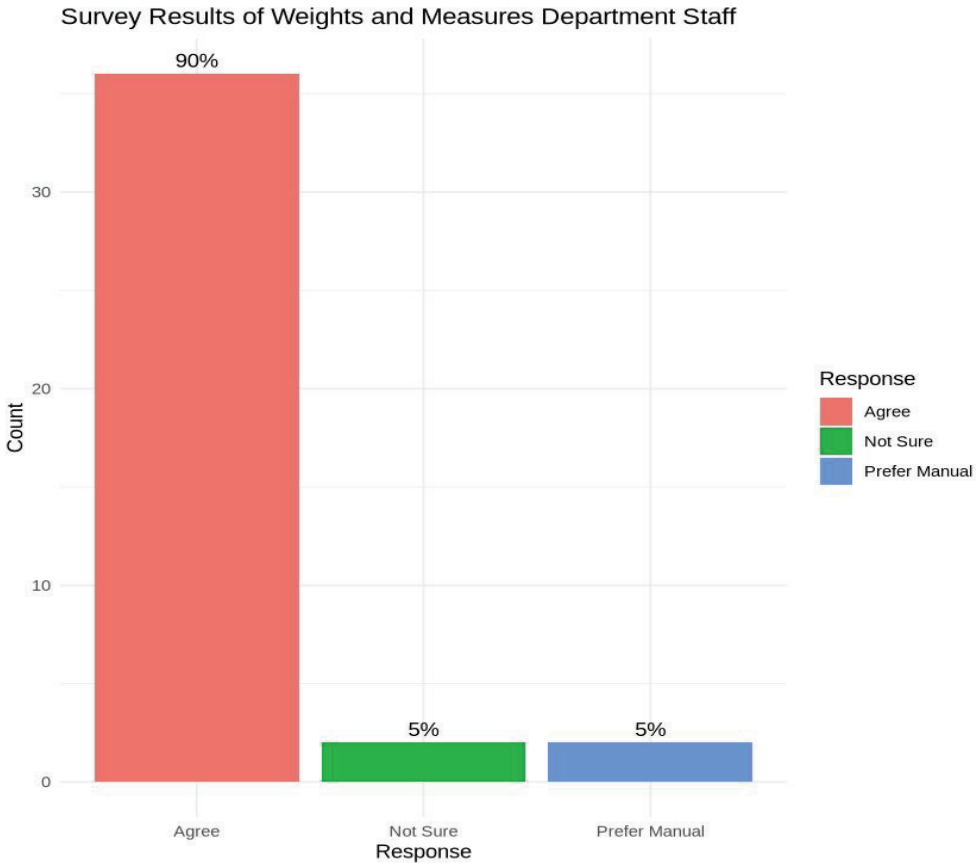
This small group might benefit from further information or training about the potential benefits of digital systems.

Preference for manual systems:

Two out of 40 staff members (5 %) preferred the manual management of data, citing limited computer knowledge.

This group represents a minority but highlights the need for comprehensive training programs to ensure all staff can effectively use new digital systems.

Bar chart:



Survey results

Additional statistical insights:

Mode: The mode of the responses is "Agree," as it is the most frequent response.

Confidence interval: With a sample size of 40 and 90 % agreeing, we can calculate a 95 % confidence interval for the true proportion of staff who agree with digitalization. Using the Wilson score interval:

Lower bound: approximately 77.4 %

Upper bound: approximately 96.3 %

This means we can be 95 % confident that between 77.4 % and 96.3 % of all staff in the department would agree with the need for digitalization.

Chi-square Goodness of Fit Test: If we were to test whether the observed distribution differs significantly from an equal distribution (33.33 % for each category), we would find a highly significant difference ($p < 0.001$), confirming that the preference for digitalization is not due to chance.

This statistical analysis strongly supports the implementation of a digitalized system in the Weights and Measures Department. The vast majority of staff recognize its necessity, which should facilitate the transition process. However, it also highlights the need for comprehensive training programs to address the concerns and limitations of the small minority who are unsure or prefer manual systems.

Conclusion

The digital transformation of the Weights and Measures Department is a crucial step towards improving public service delivery in Nigeria. The study highlights the significant benefits of digitalization, including increased efficiency, transparency, and data-driven decision-making. The strong consensus among staff members in favor of digitalization indicates a clear recognition of its necessity. However, the process also presents challenges, particularly in terms of legal and regulatory compliance, data privacy, and security.

The successful implementation of the digitalization plan requires continuous stakeholder engagement, capacity building, and a transformative leadership approach. By addressing these challenges and leveraging the potential of digital technologies, the WMD can enhance its regulatory functions and contribute to the broader goals of good governance and sustainable development in Nigeria.

Recommendations

Comprehensive training programs: Develop and implement training programs to ensure all staff members are proficient in using new digital systems. This will address the concerns of those who prefer manual processes due to limited computer knowledge.

Stakeholder engagement: Maintain continuous engagement with all stakeholders, including department officials, IT professionals, legal experts, and international partners, to ensure a collaborative approach to digitalization.

Legal and regulatory compliance: Establish robust frameworks to address legal and regulatory challenges related to data privacy, security, and compliance. This includes updating policies and procedures to align with evolving digital standards.

Change management: Implement effective change management strategies to facilitate the transition from manual to digital processes. This includes clear communication, support mechanisms, and incentives for staff to embrace digitalization.

Monitoring and evaluation: Develop a monitoring and evaluation system to track the progress of the digitalization initiative, identify areas for improvement, and ensure that the desired outcomes are achieved.

Infrastructure development: Invest in the necessary technological infrastructure to support the digitalization of the WMD. This includes developing a centralized digital platform and integrating technological solutions to enhance data management and transparency.

By following these recommendations, the Weights and Measures Department can successfully navigate the digital transformation process and achieve its goals of improved efficiency, transparency, and service delivery.

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