Macrothink Institute™

Journal of Public Administration and Governance
ISSN 2161-7104
2024, Vol. 14, No. 2

The Public Service Digitalization in the Philippines Towards a National Program to Capacitate Digital Frontliners

Reyner Aaron M. Villaseñor, MBA, DPA

Public Administration Program, University of Perpetual Help System – DALTA Graduate School

Lecturer, Ateneo de Manila University - Graduate School of Business

Received: Jul. 28, 2024 Accepted: Sep. 14, 2024 Online published: Nov. 7, 2024

doi:10.5296/jpag.v14i2.22106 URL: https://doi.org/10.5296/jpag.v14i2.22106

Abstract

The rapid advancement of technology has driven a global transformation in public service delivery. In the Philippines, efforts to digitalize public services are crucial for inclusive development and efficient governance. This study, titled "The Public Service Digitalization in the Philippines Towards a National Program to Capacitate Digital Frontliners," examines this transformation through the experiences of government employees, known as digital frontliners. These individuals are key to implementing and managing digital technologies across public sectors.

Using a mixed-method research design, the study integrates descriptive, correlative-comparative, and phenomenological approaches to gather quantitative and qualitative data. A total of 400 digital frontliners participated in a survey, while 10 key informants were interviewed. This approach provides a comprehensive analysis of the digitalization process, focusing on demographic profiles, challenges, job satisfaction, and service effectiveness.

The theoretical framework includes the Theory of Digital Government Transformation, the Unified Theory of Acceptance and Use of Technology (UTAUT), and Capacity Building and Development Theory. These frameworks help understand the dynamics of public service digitalization, technology acceptance, and the importance of capacity building.

Key findings reveal a diverse workforce among digital frontliners, significant challenges such as infrastructure limitations and digital literacy disparities, and varying levels of job satisfaction. The research underscores the need for robust digital infrastructure, tailored training programs, and streamlined administrative processes. It also highlights the importance

of public-private collaboration.

The study proposes a national program to enhance the capabilities of digital frontliners through continuous professional development and innovation support. This program aims to improve digital public services, making them more efficient, transparent, and accessible. The findings provide a foundation for evidence-based policymaking and strategic planning, contributing to the Philippines' digital transformation and inclusive growth.

Keywords: Public Service Digitalization, Digital Government Transformation, Technology Acceptance, Capacity Building, Digital Infrastructure

1. Introduction

The digital transformation of public service delivery in the Philippines is a critical response to the country's pressing socioeconomic challenges. These challenges—rooted in widespread poverty, persistent inequality, and inadequate infrastructure—have long impeded the efficient and equitable delivery of public services. With a rapidly growing population adding further strain to these systems, the need to harness digital technology has become more urgent than ever. However, the digital divide remains a significant barrier, particularly in rural and economically disadvantaged regions. Addressing this divide is essential to ensure that digitalization efforts do not exacerbate existing inequalities but instead serve as a bridge to greater inclusivity and equity.

The digitalization of public services in the Philippines is progressing rapidly, driven by laws like the Philippine Digital Workforce Competitiveness Act (RA 11927), which aims to enhance the country's digital workforce and integrate the gig economy into the labor regulatory framework. This legislative push is complemented by significant government investments in digital infrastructure and training, such as the PHP38.75 billion allocation for 2024 to support digitalization efforts across various government agencies (Gita-Carlos, 2023). President Marcos Jr.'s administration is emphasizing the digitalization of government services, as seen in initiatives like the eGov PH app and the National ID system, which aim to centralize and streamline public services ("PBBM Orders Immediate Digitalization," 2023).

At the forefront of this transformation are the digital front liners—government employees responsible for implementing digital services. These individuals play a crucial role in ensuring the accessibility, efficiency, and security of these services, acting as the bridge between technology and the public. Their role is vital in maintaining trust and confidence in government digital initiatives, particularly in protecting sensitive information and addressing technological issues (Breit et al., 2020; Ahmad, 2020).

However, the literature highlights several challenges faced by digital front liners, including infrastructure limitations, digital literacy disparities, and bureaucratic obstacles (Capistrano, 2020; Breit et al., 2020). Studies emphasize the need for adaptive strategies to manage these challenges, as seen in various sectors such as banking, education, and public services (Scholkmann, 2023; Løberg, 2022). The digital divide, especially exacerbated during the COVID-19 pandemic, presents significant barriers to effective service delivery, with disparities in internet access and digital literacy being major concerns (Lai & Widmar, 2020;

Henman, 2020).

The role of digital front liners is further complicated by issues of academic inbreeding within public institutions, where a lack of diverse perspectives and external influences can stifle innovation and slow the adoption of new technologies (Shahril et al., 2023; Watson, 2021). Addressing these issues requires a multifaceted approach, including diverse recruitment practices, cross-sectoral mobility, and continuous professional development to equip digital front liners with the necessary skills and knowledge to lead digital transformation effectively (Trece ñe, 2021; Lapuz, 2023).

In the broader context of digital transformation, the literature underscores the importance of sustainable development, governance, and citizen engagement. Effective digitalization strategies should address these areas, with an emphasis on closing the digital divide, fostering public-private partnerships, and ensuring that technological advancements benefit all sectors of society (ElMassah & Mohieldin, 2020; Alvarenga et al., 2020). Studies also highlight the potential of digitalization to combat corruption and improve public administration efficiency, as seen in the examples from Ghana and Ukraine (Addo, 2021; Borodina & Trushkina, 2021).

The theoretical framework of this research integrates several significant theories to provide a comprehensive understanding of public service digitalization in the Philippines. The Theory of Digital Government Transformation emphasizes the transformative power of digital technologies on government operations, offering insights into overcoming operational challenges and enhancing service delivery, citizen engagement, and policy implementation The Unified Theory of Acceptance and Use of Technology (UTAUT) explores the factors influencing the acceptance and use of technology within organizations, highlighting the importance of digital literacy and the need for supportive environments that foster technology adoption (Venkatesh, Thong, & Xu, 2016). Finally, the Capacity Building and Development Theory underscores the importance of enhancing the skills, knowledge, and abilities of individuals and organizations to adapt to technological changes, which is particularly relevant in developing training programs for digital frontliners (“Capacity Development: A UNDP Primer,” 2015).

These theories collectively inform the study’s approach to analyzing the challenges and opportunities in the digitalization of public services, providing a holistic view that combines strategic, behavioral, and developmental perspectives. By leveraging these frameworks, the study aims to establish a robust digital government framework and effectively address the complex challenges of digital transformation in the public sector.

This study centers on the perspectives of government employees, known as "digital front liners," who are directly involved in implementing digital public services across the Philippines. By focusing on their experiences, the study aims to provide a nuanced understanding of the opportunities, challenges, and complexities of the digitalization process. While the perspectives of the general public are important, the insights of these digital front liners—those who engage directly with the challenges of implementation—offer a critical lens through which to examine the efficacy and impact of digitalization initiatives.

The primary objective of this research is to comprehensively analyze the digitalization of public service in the Philippines from the perspective of these digital front liners. The study seeks to answer key questions that illuminate the broader digital transformation landscape:

1. ***Who Are the Digital Front Liners?*** The study first examines the demographic profiles of digital front liners, including their age, gender, educational background, and years of service. Understanding these profiles is crucial for contextualizing their perspectives and may reveal significant patterns in their experiences with digitalization.

2. What Are the Challenges? The research explores the primary challenges these digital front liners encounter, such as infrastructure limitations, disparities in digital literacy, and bureaucratic obstacles. These challenges are deeply connected to the country's socioeconomic context, where inadequate infrastructure in remote areas, for example, can significantly hinder the rollout of digital services, and where digital literacy gaps may result in unequal access to these services.

3. How Do Digital Front Liners Perceive Their Roles? The study delves into their perceptions, experiences, and job satisfaction. These factors are critical, as they directly influence the effectiveness of digitalization efforts. A better understanding of their experiences can provide insights into how digital transformation initiatives can be better supported and optimized.

4. How Is Digital Public Service Perceived? The study evaluates how digital front liners assess the outcomes of digital public service delivery in terms of efficiency, transparency, and accessibility. These aspects are often touted as key benefits of digital transformation, yet their realization can vary significantly depending on the context.

5. What Relationships Exist? The study investigates the relationships between the profiles of digital front liners, their descriptions of the challenges they face, and their perceptions of digital public service delivery. It also examines whether significant differences exist in these perceptions when digital front liners are grouped by demographic factors, offering insights into how different groups experience the digitalization process.

6. What Specific Challenges Are Faced? The research identifies specific obstacles encountered by selected digital front liners, providing a detailed understanding of the issues at hand. This could involve case studies or in-depth interviews that highlight particular difficulties in implementing digital services in specific regions or under certain conditions.

7. What Policy Recommendations Can Be Made? The study aims to develop policy recommendations to enhance public service digitalization efforts. These recommendations will focus on creating national programs to empower digital front liners, addressing gaps in digital literacy and technical skills, and promoting sustainable and inclusive digitalization. The ultimate goal is to ensure that the benefits of digital transformation are equitably distributed across the Philippines, particularly in underserved areas.

By addressing these research questions, the study aims to move beyond a broad overview of digital transformation and instead offers a detailed, data-driven analysis of the

specific challenges and opportunities in the Philippines. This approach underscores the importance of balancing technological potential with the need for inclusive progress, articulating why this balance is crucial for the country's development. The study also elaborates on the implications of this balance for different demographics and regions, thereby contributing to a more equitable and effective digitalization strategy that benefits all Filipinos.Moreover, by explicitly defining the research questions and hypotheses, the study clarifies its specific contributions to the field. It seeks to identify the most critical aspects of the linkages between technological advancements, governance practices, and societal requirements, and to provide a comprehensive analysis of these factors. This targeted approach ensures that the study's findings are both relevant and actionable, offering valuable insights for policymakers and stakeholders engaged in the digital transformation of public services in the Philippines.

2. Method

2.1 Research Design:

This study employed a mixed-method research design, integrating descriptive, correlative-comparative, and phenomenological research approaches, to comprehensively analyze the digitalization of public service in the Philippines from the perspective of government employees, termed digital frontliners. The mixed-method approach was chosen to provide a holistic examination of both quantitative data, such as demographic profiles and correlations, as well as qualitative insights into the lived experiences of digital frontliners.

The descriptive component focused on profiling digital front liners, encompassing demographic characteristics such as age, sex, marital status, highest educational background, government office, and years in public service. According to Sudrajat (2023), descriptive analysis is crucial for establishing a fundamental understanding of the people involved and effectively contextualizing their perspectives. This baseline is critical for interpreting quantitative data and correlating it with qualitative results to reveal patterns and relationships between variables.

The study also explored the primary challenges articulated by digital frontliners that hinder public service digitalization, including infrastructure limitations, digital literacy disparities, and bureaucratic obstacles. Their perceptions, experiences, and job satisfaction in delivering digitalized public service were investigated to elucidate subjective perspectives. Furthermore, digital frontliners described the efficiency, transparency, and accessibility of the Philippines' public service digitalization.

The correlative-comparative analysis investigated potential relationships between digital front liner profiles and their descriptions of digitalization, as well as between challenges and perceptions of digitalization. This analysis enabled the study to explore how individual characteristics might influence perspectives on digitalization efforts. Additionally, grouping digital frontliners according to their profiles allowed the examination of differences in their descriptions of challenges, experiences, and digitalization outcomes.

The phenomenological inquirywas employed to delve into the experiences of purposefully

selected digital frontliners, providing nuanced insights into public service digitalization. This approach is critical for capturing the subjective nuances and lived experiences that quantitative data alone cannot fully explain. Shahril et al. (2023) emphasize that mixed-method research, which integrates both quantitative and qualitative approaches, allows for the in-depth exploration of complex social realities, offering a comprehensive understanding of public service digitalization.

The integration of these methods is vital for a comprehensive analysis of public service digitalization. The mixed-method design bridges the gap between broad quantitative patterns and detailed qualitative insights, enabling a nuanced understanding of the digitalization process. A study by Wang and Ma (2022) on the digital transformation of public service delivery in China exemplifies the effectiveness of such an approach, demonstrating how combining qualitative and quantitative methods can reveal both broad trends and personal experiences.

In the context of public service digitalization in the Philippines, this mixed-method research design facilitates a thorough examination of the interplay between individual characteristics, perceived challenges, and digitalization outcomes. This comprehensive approach sheds light on the complexities inherent in the process, providing valuable insights for policymakers and practitioners aiming to improve public service delivery through digital means.

2.2 Population and Sampling

The population for this study consisted of 1,810,428 government employees, with a sample size of 400 randomly selected to ensure diverse representation for the quantitative part. Purposive sampling was employed for the qualitative component to select participants with relevant experiences. This approach allowed the study to cover a wide range of government offices and demographic backgrounds. The respondents included government employees involved in public service digitalization, particularly IT officers and key informants from various sectors. Out of the total, 400 employees participated in the quantitative survey, while 10 key informants provided qualitative insights.

2.3 Instrument

To achieve the study's objectives, a self-made survey instrument was developed for the quantitative portion of the research. The survey questionnaire comprised five distinct sections designed to assess the profile, experiences, challenges, perceptions, and job satisfaction levels of government frontliners concerning public service digitalization in the Philippines.

> **Section 1: Profile of Digital Frontliners**: This section gathered demographic information, including age, gender, educational background, and length of government service.
>
> **Section 2: Challenges in Public Service Digitalization**: Respondents rated statements related to infrastructure limitations, digital literacy disparities, and bureaucratic obstacles on a 5-point Likert scale to assess the challenges hindering the success of digitalization efforts.

Section 3: Perceptions, Experiences, and Job Satisfaction: This section explored respondents' perceptions, experiences, and job satisfaction in delivering digitalized public services. Statements were rated on a 5-point Likert scale to capture levels of agreement.

Section 4: Views on Efficiency, Transparency, and Accessibility: Respondents evaluated the efficiency, transparency, and accessibility of Philippine public service digitalization through a series of statements rated on a 5-point scale.

Section 5: Qualitative Insights: To complement the quantitative data, the survey included three open-ended questions that gathered qualitative insights on specific challenges faced, perceived impacts of digitalization, and critical factors influencing the effectiveness of public service digitalization initiatives.

2.4 Instrument Validation and Reliability

A pilot test was conducted with 20 public administration college students to validate the survey questionnaire. The Cronbach's alpha coefficient was employed to assess the internal consistency and reliability of each section of the questionnaire. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), and the results indicated that the survey instrument demonstrated good to excellent reliability across all sections, with high Cronbach's alpha values signifying strong internal consistency. Sections with lower reliability scores were revised or removed based on the pilot test feedback to ensure robustness.

Additionally, qualitative feedback from participants was gathered to identify any ambiguities and ensure the clarity and comprehensibility of the questions. Following the pilot test, the survey instrument underwent further validation by experts in the field, including the researcher's academic adviser, a specialist from the Department of Information and Communications Technology (DICT), and a representative from a Local Government Unit (LGU). Their input confirmed the instrument's validity and effectiveness in capturing data on public service digitalization in the Philippines.

2.5 Data Gathering Procedure:

Upon finalizing the survey questionnaire and setting it up on Google Forms, the researcher compiled a comprehensive list of targeted government agencies to initiate the data-gathering process. This list included the official email addresses of key contacts within each agency. A carefully crafted email invitation was sent to introduce the research study, outline its objectives, and solicit participation, with assurances of confidentiality provided in an attached formal letter of intent.

To ensure broad and efficient data collection across various government departments and agencies, the researcher partnered with Organic Intelligence, Inc., a private agency specializing in digital communication strategies. This collaboration was pivotal in reaching a national scale, leveraging Organic Intelligence's expertise and resources to fulfill the study’s objectives on public service digitalization.

Following the initial distribution of email invitations, recipients were given a reasonable

timeframe to respond, with polite follow-up emails sent to those who had not yet participated. The researcher closely monitored responses through Google Forms, tracking response rates and identifying patterns to ensure a systematic and efficient data collection process.

The collaboration with Organic Intelligence, Inc. greatly enhanced the research study by facilitating effective engagement with government agencies. Their strategic approach and communication solutions were instrumental in securing significant participation, ensuring that the study's relevance was clearly communicated, and that confidentiality was upheld throughout the process.

For the qualitative component, in-depth interviews were conducted to complement the quantitative survey findings, offering a more comprehensive understanding of public service digitalization. These interviews sought to capture nuanced insights, experiences, and perspectives from individuals directly involved in or affected by digitalization initiatives within government agencies.

Organic Intelligence, Inc. played a crucial role in this phase as well, utilizing their extensive network and deep understanding of the digital ecosystem to identify key individuals within government agencies who were deeply embedded in digitalization efforts. This enabled the research to access a wealth of insightful perspectives, significantly enriching the study's findings.

The logistical and technical support provided by Organic Intelligence, Inc. ensured that interviews, whether conducted virtually or in person, were executed smoothly, respecting participants' preferences and adhering to public health advisories.

Overall, Organic Intelligence, Inc.'s contribution was both operational and strategic. Their expertise in digital communication and their profound insights into the public service landscape were vital in maximizing engagement from government agencies. This partnership enriched the research study with diverse data points and perspectives, ultimately painting a comprehensive picture of the current state and future directions of public service digitalization in the Philippines. Their role was essential in achieving the study's ambitious objectives and underscored the importance of strategic collaboration in research endeavors of this scale.

2.6 Data Analysis

For the quantitative portion of the study, data gathered from the survey questionnaire were coded, tallied, and classified in Microsoft Excel before being subjected to various statistical analyses using the Statistical Package for the Social Sciences (SPSS). The following statistical methods were employed:

Descriptive Statistics:

Weighted Mean: The weighted mean was utilized as a measure of central tendency to present respondents' assessments and evaluations. The calculation involved assigning points to questionnaire options and multiplying the weight of each event or outcome by its associated quantitative outcome, followed by summing all products. This method provided an average

that considers the significance of each response, offering a nuanced understanding of the data.

Percentage and Frequency Distribution: The frequency of respondents' answers was tabulated to provide a proportionate representation of observations for each category. Percentages demonstrated the relationship between different parts and the whole, effectively portraying respondents' profiles.

Standard Deviation: This measure was used to assess the variation or dispersion of responses, indicating the degree of scattering in relation to the mean value.

Inferential Statistics:

Pearson Moment Correlation*:* Used to measure the linear relationship between two variables measured on interval or ratio scales, this test was applied to examine the relationship between normally distributed variables.

Spearman Rho Correlation: This non-parametric test measured the strength and direction of the association between two ranked variables.

One-Way ANOVA: Applied to compare the means of two or more independent groups, this test determined whether there was statistical evidence of significant differences between the associated population means.

Data analysis was conducted using SPSS Version 25, with computations and preliminary data handling performed using Microsoft Excel. Results were interpreted based on the significance level (p-value), where a p-value greater than 0.05 indicated the acceptance of the null hypothesis, and a p-value less than 0.05 indicated its rejection.

To interpret the degree of correlation between variables, the researcher referred to the range of correlation coefficients, assessing the strength of relationships from very weak to very strong, both positively and negatively.

The qualitative portion of the study employed thematic analysis to interpret data gathered from open-ended survey questions and in-depth interviews. Using Delve software, the researcher systematically analyzed the transcribed interviews to identify and code meaningful segments of information.

Thematic analysis followed the phases outlined by Clarke and Braun (2014), beginning with familiarization with the data through repeated readings. This was followed by coding, where significant units of data were labeled to organize the information systematically. The researcher then identified patterns and connections among the codes to develop themes that captured the essence of the data.

These themes were reviewed and refined to ensure coherence and accuracy, with each theme defined and named to clearly represent the underlying concepts. The final phase involved reporting the findings, where the identified themes were presented alongside relevant quotes, providing deep insights into the challenges, experiences, and perspectives of digital frontliners in the context of public service digitalization.

3. Results

3.1 Profile of the Respondents

The digital frontliners in the Philippines' public service digitalization efforts are predominantly middle-aged and female, with a high level of educational attainment. The majority of respondents fall within the age range of 40 to 49 years old, representing 44.3% of the participants. This group is followed by those aged 50-59 years (17.5%) and those under 30 years (17.0%). Females make up 59.8% of the workforce, while males account for 39.3%. In terms of educational background, a significant portion of the digital frontliners are highly educated, with 67.0% being college graduates. Furthermore, 25.0% hold master's degrees, and 1.0% have doctoral degrees, indicating a strong presence of advanced expertise within the workforce. The years of service among respondents are diverse, with the largest group (44.5%) having 7 to 10 years of experience, followed by those with 4 to 6 years (17.8%) and less than 1 year (13.5%).

3.2 Primary Challenges Hindering Public Service Digitalization

The study identifies several significant challenges hindering public service digitalization in the Philippines. Infrastructure limitations emerge as a major obstacle, with respondents citing poor internet connectivity, frequent power outages, and inadequate digital infrastructure in remote areas as severe restrictions on the effective delivery and expansion of digital public services. These issues are particularly underscored by concerns over outdated hardware and software, with mean scores ranging from 4.06 to 4.53. Additionally, insufficient funding and support for infrastructure upgrades further exacerbate these challenges. Digital literacy disparities are perceived as the most critical issue, with a strong agreement among respondents. The lack of digital literacy leads to unequal access and utilization of digital public services, compounded by limited awareness and understanding of digital platforms and inadequate training programs. Socioeconomic factors, such as income and education levels, also contribute to these gaps, impacting the effectiveness of digital service delivery. Bureaucratic obstacles also pose significant challenges. Respondents agree that bureaucratic red tape and lengthy approval processes delay the implementation of digital initiatives, and resistance to change within government agencies impedes the adoption of digital technologies. Inefficient procurement processes and budget allocation further hinder the timely acquisition and deployment of digital infrastructure. Complex regulatory frameworks and compliance requirements create barriers to innovation, and a lack of interdepartmental coordination limits the scalability and effectiveness of digital initiatives.

3.3 Perceptions, Experiences, and Job Satisfaction of Digital Frontliners

Digital frontliners generally have a positive perception of delivering digitalized public services, with a composite mean score of 3.82 indicating overall agreement that digitalization enhances service efficiency, accessibility, and interaction quality. They feel confident in utilizing digital tools and platforms (mean = 3.83) and perceive digitalized public services as providing greater accessibility and convenience (mean = 4.28). The experiences of digital frontliners in delivering digitalized public services are mixed yet generally positive.

Respondents moderately agree that they frequently encounter technical challenges (mean = 3.40), but they find it rewarding to witness the positive impact of digital services on clientele (mean = 3.87). They agree that they receive adequate support and training (mean = 3.68) but also experience frustration due to the complexity of digital systems (mean = 3.93). The composite mean score of 3.72 suggests that, despite challenges, frontliners generally have a positive experience and feel supported in their roles. Job satisfaction among digital frontliners is generally positive, with respondents moderately agreeing on being satisfied with the level of autonomy and flexibility (mean = 3.41) and feeling valued and recognized (mean = 3.39). They find fulfillment in assisting clientele through digital channels (mean = 3.87) and are satisfied with the support and resources provided (mean = 3.57). The composite mean of 3.58 indicates that while satisfaction is generally positive, there are areas for improvement to enhance overall job satisfaction.

3.4 Perceptions of the Philippine Public Service Digitalization

Digital frontliners generally agree on the positive impacts of digitalization on public services in the Philippines. Respondents believe that the digital services provided by the public sector are efficient (mean = 4.26), and they are satisfied with the speed and responsiveness of these digital platforms (mean = 3.57). The use of technology to streamline bureaucratic processes is also seen as efficient (mean = 3.68). Digitalization contributes positively to national development (mean = 3.97), and efforts have reduced bureaucratic red tape (mean = 3.84). The composite mean of 3.86 reflects a positive view of the digitalization of public services in terms of efficiency, transparency, and accessibility. The findings indicate that digital frontliners generally agree that digitalization has positively impacted transparency and accountability in public service delivery. Respondents moderately agree that digitalization efforts are transparent (mean = 3.24), and they agree that digitalization has enhanced the transparency of government processes (mean = 3.77). The accountability of public officials due to digitalization efforts is perceived to have improved (mean = 4.37), and it is easier to monitor government spending and budgets through digital platforms (mean = 3.88). Digitalization has also facilitated greater citizen participation in public discussions and decision-making (mean = 4.38). The composite mean of 3.93 reflects a positive view of the impact of digitalization on transparency and accountability. Digital frontliners agree on the positive aspects of accessibility and security in digitalized public services. They believe that digital services are accessible to all citizens (mean = 3.82) and that accessing important government information and services online is easy (mean = 3.84). Digitalization has made public services more accessible to marginalized communities (mean = 3.75), and the interfaces of digital platforms are user-friendly (mean = 3.81). The security and privacy protection offered by digital services are perceived as safe and secure (mean = 3.63). The composite mean of 3.77 indicates a positive view of the accessibility and security of digitalized public services.

3.5 Correlation Results

The results of the correlation analysis provide significant insights into the primary challenges hindering the success of public service digitalization in the Philippines. Infrastructure

limitations were found to negatively impact the perceived efficiency (r = -0.153, p = 0.002) and accessibility (r = -0.187, p = 0.000) of digital public services, highlighting a critical area for improvement. Digital literacy disparities exhibit significant positive correlations with the perceived efficiency (r = 0.166, p = 0.001), transparency (r = 0.212, p = 0.000), and accessibility (r = 0.103, p = 0.039) of public service digitalization. This underscores the importance of digital literacy in maximizing the benefits of digital services. Bureaucratic obstacles present a substantial barrier to the effective implementation of digital public services, as evidenced by their significant negative correlations with efficiency (r = -0.403, p = 0.000), transparency (r = -0.290, p = 0.000), and accessibility (r = -0.270, p = 0.000). Perceptions of delivering digitalized public services show significant negative correlations with efficiency (r = -0.264, p = 0.000) and transparency (r = -0.164, p = 0.001). Experiences of delivering digitalized public services show significant positive correlations with efficiency (r = 0.163, p = 0.001), transparency (r = 0.102, p = 0.041), and accessibility (r = 0.108, p = 0.031). Job satisfaction in delivering digitalized public services exhibits significant positive correlations with efficiency (r = 0.334, p = 0.000), transparency (r = 0.460, p = 0.000), and accessibility (r = 0.379, p = 0.000).

Table 1. Result of Correlation Analysis

Variables	Correlation Coefficient (r)	p-value	Significance
Infrastructure Limitations and Efficiency	-0.153	0.002	Significant
Infrastructure Limitations and Accessibility	-0.187	0.000	Significant
Digital Literacy Disparities and Efficiency	0.166	0.001	Significant
Digital Literacy Disparities and Transparency	0.212	0.000	Significant
Digital Literacy Disparities and Accessibility	0.103	0.039	Significant
Bureaucratic Obstacles and Efficiency	-0.403	0.000	Significant
Bureaucratic Obstacles and Transparency	-0.29	0.000	Significant
Bureaucratic Obstacles and Accessibility	-0.27	0.000	Significant
Perceptions of Delivering Digitalized Services and Efficiency	-0.264	0.000	Significant
Perceptions of Delivering Digitalized Services and Transparency	-0.164	0.001	Significant
Experiences of Delivering Digitalized Services and Efficiency	0.163	0.001	Significant

Experiences of Delivering Digitalized Services and Transparency	0.102	0.041	Significant
Experiences of Delivering Digitalized Services and Accessibility	0.108	0.031	Significant
Job Satisfaction in Delivering Digitalized Services and Efficiency	0.334	0.000	Significant
Job Satisfaction in Delivering Digitalized Services and Transparency	0.46	0.000	Significant
Job Satisfaction in Delivering Digitalized Services and Accessibility	0.379	0.000	Significant

3.6 ANOVA Results

The results of the analysis revealed several significant differences in perceptions across various demographic groups concerning public service digitalization in the Philippines. Gender-based differences were evident, particularly in the perception of infrastructure limitations and digital literacy disparities. Respondents who preferred not to disclose their gender perceived more significant infrastructure limitations than female and male respondents, with mean differences of 0.98 and 1.03, respectively. Similarly, significant differences were found in perceptions of digital literacy disparities, where those who preferred not to disclose their gender perceived greater challenges compared to both female and male respondents, with mean differences of -1.30 and -1.41, respectively.

Age group comparisons also highlighted significant differences. For instance, respondents aged 50-59 years perceived fewer infrastructure limitations compared to those aged 60 years and above, with a mean difference of 0.49. Additionally, digital literacy disparities were perceived as less challenging by younger respondents, with significant negative differences ranging from -0.18 to -0.31 when compared to those aged 60 years and above. Bureaucratic obstacles also showed significant differences across age groups, with respondents aged 30-39 years perceiving these obstacles more acutely compared to those aged less than 30 years and other age groups.

When analyzing the impact of years in public service, significant differences were observed in perceptions of infrastructure limitations, digital literacy disparities, and bureaucratic obstacles. Those with varying years of service perceived these challenges differently, indicating that experience in public service plays a crucial role in shaping perceptions of digitalization challenges.

Educational background also significantly influenced perceptions of digital public service delivery. Differences were particularly notable in perceptions of efficiency, transparency, and accessibility. For instance, significant differences were found between high school graduates

and those with doctoral degrees, as well as between respondents who preferred not to disclose their educational background and those with different educational levels.

The study found that gender, age, years in public service, and educational background significantly influence the perceptions of digital front liners regarding the challenges and effectiveness of public service digitalization in the Philippines. These findings underscore the importance of considering demographic factors when designing and implementing digitalization initiatives to ensure they are inclusive and responsive to the diverse needs of public service workers.

Table 2. Result of ANOVA

Variable	Comparison	Mean Difference	p-value	Significance
Infrastructure Limitations (Gender)	Prefer not to disclose vs. Female	0.98	0.003	Significant
	Prefer not to disclose vs. Male	1.03	0.003	Significant
Digital Literacy Disparities (Gender)	Female vs. Prefer not to disclose	-1.300	0.00	Significant
	Male vs. Prefer not to disclose	-1.410	0.000	Significant
Infrastructure Limitations (Age Group)	50-59 years vs. 60 years and above	0.490	0.027	Significant
Digital Literacy Disparities (Age Group)	< 30 years vs. 60 years and above	-0.180	0.000	Significant
Bureaucratic Obstacles (Age Group)	30-39 years vs. < 30 years	0.720	0.000	Significant
Infrastructure Limitations (Years in Public Service)	Across different years in public service	0.742	0.038	Significant
Digital Literacy Disparities (Years in Public Service)	Across different years in public service	0.871	0.000	Significant
Perceptions of Delivering Digitalized Services (Gender)	Female vs. Prefer not to disclose	0.3600	0.359	Significant

Experiences of Delivering Digitalized Services (Gender)	Female vs. Prefer not to disclose	-1.00	0.000	Significant
Job Satisfaction in Delivering Digitalized Services (Gender)	Female vs. Prefer not to disclose	-0.400	0.494	Significant
Perceptions of Efficiency (Educational Background)	College Graduate vs. Doctoral Graduate	-0.310	0.217	Significant
Perceptions of Transparency (Educational Background)	High School Graduate vs. Prefer not to disclose	-0.700	0.146	Significant
Perceptions of Accessibility (Educational Background)	High School Graduate vs. Prefer not to disclose	-0.73	0.035	Significant
Perceptions of Efficiency (Years in Public Service)	Across different years in public service	1.635	0.002	Significant
Perceptions of Transparency (Years in Public Service)	Across different years in public service	1.208	0.006	Significant
Perceptions of Accessibility (Years in Public Service)	Across different years in public service	1.413	0.014	Significant

3.7 Challenges Encountered by Selected Digital Front Liners About the Philippines' Public Service Digitalization

The qualitative portion of this study utilized in-depth interviews to understand the experiences and perspectives of digital front-liners in the Philippines' public service digitalization. Key themes and findings from these interviews revealed significant insights into the digital transformation efforts, goals, perceived impacts, success stories, challenges, and needs for government support and policy.

Digital transformation efforts were prominently highlighted by participants who detailed their roles in integrating digital systems, such as payment systems and AI for healthcare, into government operations. They emphasized the critical importance of ensuring successful integration to streamline processes and improve service delivery. Participants noted

significant improvements in efficiency and service delivery due to digital transformation, making public services more accessible and reducing the need for physical visits. Success stories included implementing QR-payment systems in local markets and maintaining public service operations during the pandemic, demonstrating the transformative power of digital tools.

The primary goals of digitalization, as expressed by participants, centered on improving efficiency, reducing physical movement, and enhancing service delivery. Setting clear, measurable objectives was deemed essential for ensuring successful digital initiatives. Digitalization has significantly impacted public services by streamlining operations, reducing paperwork, and enhancing service delivery, making them more efficient and convenient. It has also promoted financial inclusion and supported economic growth, as evidenced by the successful adoption of digital payment systems and other initiatives.

Participants shared notable success stories, such as increased digital transactions, improved tax remittance processes, and the successful implementation of online learning platforms. These initiatives have led to tangible benefits for public services and streamlined operations, underscoring the positive impact of digital transformation. However, several challenges and difficulties were encountered during these efforts. Low digital literacy among government employees and the public emerged as a critical barrier, highlighting the need for comprehensive training programs and a change in mindset. Infrastructure challenges, including outdated technology, slow internet connectivity, and power source limitations, also hindered digital transformation efforts. Lengthy procurement processes often resulted in outdated technologies, emphasizing the need for streamlined procedures and clear policies supported by legislative backing.

Collaboration and coordination challenges were evident in harmonizing ICT projects across various government agencies, necessitating cohesive policies and inter-agency collaboration. Continuous education and structured training programs were identified as essential for equipping stakeholders with the necessary skills and knowledge for digital transformation. Strategic partnerships with financial and mobile technology providers can enhance support for these initiatives. Participants also suggested recognition programs for digitized agencies to motivate stakeholders to embrace digital transformation.

Government support and policy were deemed crucial for facilitating effective digital transformation. Participants emphasized the need for government-funded training, quality technology, improved infrastructure, and recognition programs. Clear policies, legislative backing, and strong political support were highlighted as essential for sustaining digital transformation efforts. Addressing these needs requires a multifaceted approach, including legislative support, adequate budget allocation, continuous education, and strategic partnerships. Overall, the study underscores the importance of improving digital literacy, investing in better technology and infrastructure, streamlining procurement processes, fostering inter-agency collaboration, and ensuring continuous education and training to drive and sustain digital transformation efforts in the Philippines' public services.

4. Discussion

The profile of digital frontliners in the Philippines' public service digitalization efforts reflects a workforce that is not only diverse in age and gender but also highly educated. This aligns with global trends, where similar studies have found that digital initiatives often attract well-educated individuals, as noted by Alam et al. (2022) and Grebnyak and Novozhenina (2022). However, while the high representation of women in digital frontliner roles is consistent with global observations, it is crucial to explore whether this trend in the Philippines is driven by similar factors such as social expectations and access to digital platforms, or if it is influenced by unique cultural and institutional dynamics specific to the country. The presence of a highly educated workforce, with a significant portion holding advanced degrees, suggests that there is substantial expertise available to drive digital transformation. However, the specific challenges faced by the Philippine public sector, such as resource constraints and bureaucratic inertia, may impact how this education level translates into effective digital innovation, as discussed by Li et al. (2022).

The challenges identified in the study, particularly infrastructure limitations, digital literacy disparities, and bureaucratic obstacles, are consistent with global findings. Studies by Hjort and Tian (2021), Kumar et al. (2022), Shaw (2023), Miller et al. (2023), and Suardana (2023) emphasize the importance of robust digital infrastructure, digital literacy, and efficient bureaucratic processes for successful digitalization efforts. In the context of the Philippines, these challenges are exacerbated by geographic and socioeconomic factors, making it imperative to address these issues through targeted interventions. The significant negative correlations between infrastructure limitations and both efficiency and accessibility highlight the critical need for investment in upgrading the digital infrastructure to support the effective delivery of public services. Similarly, the positive correlations between digital literacy and perceptions of efficiency, transparency, and accessibility underscore the importance of enhancing digital literacy across the population to ensure equitable access to digital public services.

The generally positive perceptions, experiences, and job satisfaction reported by digital frontliners suggest that, despite the challenges, there is a strong foundation for continuing to build and improve digital public services. The high scores for accessibility and interaction quality indicate that digitalization efforts are succeeding in making public services more convenient and user-friendly. However, the slightly lower job satisfaction scores suggest that there are areas for improvement, particularly in enhancing autonomy, recognition, and support for digital frontliners. These findings resonate with the work of Whillans et al. (2023) and Konovalova (2021), who emphasize the importance of these factors in fostering job satisfaction and overall well-being. Addressing these areas will be crucial for maintaining and enhancing the motivation and effectiveness of digital frontliners as they continue to implement and manage digital technologies in public service.

The ANOVA results revealing significant gender and age-based differences in perceptions of digitalization challenges underscore the importance of considering demographic factors in digital transformation strategies. The finding that respondents who preferred not to disclose

their gender perceived more challenges in terms of infrastructure limitations and digital literacy disparities suggests that there may be underlying biases or contextual factors at play. This calls for more inclusive digital literacy programs that specifically address the unique experiences and challenges faced by gender-diverse individuals. Additionally, the age-related differences, where older respondents perceived more digital literacy disparities, suggest a generational gap in digital proficiency that needs to be addressed through targeted training programs tailored to older employees. Ensuring that all demographic groups are adequately supported in their digital roles will be essential for the success of public service digitalization efforts in the Philippines.

Finally, the qualitative insights from digital frontliners provide valuable context to the quantitative findings. The emphasis on government support, streamlined processes, and continuous education reflects the practical needs of those on the front lines of digital transformation. These insights highlight the importance of a comprehensive approach that includes not only technical upgrades and training but also policy reforms and inter-agency collaboration. The success stories shared by participants, such as the implementation of QR-payment systems and maintaining operations during the pandemic, demonstrate the potential of digital tools to transform public service delivery. However, the challenges, particularly those related to low digital literacy and outdated infrastructure, emphasize the need for sustained efforts to build the capacity of digital frontliners and ensure that they have the tools and support necessary to succeed. Addressing these challenges will be critical for realizing the full potential of digital public services in the Philippines.

Policy recommendations that can be proposed to further enhance public service digitalization efforts in the Philippines, particularly in national program to capacitate digital front liners: To improve the digitalization of public services in the Philippines, particularly through a national program aimed at capacitating digital frontliners, several key policy recommendations are proposed:

1. **Establish Government-Funded Training Programs:** Develop ongoing training programs in digital literacy, emerging technology trends, AI, data applications, and automation. These programs should be created in collaboration with financial institutions, technology providers, and educational institutions to ensure high-quality education. However, the nature and structure of these partnerships need to be clearly defined. Formal frameworks for collaboration should be established, outlining the specific roles each institution will play. For example, technology providers could supply cutting-edge tools and platforms for training, while financial institutions might fund scholarships or grants for participants. To manage potential conflicts of interest, a regulatory body or oversight committee should be established to ensure transparency and alignment with public service objectives.
2. **Invest in Digital Infrastructure**: Prioritize investments in digital infrastructure, particularly for improving internet connectivity in underserved areas and providing high-quality equipment to government offices and educational institutions. These investments are foundational to enabling the successful implementation of digital public services and ensuring equitable access across different regions.

3. **Implement Structured Change Management and Communication Strategies**: Structured change management and communication strategies are essential to guide stakeholders through the digital transformation process. The development and execution of these strategies should involve a dedicated task force comprising representatives from various government agencies, IT specialists, and change management experts. This task force will be responsible for addressing resistance to change, developing communication plans, and ensuring sustained stakeholder engagement. Specific methods for addressing resistance might include targeted training sessions, regular updates on the benefits of digitalization, and channels for feedback and concerns. To maintain stakeholder engagement throughout the process, continuous communication, involving regular briefings, newsletters, and interactive workshops, will be key.
4. **Secure Legislative Support**: Advocate for legislative measures to ensure proper budget allocation for IT infrastructure and to mandate continuous improvement in digital literacy and infrastructure. This could include drafting laws that require periodic assessments of digital capabilities and infrastructure needs, ensuring that digital transformation efforts remain aligned with the evolving technological landscape.
5. **Implement Recognition and Benchmarking Initiatives**: Establish recognition programs and benchmarking initiatives to incentivize digital adoption and publicize the successes of agencies that excel in digital transformation. This could involve annual awards, certifications, and public recognition for agencies that demonstrate exceptional progress in digitalization.
6. **Promote Cross-Agency Collaboration**: Encourage collaboration among government agencies to harmonize digital initiatives and develop a centralized digital transformation strategy. This collaboration should be formalized through inter-agency agreements or memoranda of understanding, ensuring that all parties are aligned on goals and responsibilities. Regular inter-agency meetings and joint task forces could be established to oversee the implementation of this centralized strategy, ensuring that digital initiatives are cohesive and mutually supportive.
7. **Enhance Public Digital Literacy**: Implement comprehensive training programs for the public to improve digital literacy and ensure accessibility to digital services. These programs should be inclusive, with additional support for vulnerable groups such as older people and residents of rural areas. This could include offering free or subsidized courses, creating easy-to-understand digital literacy materials, and setting up community centers with digital resources and support staff.
8. **Establish Mechanisms for Monitoring and Evaluation**: Create mechanisms for regularly monitoring and evaluating digital initiatives. This should include establishing feedback loops where digital frontliners and the public can provide input on their experiences with digital services, leading to continuous refinement and improvement of digital transformation efforts. A dedicated evaluation team within the government could be tasked with collecting and analyzing data on the effectiveness of these initiatives, ensuring that they are meeting their intended goals and adjusting strategies as needed.

Acknowledgments

The researcher expresses deep gratitude to his advisor for providing invaluable guidance and support throughout the research. Appreciation is also extended to the members of the Oral Examination Committee for offering critical insights and constructive feedback. The researcher acknowledges the significant contributions of administrative and data collection support to the success of the study. Special thanks are given to the digital front-liners whose participation and shared experiences formed the foundation of the research. Lastly, the researcher is profoundly thankful for the unwavering support, love, and inspiration provided by their family, colleagues, and friends.

References

Addo, A. (2021). Controlling petty corruption in the public administrations of developing countries through digitalization: An opportunity theory-informed study of Ghanaian customs. *The Information Society, 37*(2), 99–114. https://doi.org/10.1080/01972243.2020.1870182

Ahmad. (2020). *Strategi frontliner dalam mengoptimalkan Muamalat DIN (Digital Islamic Network) pada Bank Muamalat KC Palangka Raya*. Digital Library IAIN Palangka Raya. Retrieved February 9, 2024, from http://digilib.iainpalangkaraya.ac.id/2801/

Alam, M. N., Hossain, M. F., & Ali, M. C. (2023). The mediating effect of job satisfaction on technology law compliance: A study of employee perceptions in the digital era. *International Journal for Multidisciplinary Research, 5*(4). https://doi.org/10.36948/ijfmr.2023.v05i04.4656

Alvarenga, A., Matos, F., Godina, R., & Matias, J. C. O. (2020). Digital transformation and knowledge management in the public sector. *Sustainability, 12*(14), 5824. https://doi.org/10.3390/su12145824

Breit, E., Egeland, C., Løberg, I. B., & Rønnebæk, M. T. (2020). Digital coping: How frontline workers cope with digital service encounters. *Social Policy & Administration, 55*(5), 833–847. https://doi.org/10.1111/spol.12664

Borodina, O., & Trushkina, N. (2021). The cluster approach to the digitalization of public governance in the regional strategy: International practice and Ukrainian realities. *Economics & Education, 6*(4), 12–22. https://doi.org/10.30525/2500946x/202142

Capistrano, E. P. (2020). Determining eGovernment trust: An information systems success model approach to the Philippines' Government Service Insurance System (GSIS), the Social Security System (SSS), and the Bureau of Internal Revenue (BIR). Retrieved from https://pmr.upd.edu.ph/index.php/pmr/article/view/342

ElMassah, S., & Mohieldin, M. (2020). Digital transformation and localizing the sustainable development goals (SDGs). *Ecological Economics, 169*, 106490. https://doi.org/10.1016/j.ecolecon.2019.106490

Gita-Carlos. (2023). The government seeks P38.75B for digitalization efforts in 2024. *Philippine News Agency*. Retrieved February 9, 2024, from

https://www.pna.gov.ph/articles/1210206

Grebnyak, O. V., & Novozhenina, O. P. (2022). Distribution of socio-gender activity in the transition to a digital state. *Vestnik RGGU. Seriâ: Filosofiâ, Sociologiâ, Iskusstvovedenie, 1*, 256–265. https://doi.org/10.28995/2073-6401-2022-1-256-265

Ha, L. T. (2022a). Are digital business and digital public services drivers for better energy security? Evidence from a European sample. *Environmental Science and Pollution Research International, 29*(18), 27232–27256. https://doi.org/10.1007/s11356-021-17843-2

Henman, P. (2020). Improving public services using artificial intelligence: Possibilities, pitfalls, and governance. *Asia Pacific Journal of Public Administration, 42*(4), 209–221. https://doi.org/10.1080/23276665.2020.1816188

Hjort, J., & Tian, L. (2021). The economic impact of internet connectivity in developing countries. *Social Science Research Network*. https://doi.org/10.2139/ssrn.3964618

Kumar, S. K. A., Ihita, V. G., Chaudhari, S., & Paventhan, A. (2022). A survey on rural internet connectivity in India. https://doi.org/10.1109/comsnets53615.2022.9668358

Lapuz, M. C. M. (2023). The role of local community empowerment in the digital transformation of rural tourism development in the Philippines. *Technology in Society, 74*, 102308. https://doi.org/10.1016/j.techsoc.2023.102308

Lai, J., & Widmar, N. O. (2020). Revisiting the digital divide in the COVID-19 era. *Applied Economic Perspectives and Policy, 43*(1), 458–464. https://doi.org/10.1002/aepp.13104

Li, L., Liu, L., & Wu, H. (2022). Workforce education and corporate innovation. *Australian Journal of Management, 47*(4), 599–629. https://doi.org/10.1177/03128962221077453

Lin, Z., Tarasova, O., Lomakina, O., Li, O., & Gribkova, I. (2023). Public services: Forced digitalization in a pandemic—the nuances of management. *Institute for Local Self-Government and Public Procurement*. https://doi.org/10.4335/21.1.93-116(2023)

Løberg, I. B. (2022). Assessments of digital client representations: How frontline workers reconstruct client narratives from fragmented information. *Journal of Public Administration Research and Theory*. https://doi.org/10.1093/jopart/muac017

Magcope, A., Abante, M. V., Caspe, R. J., Vigonte, F., & Peñamora, J. (2023). Assessing the utility of digital governance for inter-generational public sector workers. *Social Science Research Network*. https://doi.org/10.2139/ssrn.4629912

Miller, L. M. S. (2024). Digital literacy training for low-income older adults through undergraduate community-engaged learning: A single group pre-post study (Preprint). *JMIR Aging, 7*, e51675. https://doi.org/10.2196/51675

Moreno, F., & Zabala, C. (2023). Digitalization of municipal governments in the Zamboanga Peninsula region, Philippines: Problems, viability, and way forward. *Social Science Research Network*. https://doi.org/10.2139/ssrn.4519195

PBBM orders immediate digitalization of vital government services to boost ease of doing business and combat corruption. (2023). *Presidential Communication Office*. Retrieved February 9, 2024, from https://pco.gov.ph/news_releases/pbbmordersimmediate

Scholkmann, A. (2023). Who are the frontline workers of digital transformations in higher education? A conceptual elaboration. *Springer eBooks*. https://doi.org/10.1007/9783031277580_8

Shahril, R. N., Makhbul, Z. K. M., & Osman, L. H. (2023). Sustainability public service through digitalization: Mapping the field and future directions via a bibliometric review. *Journal of Law and Sustainable Development, 11*(11), e1767. https://doi.org/10.55908/sdgs.v11i11.1767

Shen, Y., Cheng, Y., & Yu, J. (2022). From recovery resilience to transformative resilience: How digital platforms reshape public service provision during and post COVID-19. *Public Management Review, 25*(4), 710–733. https://doi.org/10.1080/14719037.2022.2033052

Trece ñe, J. K. D. (2021). The digital transformation strategies of the Philippines from 1992 to 2022: A review. *Engineering & Technology Review, 2*(1), 8–13. https://doi.org/10.47285/etr.v2i1.66

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the Association for Information Systems, 17*(5). Retrieved March 23, 2024, from https://aisel.aisnet.org/jais/vol17/iss5/1/

Whillans, A., Lee-Yoon, A. J., Murray, J., Schlund, R., Sommers, R., Bohns, V., Hur, J. D., Ruttan, R. L., Lin, J., Conzon, V., Yang, D., Park, D., Kelly, E., & DeVoe, S. E. (2023). How time management, autonomy, and flexibility can shape the employee experience. *Proceedings, Academy of Management, 2023*(1). https://doi.org/10.5465/amproc.2023.16060symposium

Copyright Disclaimer