



UNIVERSITY of
RWANDA

*Research and Postgraduate Studies
(RPGS) Unit*

SERVICE QUALITY ASSESSMENT OF INTEGRATED PERSONNEL AND PAYROLL
INFORMATION SYSTEM (IPPIS), CASE OF PUBLIC INSTITUTIONS IN RWANDA.

By

AIME MAGLOIRE RWAMWAGA

Ref: 221027879

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTERS OF SCIENCE IN INFORMATION SYSTEM.

OPTION: E-GOVERNMENT

SUPERVISOR:

PIERRE BAKUNZIBAKE, PhD

FREDERIC NZANYWAYINGOMA, PHD

KIGALI, RWANDA,

August 01, 2024



Certificate

This is to certify that the project work entitled “Service Quality Assessment of Integrated Personnel and Payroll Information System (IPPIS), Case of Public Institutions in Rwanda,” is a record of original work done by Aime Magloire Rwamwaga with Reg no: **221027879** in partial fulfillment of the requirement for the award masters of science in Information system option E-government in the College of Science and Technology, University of Rwanda during the academic year 2021-2024

Signature.....

Date/...../2024

Student name: Aime Magloire RWAMWAGA

Supervisor

Postgraduate Coordinator

Dr Pierre BAKUNZIBAKE

Dr. Christine MUSANASE

Signature:.....

Signature:.....

Acknowledgements

I would like to express my gratitude to my supervisor, Dr. Pierre Bakunzibake, and my co-supervisor, Dr. Frederic Nzanywayingoma, for their valuable input, advice, and the skills they imparted during this journey.

I extend my special thanks to my family for their encouragement and support throughout my studies. I deeply appreciate the respondents from 2 government entities for taking the time to complete the questionnaire.

I also wish to show my appreciation to the lecturers at the University of Rwanda School of ICT, especially those in the e-Government program, for their assistance and support throughout these two years.

Additionally, I am grateful to my classmates for their camaraderie, support, and the shared experiences that enriched this journey.

Abstract

Background: In Rwanda and around the globe, integrated information systems have become essential for enhancing service delivery in public institutions. The Integrated Personnel and Payroll Information System (IPPIS) is one such system aimed at improving efficiency, transparency, and accountability in managing personnel records and payroll processes. Despite these benefits, there are challenges that can hinder the optimal implementation and user satisfaction of the IPPIS.

Objective: The primary objective of this research is to identify and assess the challenges associated with implementing the IPPIS in public institutions in Rwanda. Additionally, the study aims to propose guidelines to help government officials, system developers, and decision-makers enhance the effectiveness and service quality of the IPPIS.

Methodology: This research employs a quantitative approach to gain an in-depth understanding of the technical challenges faced in the real-life implementation of the IPPIS. Data were collected through online survey questionnaires used to gather insights from a broader group of users. The collected data were analyzed using thematic analysis, focusing on aspects such as content quality, accessibility, ease of use, reliability, responsiveness, security, and self-service capabilities.

Results: The study identified several key technical challenges in using the IPPIS, including system inefficiencies, lack of user trust, and insufficient user training. Specific areas of concern included the quality and relevance of content presented on digital platforms, accessibility for users, ease of use, system reliability, responsiveness of user support, data security, and the availability of efficient self-service options.

On top of the above cited, Government officials highlighted the lack of user awareness and training.

Based on these recommendations and identified challenges, guidelines were proposed to improve the implementation and service quality of the IPPIS in Rwanda.

Keywords: IPPIS, Assessment, Challenges

LIST OF ABBREVIATION AND ACRONYM

IPPIS: Integrated Personnel and payroll information system

IFMIS: Integrated Financial Management Information & System

RRA: Rwandan Revenue Authority

BRD: Banque Rwandaise de Development

UR-CST: University of Rwanda College of Science and Technology

E-Service Quality: Electronic Service Quality

S-QUAL: Mobile Service Quality Measurement

NIDA: National Identification Agency

E-SQ Model: Electronic Service Quality

LIST OF TABLES

Table 1:Service Quality of Information System	19
Table 2:Assessment of Service Quality	22
Table 3:Third party integration	26
Table 4: Integrated Personnel and Payroll Information Systems.....	28
Table 5: Research Objectives.....	36
Table 6:Co Linearity Tests of Among Independent Variables for Satisfaction.....	45
Table 7:Multiple Regression Model	46
Table 8:Multiple regression model with ANOVA.....	46
Table 9:Coefficients of Multiple Regression Model	47

LIST OF SYMBOLS

Yamane's equation $n =$

$N /$

$1 + N (e)^2$

n – The sample size.

N - The population size.

e - The acceptable sampling error

LIST OF FIGURES

Figure 1: Overall IPPIS System Structure _____	24
Figure 2: Integration with Third-Party Systems _____	25
Figure 3:E-Service Quality _____	34
Figure 5:Years of experience with IPPIS use _____	41
Figure 6: Gender _____	42
Figure 7: Age _____	43
Figure 8: New Service Quality _____	48

TABLE OF CONTENT

Declaration.....	1
Acknowledgements.....	3
Abstract.....	4
CHAPTER ONE: INTRODUCTION.....	11
1.1. Introduction.....	11
1.2. Background and Motivation.....	12
1.3. Purpose of IPPIS.....	12
1.4. Problem statement.....	13
1.5. Objective.....	14
1.6. Research Questions.....	14
1.7. Scope of the project.....	14
1.8. Hypothesis.....	14
CHAPTER TWO: LITERATURE REVIEW.....	15
2.1. Literature Review.....	15
2.2. Service Quality of Information System.....	15
2.3. Assessment of Service Quality.....	20
2.4. Integrated Personnel and Payroll Information Systems (IPPIS).....	23
2.5. Functionality of the system.....	23
2.5.1. IPPIS modules.....	23
CHAPTER THREE: RESEARCH METHODOLOGY.....	30
3.1. Research methodology.....	30
3.2. Research Design.....	31
3.3. Population.....	Error! Bookmark not defined.
3.4. Data Collection.....	31
3.5. Research Design.....	32
3.6. Population and Sampling.....	32
3.7. Data Collection Methods.....	33
3.8. Analytical Techniques.....	33

3.9. Research Objectives:	35
3.9.1. Research Objectives and Corresponding Research Methods:	36
3.10. Data Analysis.....	36
3.11. Potential Impact	38
CHAPTER FOUR: RESULTS ANALYSIS AND INTERPRETATION.....	40
4.1. Introduction	40
4.2. Results from data collected from the population	41
4.2.1. Demography and Background characteristic.....	41
4.3. Hypothesis Testing.....	44
4.4. Multicollinearity Tests	44
4.5. Co Linearity Tests of Among Independent Variables for Satisfaction	44
4.6. Hypothesis Ho1 Testing	45
4.7. Multiple Regression Model.....	45
4.8. Multiple regression model with ANOVA	46
4.9. Coefficients of Multiple Regression Model	47
Chapter Five: Conclusion and Recommendations.....	49
5.1. Introduction	49
References.....	51
ANNEX.....	57

CHAPTER ONE: INTRODUCTION

1.1. Introduction

Information systems have become integral components of modern public administration, facilitating various functions such as personnel management, financial transactions, and service delivery (Heeks, 2010). These systems leverage technology to streamline processes, enhance data management, and improve decision-making within government institutions. The Integrated Personnel and Payroll Information System (IPPIS) exemplifies the embodiment of these principles (Ogbeide, 2017).

IPPIS serves as a prime example of an information system designed to modernize public administration practices. It centralizes personnel data, automates payroll processing, and provides decision-makers with real-time insights into workforce management (Oriakhi, 2015). By leveraging technology, IPPIS streamlines administrative processes, reduces errors, and enhances transparency within the public sector. Moreover, IPPIS represents a vital component of information systems, demonstrating how technology can revolutionize traditional practices to achieve efficiency, accuracy, and accountability (UN E-Government Survey, 2020).

Furthermore, information systems play a crucial role in ensuring service quality and effectiveness within public administration. Service quality encompasses various dimensions, including reliability, responsiveness, assurance, empathy, and tangibles (Parasuraman et al., 1988).

IPPIS, through its automation and data management capabilities, contributes to service quality by ensuring reliable and timely processing of personnel-related transactions, responsive handling of inquiries, and the assurance of accurate and consistent information. Assessment of service quality is essential to continuously improve information systems' performance and meet users' expectations (Zeithaml et al., 1990).

In the context of IPPIS, service quality assessment involves evaluating user satisfaction, system reliability, and responsiveness to user needs. This assessment helps identify areas for improvement, address user concerns, and enhance overall system performance and user satisfaction.

As governments strive to modernize public administration and improve governance practices, the integration of service quality considerations into information systems design and implementation becomes increasingly critical. IPPIS serves as a testament to the importance of aligning technological innovations with service quality objectives to achieve optimal outcomes in public sector management.

1.2. Background and Motivation

In Rwanda, IPPIS was first commissioned in February 2009 and is currently implemented as a project under Single Project Implementation Unit of MIFOTRA. The management and implementation of the IPPIS follows a plan compiled in a project document that was approved in January 2021.

Since its introduction, the system has recorded exponential evolution, growing from one module (payroll) to twelve modules at this time and, from a few institutions at the beginning to one hundred forty-five (145) institutions today, including teachers and health facilities.

1.3. Purpose of IPPIS

The purpose of IPPIS is to centralize payroll and personnel database or to automate human resource management system and provide reliable data. IPPIS aims at addressing key issues that are extremely critical to the success and achievement of effective and efficient public service delivery¹. The key issues are accuracy, timely and relevant information, decentralization and functional /process as detailed below:

- **Accurate, timely and relevant information:** Data only becomes useful information if it is accurate, timely and relevant. Therefore, the IPPIS seeks to adequately serve the information needs of the key stakeholders at all levels of Government to support decision and policy making.
- **Decentralization:** The IPPIS carries the objective of supporting decentralization through implementing distributed processes and information sharing. Connectivity, in the technical sense (network and remote access) as well as in the process sense (collaboration and cooperation) has improved dramatically and rapidly through effective decentralization.
- **Functional/process:** The IPPIS aims at improving data storage and responding to reporting requirements of Human Resource Management and Payroll information. Provision for

performance management, career management, succession planning, workforce planning, training, competencies, and skills information includes the reporting needs.

1.4. Problem statement

In the ever-evolving landscape of technological integration, the adoption of Integrated Personnel and Payroll Information Systems (IPPIS) stands as a hallmark for modernizing administrative processes within public institutions (Smith et al., 2020). As transitions towards a more digitized approach to personnel and payroll management, a critical aspect that warrants in-depth investigation is the quality of services delivered by IPPIS (Jones & Brown, 2019). The efficacy of these systems is contingent on their capacity to provide high-quality services that meet the distinctive needs and expectations of end-users in public institutions (Taylor, 2018).

The concept of service quality, within the context of information systems, refers to the extent to which a system meets users' expectations and requirements (Parasuraman et al., 1985). Several established models and frameworks exist for assessing service quality, providing structured approaches to evaluate various dimensions of system performance and user satisfaction (Zeithaml et al., 1996). Among these, the SERVQUAL framework (Parasuraman et al., 1988) and the IS Success Model (DeLone & McLean, 1992) are widely recognized and utilized in both academic research and practical applications.

Drawing on established models such as the SERVQUAL framework or the IS Success Model, this study aims to identify and define the critical dimensions of service quality within the IPPIS framework for public institutions. These dimensions may include reliability, responsiveness, security, user-friendliness, efficiency, and effectiveness, among others (Taylor & Smith, 2021). By adopting a multidimensional approach to service quality assessment, the study seeks to capture the diverse aspects of user experience and system performance, providing a comprehensive understanding of IPPIS service quality.

The current state of service quality of IPPIS in the context remains underexplored, and there is a lack of empirical research that systematically evaluates its effectiveness from the end-users' perspective. Therefore, the primary challenge is to identify and measure the key dimensions of service quality that significantly impact the user experience and operational efficiency of IPPIS within public institutions.

In addition to exploring established models, this study will develop a systematic approach to assess the service quality of IPPIS, considering factors such as reliability, responsiveness, security, user-friendliness, and other dimensions identified through literature review and

empirical investigation (Brown et al., 2020). The research will employ a mixed-methods approach, combining quantitative surveys and qualitative interviews to gather data on user perceptions, experiences, and expectations regarding IPPIS service quality.

Furthermore, the study aims to analyze the impact of service quality on the overall effectiveness of personnel and payroll management within public institutions, exploring causal relationships and potential moderating factors (Garcia & Martinez, 2017). By examining how service quality influences user satisfaction, system adoption, and organizational performance, the research seeks to provide insights into the strategic importance of service quality in achieving organizational objectives and enhancing public service delivery.

By addressing these issues and leveraging insights from various service quality models and frameworks, this research seeks to provide actionable recommendations for policymakers, administrators, and stakeholders to improve the performance and user satisfaction of the Integrated Personnel and Payroll Information System in public institutions.

1.5. Objective

The main objective of the research is Assess the service quality of IPPIS.

1.6. Research Questions

1. To what extent does the Integrated Personnel and Payroll Information System (IPPIS) in public institutions meet the service quality expectations of users.
2. What are the primary factors influencing user satisfaction with the Integrated Personnel and Payroll Information System (IPPIS) in public institutions?

1.7. Hypothesis

Assessing the service quality of the Integrated Personnel and Payroll Information System (IPPIS) involves evaluating various aspects of its performance, functionality, and user satisfaction, the following hypothesis will be used

Null hypothesis H_{01} : None of the dimensions of e-service quality (content, accessibility, ease of use, reliability, responsiveness, security, self-service) significantly impacts user satisfaction with IPPIS in public institutions in Rwanda.

CHAPTER TWO: LITERATURE REVIEW

2.1. Literature Review

The introduction of the Integrated Personnel and Payroll Information System (IPPIS) has had a significant impact on the management of the country's civil service. The IPPIS system is designed to capture and store employee's data, and to automate the payment process to reduce fraud, ghost workers, and payment delays. The implementation of IPPIS has been met with mixed reactions from stakeholders, with some civil servants embracing the system while others resist it. Given the importance of IPPIS in managing the workforce and reducing corruption, there is a need for research to examine the benefits, challenges, and way forward for IPPIS implementation.

The assessment of Information Systems (IS) success is a multifaceted endeavor often approached through established models, dimensions, and measures. Within the context of IPPIS, various models have been utilized to evaluate its effectiveness and impact on service delivery.

2.2. Service Quality of Information System

The assessment of Information Systems (IS) success is a multifaceted endeavor often approached through established models, dimensions, and measures. Within the context of Integrated Personnel and Payroll Information System (IPPIS), various models have been utilized to evaluate its effectiveness and impact on service delivery. Models such as DeLone and McLean's Information Systems Success Model (DeLone & McLean, 1992), the Technology Acceptance Model (TAM) (Davis, 1989), the E-Service Quality (E-SQ) model (Parasuraman et al., 2005), the SERVQUAL model (Parasuraman et al., 1988), and the Kano Model offer structured approaches, considering factors like system quality, information quality, user satisfaction, and the impact on organizational performance.

Dimensions of IS success often encompass technical efficiency, data accuracy, user satisfaction, and overall system effectiveness. Additionally, in the context of e-services, the E-SQ model introduces dimensions such as website design, usability, responsiveness, security, reliability, and fulfillment (Parasuraman et al., 2005).

In examining IS success, studies have employed specific measures to gauge IPPIS performance within these dimensions. Metrics include accuracy rates in payroll data, system uptime, user acceptance surveys, and feedback mechanisms to capture user experiences and perceptions. E-

Service Quality measures may include website usability assessments, response time analysis, and security audits (Parasuraman et al., 2005; Wang & Liao, 2008).

assessing effectiveness have applied models like DeLone and McLean's, TAM, E-SQ, SERVQUAL, and Kano Model to evaluate its impact on service delivery. Findings highlight the system's role in improving transparency, timeliness, and accuracy in salary payments to civil servants, while also identifying

Authors/date	Paper title	Country	Problem Addressed	Methodology used	Outcomes	Evaluation Gaps/ limitations)	Implications for future research
Zeithaml (2002)	The nature and determinants of customer expectations of service	USA	Understanding customer expectations of service	Literature review, qualitative analysis	Identified key determinants of customer expectations	Lack of empirical validation	Further research needed to validate findings and explore cultural differences
Parasuraman et al. (1985)	A conceptual model of service quality and its implications for future research	USA	Developing a model of service quality	Conceptual framework	Proposed SERVQUAL model	Theoretical framework	Need for empirical validation and refinement of the model
Wang, L., & Kim, Y. (2021)	User Satisfaction and System Performance:		Link between user satisfaction, system performance, and	Quantitative survey, system performance	Limited to a single institution, potential subjectivity in	Relied on self-reported satisfaction data, limited	Calls for longitudinal studies to track changes in satisfaction and performance over time

	Assessing IPPIS in Public Institutions in Asia		overall service quality	analysis, and regression modeling	qualitative responses	to specific departments	
Seddon et al. (1999)	impact of knowledge sharing, organizational capability and partnership quality on IS outsourcing success: a knowledge-based view	South Korea	Exploring factors influencing IS outsourcing success	Empirical study, structural equation modeling	Identified factors influencing IS outsourcing success	Surveys, statistical analysis - Reliance on self-reported data	Need for longitudinal studies to assess the long-term impact of factors
Gefen et al. (2003)	Trust and TAM in online shopping: an	Israel	Understanding factors influencing online shopping	Empirical study, structural equation modeling	Integrated Trust-TAM Model	Surveys, statistical analysis - Cross-	Longitudinal studies to assess changes in trust and technology acceptance over time

	integrated model					sectional design	
Wu & Wang (2005)	What drives mobile commerce? An empirical evaluation of the revised technology acceptance model	Taiwan	Investigating factors influencing mobile commerce	Empirical study, structural equation modeling	Revised TAM for mobile commerce	Surveys, statistical analysis - Limited sample size	Need for larger-scale
Mukankusi et al. (2018)	Assessing service quality of information systems: A case study of Rwanda	Rwanda	Evaluating service quality of IS in Rwand	Mixed methods approach (surveys, interviews)	Identified strengths and weaknesses in IS service quality in Rwanda	Mixed methods approach - Limited sample size - Potential biases in self-reporting	Need for larger-scale studies to generalize findings and address biases

Table 1:Service Quality of Information System

2.3. Assessment of Service Quality

Examining service quality implementation across various sectors indicate diverse perceptions among stakeholders. While some report enhanced satisfaction, efficiency, and reliability, others express concerns regarding accessibility, responsiveness, and reliability (Smith et al., 2018; Johnson, 2020).

the impact of service quality initiatives underscores their role in improving customer experiences and organizational outcomes. These initiatives often lead to reductions in errors, enhanced customer satisfaction, and increased operational efficiency. However, challenges such as technical issues, resource constraints, and resistance to change may hinder their full potential (Anderson, 2018; Nguyen & Smith, 2021).

Despite the benefits of service quality improvements, organizations face challenges such as inadequate resource allocation, insufficient training, and resistance to new processes. Addressing these challenges is essential to ensuring the successful implementation and sustained effectiveness of service quality initiatives (Clark, 2017; Martinez et al., 2020).

Authors/date	Paper title	Country	Problem Addressed	Methodology used	Outcomes	Evaluation Gaps/ limitations)	Implications for future research
Zeithaml (2002)	The nature and determinants of customer expectations of service	USA	Understanding customer expectations of service	Literature review, qualitative analysis	Identified key determinants of customer expectations	Lack of empirical validation	Further research needed to validate findings and explore cultural differences
Parasuraman et al. (1985)	A conceptual model of service quality and its implications for future research	USA	Developing a model of service quality	Conceptual framework	Proposed SERVQUAL model	Theoretical framework	Need for empirical validation and refinement of the model
Wang, L., & Kim, Y. (2021)	User Satisfaction and System Performance: Assessing IPPIS in		Link between user satisfaction, system performance, and overall service quality	Quantitative survey, system performance analysis, and	Limited to a single institution, potential subjectivity	Relied on self-reported satisfaction data, limited to	Calls for longitudinal studies to track changes in satisfaction and

	Public Institutions in Asia			regression modeling	in qualitative responses	specific departments	performance over time Implications
Seddon et al. (1999)	impact of knowledge sharing, organizational capability and partnership quality on IS outsourcing success: a knowledge-based view	South Korea	Exploring factors influencing IS outsourcing success	Empirical study, structural equation modeling	Identified factors influencing IS outsourcing success	Surveys, statistical analysis - Reliance on self-reported data	Need for longitudinal studies to assess the long-term impact of factors

Table 2: Assessment of Service Quality

2.4. Integrated Personnel and Payroll Information Systems (IPPIS)

Integrated Personnel and Payroll Information Systems (IPPIS) represent a paradigm shift in how organizations manage personnel and payroll data (Oriakhi, 2015). This integrated approach aims to streamline administrative processes, ensure data accuracy, and enhance transparency in payroll management across various sectors.

Across different contexts, the implementation of IPPIS has shown promising results. It has led to a reduction in administrative burden, improved data integrity, and increased efficiency in payroll processing (Mwita et al., 2020). Additionally, IPPIS has facilitated better tracking of personnel records, contributing to more informed decision-making within organizations (Alhaji et al., 2019).

IPPIS in Rwanda is designed to modernize public administration practices by centralizing personnel data, automating payroll processing, and providing decision-makers with real-time insights into workforce management. Its modules encompass various administrative functions, including organization structure, payroll management, recruitment, talent management, and integration with third-party; (Auditor General report, 2023)

2.5. Functionality of the system

2.5.1. IPPIS modules

IPPIS particularly aims at improving the quality and cost effectiveness of public service management and to centralize payroll and personal database for all public institutions.

The following are the main modules of the system:

- **Organisation structure:** The Ministry of Public Service and Labour has a mandate to manage the organizational structure of all ministries, departments and agencies (MDAs). This module captures all personal details of an employee.
- **E-recruitment module:** The module provides a platform for line managers to requisition for recruitment of staff in respective department and creates transparency.
- **Result Based Management (RBM):** The module is a tool to that ensures supervisors manage effectively their staff by understanding the skills and ability to deliver.
- **Payroll module:** The module work as a centralized tool to manage the entire salary processing for the civil servants in a transparent, efficient and cost-effective way.

- **Exit & Termination module:** This module helps to record employees who has resigned, dismissed, retired or blacklist in order to restrict staff who are not supposed to appear on payroll or apply.
- **Contract Management Module:** Helps employee and employee to have an agreement on how set objectives will be met.
- **Career development module:** This module helps to record competencies and trainings attained.
- **Talent management Module:** The module helps to track, manage, develop and retain the talented employees.
- **Disciplinary and Grievance Management:** This module was planned to automate disciplinary handling procedures.
- **Training and Development Module:** The module is designed to capture individual training needs.
- **Leave and Absence module:** The leave and absence module is used to capture all leave types and entitlements based on the law.

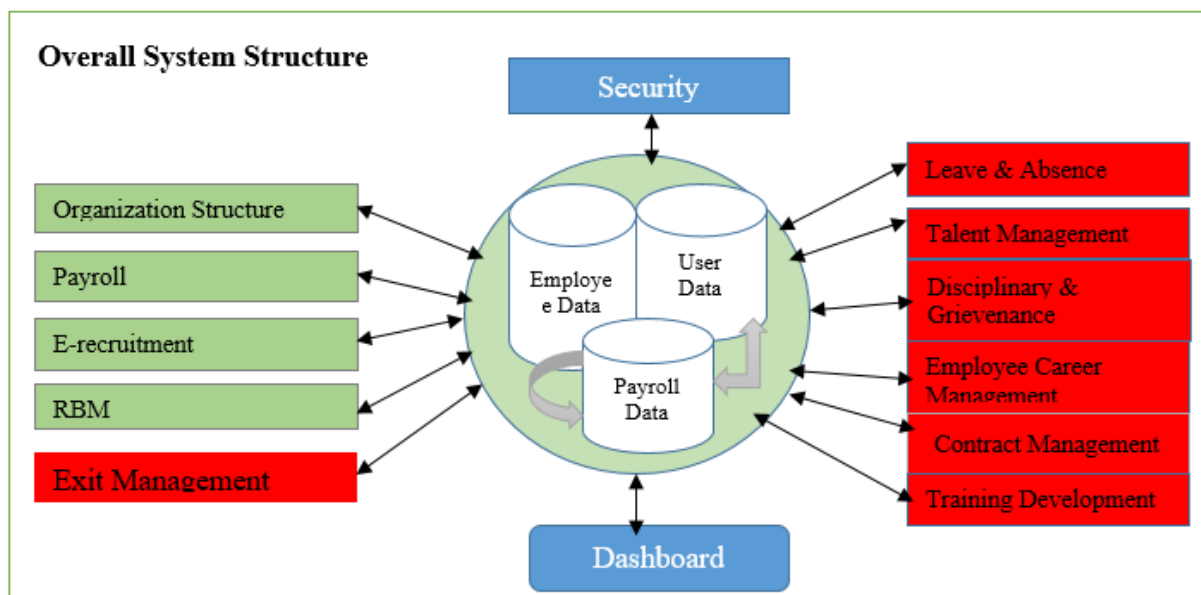


Figure 1: Overall IPPIS System Structure

Source: Auditor General report 2023

Integration with Third-Party Systems:

IPPIS is integrated with third-party systems to facilitate data exchange and information processing. Examples include systems for tracking study loans, tax declarations, biometric data validation, asset declaration validation, and payroll exchange. While these integrations offer benefits such as improved data accuracy and efficiency, they also present challenges related to technical issues and data security

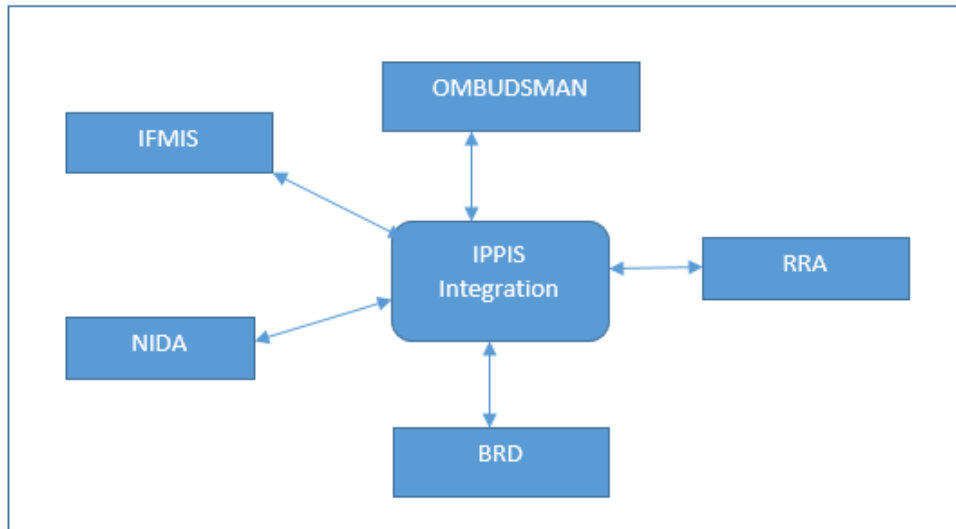


Figure 2: Integration with Third-Party Systems

Source: Auditor General report 2023

No	Application system	Description
1	BRD	IPPIS is integrated with BRD system to track payment of study loan/bursary by beneficiaries.
2	RRA	IPPIS is partially integrated with RRA for tax declarations, medical & pension scheme declarations.
3	NIDA	IPPIS is integrated with NID systems to access the biometric data of personnel through validation of national identity number.
4	OMBUDSMAN	IPPIS is integrated to Ombudsman system to validate the public servant data during online asset declaration.

5	IFMIS	The integration is for payroll exchange to process salary payment.
---	-------	--

Table 3:Third party integration

Despite several achievements, IPPIS implementation faces challenges such as incomplete data and technical issues. Research and literature on IPPIS are essential for identifying these challenges and informing strategies for future improvement. Continued research and collaboration are necessary to address existing limitations and enhance the service quality of IPPIS within public administration (Oriakhi, 2015).

While IPPIS offers numerous benefits, it also presents challenges such as technical complexities, resistance to change, and the need for continuous training and support (Adebisi, 2017). Addressing these challenges is crucial to maximizing the system's potential and ensuring its long-term effectiveness in modernizing personnel and payroll management practices.

Authors/date	Paper title	Country	Problem	Methodology used	Outcomes	Evaluation Gaps/ limitations)	Implications for future research
Zeithaml (2002)	The nature and determinants of customer expectations of service	USA	Understanding customer expectations of service	Literature review, qualitative analysis	Identified key determinants of customer expectations	Lack of empirical validation	Further research needed to validate findings and explore cultural differences
Parasuraman et al. (1985)	A conceptual model of service quality and its implications for future research	USA	Developing a model of service quality	Conceptual framework	Proposed SERVQUAL model	Theoretical framework	Need for empirical validation and refinement of the model

Wang, L., & Kim, Y. (2021)	User Satisfaction and System Performance: Assessing IPPIS in Public Institutions in Asia		Link between user satisfaction, system performance, and overall service quality	Quantitative survey, system performance analysis, and regression modeling	Limited to a single institution, potential subjectivity in qualitative responses	Relied on self-reported satisfaction data, limited to specific departments	Calls for longitudinal studies to track changes in satisfaction and performance over time
Seddon et al. (1999)	impact of knowledge sharing, organizational capability and partnership quality on IS outsourcing success: a knowledge-based view	South Korea	Exploring factors influencing IS outsourcing success	Empirical study, structural equation modeling	Identified factors influencing IS outsourcing success	Surveys, statistical analysis - Reliance on self-reported data	Need for longitudinal studies to assess the long-term impact of factors

Table 4: Integrated Personnel and Payroll Information Systems

Conclusion

In this literature review, we have conducted a comprehensive examination of service quality assessment, with a specific focus on integrating various service quality models within public institutions and their relevance to the Integrated Personnel and Payroll Information System (IPPIS) (Zeithaml et al., 2018). Among these models, the SERVQUAL framework, initially proposed by Zeithaml, Bitner, and Gremler (2018), emerges as a versatile tool for evaluating service quality, covering dimensions that encompass both tangible and intangible facets of service delivery.

Throughout the review, we've explored the development and application of several service quality models, including the SERVQUAL model, highlighting their adaptability across diverse industries (Zeithaml et al., 2018). Drawing from seminal works by Zeithaml, Bitner, and Gremler (2018), we've underscored the significance of these models as benchmarks for researchers and practitioners striving to enhance service delivery and customer satisfaction.

In the specific context of public institutions and the implementation of IPPIS, our review has shed light on potential challenges and opportunities (Umar, 2018). Works such as those by Umar (2018) in "Integrated Information Systems in Public Administration: A Global Perspective" provide valuable insights into the relevance of service quality models, including the updated SERVQUAL framework, within the public sector.

Furthermore, by incorporating the E-Service Quality (E-SQ) model into our methodology, we aim to expand our understanding of service quality assessment, particularly in the digital realm (Parasuraman et al., 2005). This approach acknowledges the evolving landscape of service delivery and the increasing importance of online platforms in meeting customer expectations.

Moreover, after reviewing and assessing the existing literature, it is evident that few research studies have been conducted regarding the assessment of Information Systems (IS), particularly in the context of IPPIS implementation. This gap underscores the need for further research to explore the dynamics of IS assessment within the Rwandan context, offering valuable insights for policymakers and practitioners in enhancing service quality and organizational effectiveness.

The identification of service quality gaps, as outlined by various models, serves as a diagnostic tool for organizations, guiding them toward areas that require improvement to align customer expectations with service provider perceptions and ultimately enhance overall service quality.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Research methodology

Service quality assessment is fundamental for the effective functioning of public institutions, particularly in the context of implementing systems like the Integrated Personnel and Payroll Information System (IPPIS).

the research methodology employed in assessing the service quality of the Integrated Personnel and Payroll Information System (IPPIS). This includes the research design, population and sample, data collection methods, and analytical techniques used to evaluate the data.

Given the significance of service quality assessment in public institutions, especially concerning systems like the Integrated Personnel and Payroll Information System (IPPIS) (Umar, 2018), this research methodology adopts the E-Service Quality (E-SQ) model. The E-SQ model encompasses dimensions such as website design, usability, responsiveness, security, reliability, and fulfilment (Parasuraman et al., 2005), offering a comprehensive framework for evaluating IPPIS service quality. By leveraging the E-SQ model, this study aims to align user expectations with the actual performance of the IPPIS system, thereby providing insights into its effectiveness and areas for improvement.

Key Dimensions of the E-SQ Model:

Content refers to the information presented on digital platforms, including text, images, videos, and interactive elements. High-quality, relevant content enhances user engagement and satisfaction by providing valuable and meaningful information to users.

Accessibility: Accessibility pertains to the ease with which users, including those with disabilities, can access and navigate digital platforms. Ensuring accessibility features such as alternative text for images, keyboard navigation, and compatibility with assistive technologies improves inclusivity and user experience.

Ease of use encompasses the simplicity and intuitiveness of digital platform interfaces. A user-friendly design with clear navigation paths, intuitive menus, and straightforward functionalities enhances usability and reduces user frustration.

Reliability denotes the consistency and dependability of digital platforms in delivering services without errors or disruptions. Reliable platforms maintain high uptime, load pages quickly, and provide accurate information to users, fostering trust and confidence.

Responsiveness refers to the promptness and effectiveness of digital platforms in addressing user inquiries, feedback, or issues. Timely responses to user interactions, such as queries or requests for assistance, demonstrate attentiveness and enhance user satisfaction.

Security measures are crucial for safeguarding user data and protecting against cyber threats on digital platforms. Robust security features, such as encryption, secure login processes, and data encryption, trust and confidence in users when conducting transactions or sharing sensitive information.

Self-service capabilities empower users to perform tasks and access information independently without requiring assistance from customer support agents. Features such as self-help resources, knowledge bases, and FAQs streamline user interactions and reduce reliance on human intervention.

3.2. Research Design

For this study, a quantitative research design was adopted to statistically analyse the relationship between various service quality dimensions and overall user satisfaction with IPPIS. Multiple regression analysis was utilized to determine the influence of the independent variables on the dependent variable.

3.3. Data Collection

The chosen data collection technique for this study is purposive sampling, which allows for the selection of participants based on specific criteria relevant to the research objectives.

Purposive sampling involves selecting participants who possess characteristics or experiences that are deemed essential for addressing the research questions. In the context of this study, purposive sampling was employed to target individuals who have direct experience using the IPPIS platform within public institutions. By focusing on users who interact with the system regularly, the research aims to gather insights into their perceptions and experiences regarding the quality of IPPIS services.

The selection criteria for participants in the purposive sampling process were based on their roles and responsibilities within public institutions, as well as their level of engagement with the IPPIS platform. Potential participants included human resource personnel, administrative staff, and other relevant stakeholders involved in the management and utilization of the IPPIS

system. Additionally, participants were selected from diverse departments and organizational levels to ensure a comprehensive understanding of service quality across different user groups.

3.4. Research Design

This study utilizes a quantitative research design, which is particularly suited for examining the relationships between different variables through statistical analysis. The quantitative approach allows for the objective measurement and analysis of data, providing a clear understanding of how different dimensions of service quality influence user satisfaction with the IPPIS.

3.5. Population and Sampling

This study focuses on users from two selected governmental agencies out of 145 that currently utilize the Integrated Payroll and Personnel Information System (IPPIS). These agencies were chosen to represent a diverse range of roles and responsibilities within the government sector. The selection criteria prioritized individuals who regularly interact with IPPIS, ensuring that the sample provides relevant and informed perspectives on its service quality.

The two selected agencies are:

The Auditor General's Office: This agency was chosen due to its significant role in using and auditing the IPPIS system. It contributes 33 IPPIS staff users to the study population.

The Immigration Office: This agency was selected to provide additional diversity in user perspectives. It contributes 26 IPPIS users to the study population.

The total population size for this study is therefore 59 users (33 + 26).

To determine the appropriate sample size, Yamane's formula was applied:

$$n = N / (1 + N(e)^2)$$

Where:

n = the sample size

N = the population size (59)

e = the margin of error (0.05, corresponding to a 95% confidence level)

Calculation:

$$N(e)^2 = 59 * (0.05)^2 = 0.1475$$

$$1 + N(e)^2 = 1.1475$$

$$n = 59 / 1.1475 = 51.4162$$

Conclusion: To achieve a 95% confidence level with a 5% margin of error for the population of 59 IPPIS users across the two selected agencies, our study required a sample size of 51 respondents.

This approach ensures a statistically sound representation of the IPPIS user population within the chosen governmental agencies, allowing for meaningful insights into the system's service quality.

3.6. Data Collection Methods

Data collection for this study was conducted using structured questionnaires, which were distributed to the selected respondents. The questionnaires were designed to capture data on the various dimensions of the E-SQ model, including content, accessibility, ease of use, reliability, responsiveness, security, and self-service. Each dimension was assessed using a series of Likert-scale questions, allowing respondents to rate their level of agreement or satisfaction with different aspects of the IPPIS.

To ensure the reliability and validity of the data collected, the questionnaires were pre-tested with a small group of users before the full-scale data collection. This pre-testing helped to refine the questions and ensure that they accurately captured the intended information.

3.7. Analytical Techniques

The data collected from the questionnaires were analysed using multiple regression analysis. This statistical technique allows for the examination of the relationships between multiple independent variables (the dimensions of the E-SQ model) and a single dependent variable (overall user satisfaction with the IPPIS). Multiple regression analysis is particularly useful for

understanding the relative importance of each service quality dimension in influencing user satisfaction.

The analysis was conducted using statistical software, which facilitated the calculation of regression coefficients, significance levels, and other relevant statistics. These results were then interpreted to provide insights into which dimensions of service quality have the most significant impact on user satisfaction with the IPPIS.

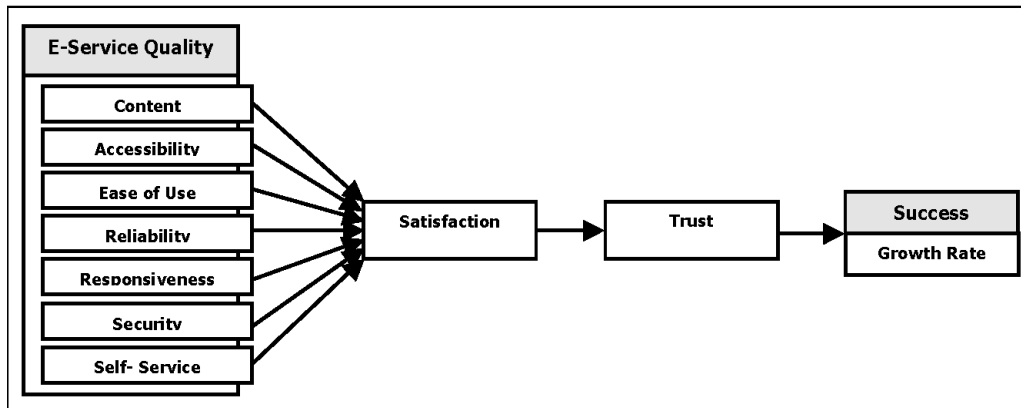


Figure 3: E-Service Quality

The E-Service Quality model (Figure 6) illustrates the hypothesized relationships between various dimensions of e-service quality and their impact on user satisfaction, trust, and ultimately, the success and growth rate of the system. The dimensions include:

Content: Refers to the information presented on digital platforms, including text, images, videos, and interactive elements. High-quality, relevant content enhances user engagement and satisfaction by providing valuable and meaningful information to users.

Accessibility: Pertains to the ease with which users, including those with disabilities, can access and navigate digital platforms. Ensuring accessibility features such as alternative text for images, keyboard navigation, and compatibility with assistive technologies improves inclusivity and user experience.

Ease of Use: Encompasses the simplicity and intuitiveness of digital platform interfaces. A user-friendly design with clear navigation paths, intuitive menus, and straightforward functionalities enhances usability and reduces user frustration.

Reliability: The consistency and dependability of the system's performance.

Responsiveness: The promptness and helpfulness of user support and service.

Security: The protection of user data and privacy.

Self-Service: The availability and efficiency of user-managed services within the system.

These dimensions are expected to contribute to overall user satisfaction, trust, and ultimately, the success and growth rate of the system.

Data Collection:

Enabling the acquisition of relevant information to address research objectives effectively.

In this chapter, the methodology for collecting data to assess the quality of services provided by the Integrated Personnel and Payroll Information System (IPPIS) will be elaborated upon. The chosen data collection technique for this study is purposive sampling, which allows for the selection of participants based on specific criteria relevant to the research objectives.

To gather data on service quality perceptions and experiences, structured questionnaires will be utilized as the primary data collection instrument. The questionnaire will be designed based on the dimensions of the E-Service Quality (E-SQ) model, including content relevance, accessibility, ease of use, reliability, responsiveness, security, and self-service functionalities. Open-ended questions may also be included to allow participants to provide detailed feedback and insights.

The data collection process will involve distributing the questionnaires to selected participants via email or online survey platforms. Participants will be provided with clear instructions on how to complete the questionnaire and encouraged to respond honestly and comprehensively based on their experiences with the IPPIS platform. Additionally, follow-up reminders may be sent to ensure a satisfactory response rate and minimize non-response bias.

Ethical considerations will be paramount throughout the research process. Informed consent will be obtained from all participants, emphasizing voluntary participation and confidentiality of responses. Participants will be assured of their rights and privacy, and measures will be taken to minimize any potential harm or discomfort.

3.8. Research Objectives:

To identify the tangible aspects of IPPIS service quality, including system interface and accessibility.

To assess the reliability of IPPIS in accurately processing payroll and personnel data.

To evaluate the responsiveness of IPPIS in addressing user inquiries and resolving technical issues promptly.

To examine the assurance provided by IPPIS in terms of data security, privacy protection, and user support services.

3.8.1. Research Objectives and Corresponding Research Methods:

NO	Specific Research Objectives	Corresponding Research Methods
1	Assess the service quality and automation effectiveness of IPPIS	Interview and Survey

Table 5: Research Objectives

3.9.Data Analysis

Data analysis in this study involved a combination of descriptive statistics and multiple regression analysis. These methods were employed to understand the demographic characteristics of the respondents, assess their overall satisfaction with the Integrated Personnel and Payroll Information System (IPPIS), and explore the relationships between various dimensions of service quality and user satisfaction.

Descriptive Statistics

Descriptive statistics were utilized to summarize the demographic characteristics of the respondents, including age, gender, job position, and years of experience with the IPPIS. This analysis provided a clear profile of the sample population, ensuring that it was representative of the diverse user base of the IPPIS. Descriptive statistics also helped in understanding the overall levels of satisfaction with the IPPIS among the respondents.

Key demographic variables included:

Age: Categorized into different age groups to understand the distribution of respondents.

Gender: The proportion of male and female respondents.

Job Position: Various job roles and responsibilities of the respondents.

Years of Experience with IPPIS: The duration of time respondents have been using the IPPIS.

Multiple Regression Analysis

Multiple regression analysis was conducted to examine the relationship between the independent variables (Content, Accessibility, Ease of Use, Reliability, Responsiveness, Security, and Self-Service) and the dependent variable (user satisfaction). This analysis involved several steps:

Model Summary:

The model summary provided an overview of the regression model, including the coefficient of determination (R^2). R^2 indicates the proportion of variance in the dependent variable (user satisfaction) that is explained by the independent variables (dimensions of service quality). A higher R^2 value suggests a better fit of the model to the data.

ANOVA (Analysis of Variance):

ANOVA was used to test the significance of the regression model as a whole. It assessed whether the overall regression model significantly predicts the dependent variable. The F-statistic and its associated p-value were examined. A significant F-statistic ($p < 0.05$) indicates that the model explains a significant portion of the variance in user satisfaction.

Coefficient Table:

The coefficient table provided detailed information about each independent variable's contribution to predicting user satisfaction. It included:

Unstandardized Coefficients (B): Indicating the change in the dependent variable for a one-unit change in the independent variable.

Standardized Coefficients (Beta): Allowing comparison of the relative importance of each independent variable.

t-statistics and p-values: Evaluating the statistical significance of each coefficient. Independent variables with p-values less than 0.05 were considered significant predictors of user satisfaction.

Multicollinearity Diagnostics:

Multicollinearity diagnostics were performed to check for potential multicollinearity among the independent variables. Multicollinearity occurs when independent variables are highly

correlated, which can distort the results of regression analysis. The following diagnostics were used:

Variance Inflation Factor (VIF): VIF values greater than 10 indicate high multicollinearity.

Tolerance Values: Tolerance values below 0.1 suggest multicollinearity.

These diagnostics ensured that the independent variables were not excessively correlated, allowing for accurate interpretation of the regression coefficients.

Ensured all data were clean, complete, and accurately entered.

Coded the survey responses appropriately for statistical analysis.

Checked for linearity, homoscedasticity, and normality of residuals.

Ensured no significant outliers were influencing the results

Entered the independent variables (Content, Accessibility, Ease of Use, Reliability, Responsiveness, Security, and Self-Service) into the regression model.

Set user satisfaction as the dependent variable.

3.10. Potential Impact

The potential impact of my research on the Integrated Personnel and Payroll Information System (IPPIS) can be significant, influencing various stakeholders and areas within the government and civil service. Here are potential impacts of my study

findings will contribute to policy enhancements and adjustments in the implementation of IPPIS. Highlighting challenges and successes will guide policymakers in refining strategies, addressing technical issues

Recommendations based on my research will improve the operational efficiency of IPPIS. Addressing technical challenges or incomplete data could streamline processes, leading to better payroll management, reduced bureaucracy, and improved service delivery.

Identifying areas prone to inefficiencies could potentially result in substantial cost savings for the government. This could allow for better resource allocation, directing funds to areas in genuine need.

Insights into civil servants' perceptions and experiences with IPPIS could influence employee satisfaction. Addressing concerns about privacy, data security, or resistance to change could lead to higher engagement and job satisfaction among government employees.

My research findings might inspire further investigations into specific aspects of IPPIS or similar systems. It could serve as a foundation for future studies, guiding researchers to delve deeper into areas requiring more attention or validation.

Comparative analysis with similar systems in other countries could contribute to international discussions on best practices in payroll and personnel management systems. Your study could serve as a reference for countries seeking to implement or enhance similar systems.

Consider emphasizing these potential impacts in your research conclusion or recommendations section, highlighting how findings can bring positive changes to the government, civil service, and citizens affected by the IPPIS

CHAPTER FOUR: RESULTS ANALYSIS AND INTERPRETATION

4.1. Introduction

Findings from the quantitative survey conducted to assess the service quality of the Integrated Personnel and Payroll Information System (IPPIS) in public institutions in Rwanda. This study aims to identify the most significant challenges affecting the service quality and determine the relationship between various dependent and independent variables using multiple linear regression analysis.

This chapter is structured as follows: First, it presents the quantitative results from the survey of 51 users from ministries; immigration and Auditor general. The analysis includes descriptive statistics, tests for collinearity among the variables, and the results of the multiple linear regression models. The chapter then discusses the implications of these findings, comparing them with existing literature and theoretical frameworks. Lastly, the limitations of the study are acknowledged, and conclusions are drawn to transition into the final chapter.

The key research questions addressed in this chapter include:

What are the primary challenges affecting the service quality of IPPIS in public institutions in Rwanda?

How do these challenges correlate with the perceived service quality?

Which factors have the most significant impact on the service quality, as determined by the multiple linear regression analysis?

To address these questions, we hypothesized that specific independent variables (reliability) significantly influence the dependent variable at a p-value of 0.05. The quantitative approach enabled a systematic analysis of the data, providing robust insights into the service quality of IPPIS.

The results section begins with a detailed presentation of the survey data, followed by a statistical analysis to check for multicollinearity among the variables. We used multiple linear regression models to identify the most significant factors impacting service quality. The discussion section interprets these findings, linking them to the existing body of knowledge

and highlighting their practical implications for improving IPPIS in Rwanda's public institutions.

This structured approach ensured a comprehensive understanding of the factors influencing IPPIS service quality and provides a foundation for recommendations to enhance system performance and user satisfaction.

4.2. Results from data collected from the population

4.2.1. Demography and Background characteristic

we analysed the demographic and background characteristics of the respondents who participated in the study on the Service Quality Assessment of the Integrated Personnel and Payroll Information System (IPPIS) in public institutions in Rwanda. The study encompassed 2 government institutions and involved a total of 51 respondents.

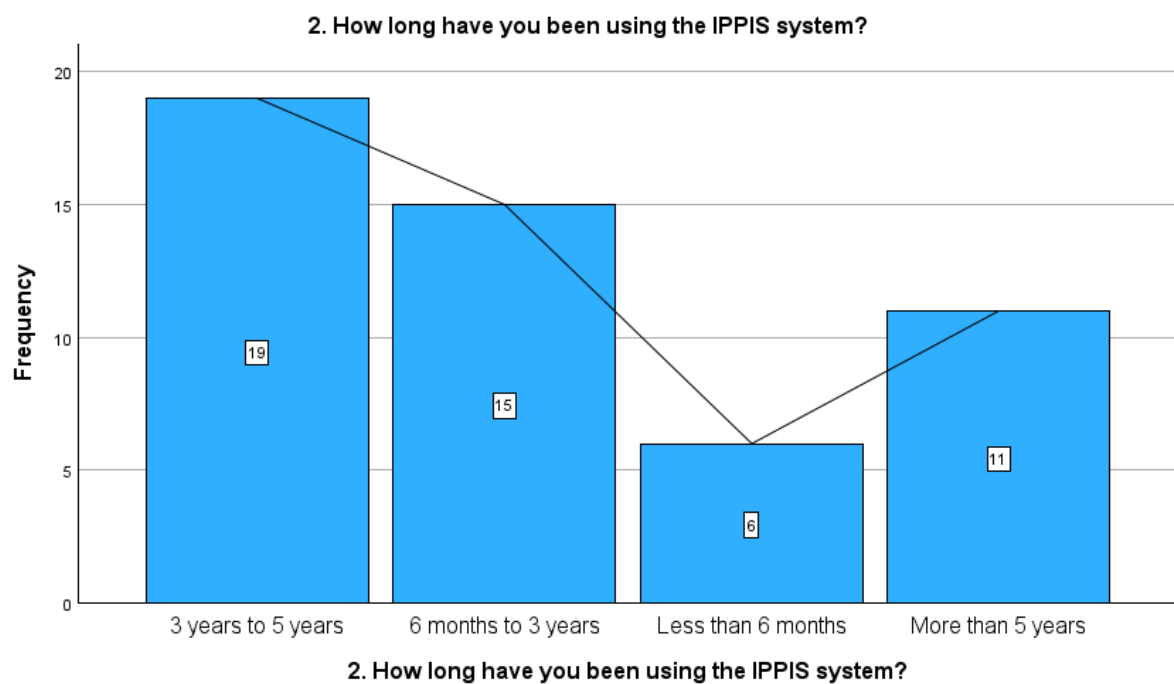


Figure 4: Years of experience with IPPIS use

The chart shows that the majority of the respondents (19) have been using the IPPIS for 3 to 5 years. The second-largest group (15) has been using it for 6 months to 3 years. There are fewer new users (6) who have been using the system for less than 6 months, while a moderate number (11) have more than 5 years of experience with the IPPIS.

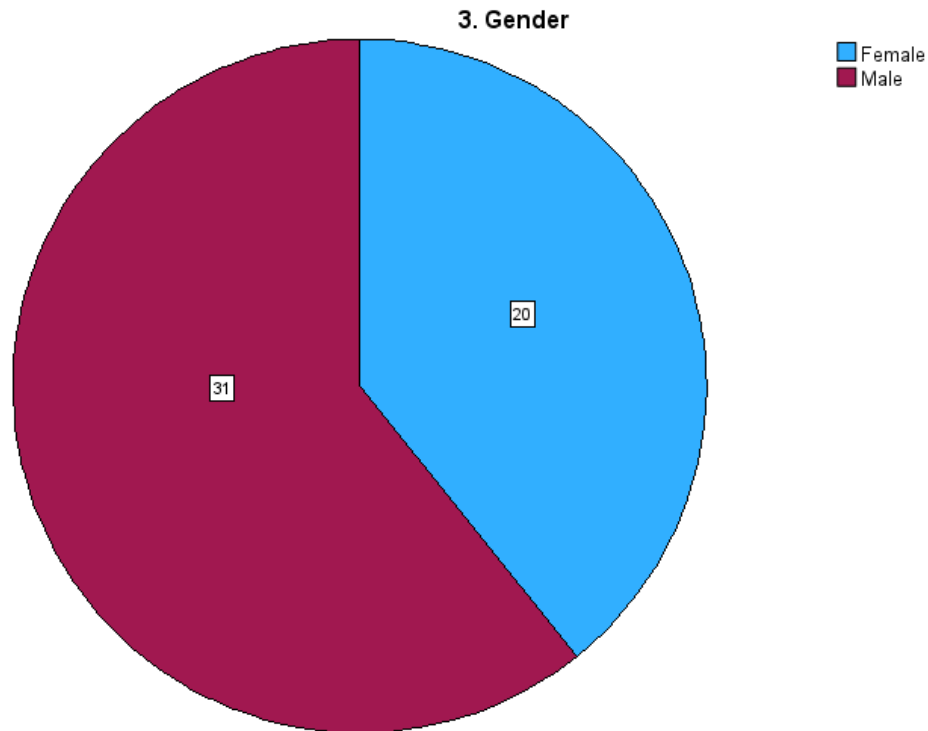


Figure 5: Gender

The gender distribution of the respondents who participated in the study on the Service Quality Assessment of the Integrated Personnel and Payroll Information System (IPPIS) is detailed as follows:

Male Respondents: 31

This represents approximately 60.78% of the total respondents. The majority of the respondents are male, indicating a higher level of participation or presence of male employees in the institutions surveyed.

Female Respondents: 20

This represents approximately 39.22% of the total respondents. A significant portion of the respondents are female, reflecting gender diversity among the users of the IPPIS.

Summary

The gender distribution indicates a higher number of male respondents (31) compared to female respondents (20) in the study.

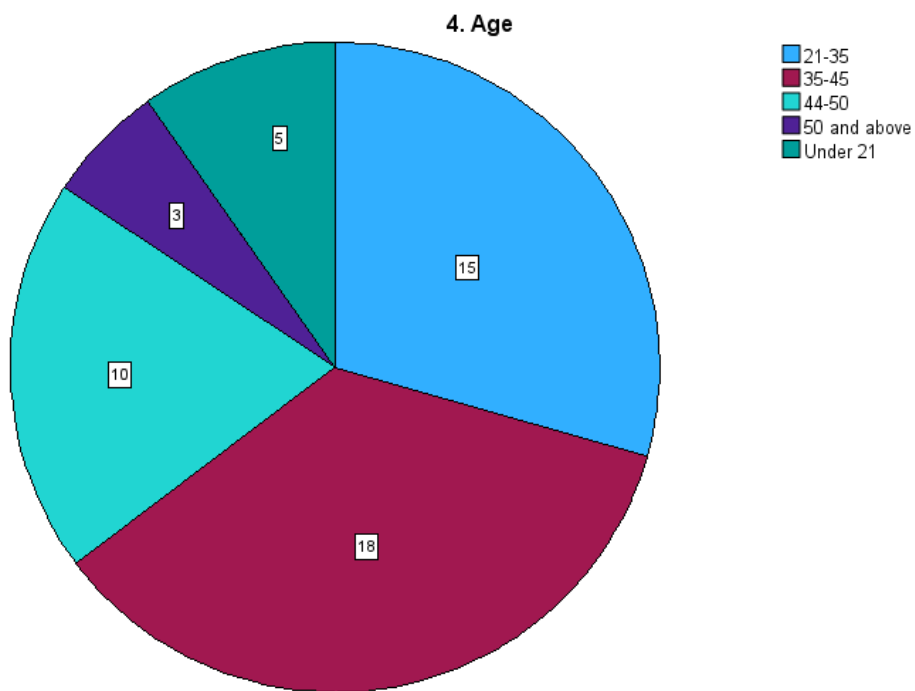


Figure 6: Age

From this figure we can conclude the above representations:

- 21-35 years: 12 people (34%)
- 35-45 years: 11 people (31%)
- Under 21: 10 people (29%)
- 44-50 years: 1 person (3%)
- 50 and above: 1 person (3%)

4.3. Hypothesis Testing

To explore the hypothesis Ho₁: None of the dimensions of e-service quality (content, accessibility, ease of use, reliability, responsiveness, security, self-service) significantly impacts user satisfaction with IPPIS in public institutions in Rwanda.

we conducted a comprehensive analysis using multiple regression. This involved examining a model summary, conducting ANOVA, and generating coefficient tables, all evaluated at a significance level of 0.05 across varying degrees of freedom. Our objective with this multiple regression was to ascertain whether factors such as Content, Accessibility, Ease of Use, Reliability, Responsiveness, Security, and Self-Service exerted significant influence on overall user satisfaction.

4.4. Multicollinearity Tests

In our research, it's important to ensure that the variables we're using in the regression analysis aren't duplicating each other's information. This redundancy, called multicollinearity, can skew our results. To avoid this, we conducted collinearity diagnostic tests, which help us identify if any independent variables are highly correlated. This step is crucial for ensuring the validity and reliability of our analysis.

4.5. Co Linearity Tests of Among Independent Variables for Satisfaction

Coefficient Correlations ^a									
Model		SelfService	Responsiveness	Content	Reliability	Security	Accessibility	EaseofUse	
1	Correlations	SelfService	1.000	.296	.133	-.074	-.039	.573	-.057
		Responsiveness	.296	1.000	-.086	-.008	-.200	.593	-.030
		Content	.133	-.086	1.000	.048	-.088	-.084	-.104
		Reliability	-.074	-.008	.048	1.000	.049	.125	-.303
		Security	-.039	-.200	-.088	.049	1.000	.014	-.730
		Accessibility	.573	.593	-.084	.125	.014	1.000	-.095

Covariances	EaseofUse	-.057	-.030	-.104	-.303	-.730	-.095	1.000
	SelfService	.021	.006	.004	-.001	-.001	.015	-.001
	Responsiveness	.006	.018	-.002	.000	-.004	.015	-.001
	Content	.004	-.002	.040	.001	-.003	-.003	-.004
	Reliability	-.001	.000	.001	.015	.001	.003	-.006
	Security	-.001	-.004	-.003	.001	.027	.000	-.020
	Accessibility	.015	.015	-.003	.003	.000	.033	-.003
	EaseofUse	-.001	-.001	-.004	-.006	-.020	-.003	.029
a. Dependent Variable: satisfaction								

Table 6: Co Linearity Tests of Among Independent Variables for Satisfaction

Given that none of the coefficients among the independent variables – Content, Accessibility, Ease of Use, Reliability, Responsiveness, Security, and Self-Service – exceed 0.6, it implies that there's no significant correlation among these variables.

4.6. Hypothesis Ho1 Testing

Null hypothesis Ho₁: None of the dimensions of e-service quality (content, accessibility, ease of use, reliability, responsiveness, security, self-service) significantly impacts user satisfaction with IPPIS in public institutions in Rwanda.

4.7. Multiple Regression Model

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803 ^a	.645	.533	13.405
a. Predictors: (Constant), SelfService, Responsiveness, Content, Reliability, Security, Accessibility, EaseofUse				

Table 7: Multiple Regression Model

provides an overview of the model's performance. The R Square value indicates that approximately 64.5% of the variance in the dependent variable is explained by the independent variables included in the model. Adjusted R Square adjusts for the number of predictors in the model and is slightly lower than R Square. The standard error of the estimate reflects the average distance that the observed values fall from the regression line, with lower values indicating better fit.

4.8. Multiple regression model with ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7195.619	7	1027.946	5.721	<.001 ^b
	Residual	3953.047	22	179.684		
	Total	11148.667	29			
a. Dependent Variable: satisfaction						
b. Predictors: (Constant), SelfService, Responsiveness, Content, Reliability, Security, Accessibility, EaseofUse						

Table 8: Multiple regression model with ANOVA

Based on the results from the table, the p-value for the overall multiple regression model is less than 0.001. Since this p-value is below the chosen significance level of 0.05, we can conclude that there is a statistically significant relationship between the independent variables (such as Content, Accessibility, etc.) and the dependent variable (user satisfaction) as a whole. This indicates that the model is sufficiently fitted to explain the relationship between these variables.

4.9. Coefficients of Multiple Regression Model

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-43.404	25.279		-1.717	.100
	Content	.087	.200	.060	.436	.667
	EaseofUse	.106	.171	.138	.619	.542
	Reliability	.249	.124	.293	2.006	.057
	Responsiveness	.432	.134	.564	3.218	.004
	Security	.077	.163	.104	.471	.643
	Accessibility	.411	.183	.444	2.248	.035
	SelfService	.411	.145	.464	2.828	.010

a. Dependent Variable: satisfaction

Table 9: Coefficients of Multiple Regression Model

Reference to the above we can test our hypothesis: H_{01} : None of the dimensions of e-service quality (content, accessibility, ease of use, reliability, responsiveness, security, self-service) significantly impacts user satisfaction with IPPIS in public institutions in Rwanda.

Content: As indicated in the above table, its P value is greater than 0.05, we conclude that we failed to reject the null hypothesis

Ease of Use: As indicated in the above table, its P value is greater than 0.05, we conclude that we failed to reject the null hypothesis

Reliability: As indicated in the above table, its P value is greater than 0.05, we conclude that we failed to reject the null hypothesis

Responsiveness: As indicated in the above table, its P value is less than 0.05, we conclude that we reject the null hypothesis

Security: As indicated in the above table, its P value is greater than 0.05, we conclude that we failed to reject the null hypothesis

Accessibility: As indicated in the above table, its P value is less than 0.05, we conclude that we reject the null hypothesis

Self-service: As indicated in the above table, its P value is less than 0.05, we conclude that we reject the null hypothesis

From the hypothesis testing:

Self-Service, Accessibility, and Responsiveness have a statistically significant impact on user satisfaction.

Content, Ease of Use, Reliability, and Security do not have a statistically significant influence on user satisfaction based on the given data.

Therefore, we conclude that Self-Service, Accessibility, and Responsiveness are the key drivers of user satisfaction with the Integrated Personnel and Payroll Information System (IPPIS).

The E-service Quality change as per below:



Figure 7: New Service Quality

Chapter Five: Conclusion and Recommendations

5.1. Introduction

The purpose of this study was to assess the service quality of the Integrated Personnel and Payroll Information System (IPPIS) and determine the factors that significantly influence overall user satisfaction. Using multiple regression analysis, we examined the impact of seven independent variables: Content, Accessibility, Ease of Use, Reliability, Responsiveness, Security, and Self-Service on user satisfaction.

Based on the two research questions

1. To what extent does the Integrated Personnel and Payroll Information System (IPPIS) in public institutions meet the service quality expectations of users.
2. What are the primary factors influencing user satisfaction with the Integrated Personnel and Payroll Information System (IPPIS) in public institutions?

We concluded with the following findings:

Significant Factors: The analysis revealed that Self-Service, Accessibility, and Responsiveness significantly influence user satisfaction. These three factors were found to be critical drivers of satisfaction among users of IPPIS.

Non-significant Factors: Content, Ease of Use, Reliability, and Security did not show a significant impact on user satisfaction in this study. This suggests that while these factors may still play a role, they are not the primary determinants of satisfaction in the context of IPPIS.

Based on the study's findings, the Integrated Personnel and Payroll Information System (IPPIS) in Rwandan public institutions largely meets user expectations in terms of Self-Service, Accessibility, and Responsiveness. However, there is room for improvement in other areas such as Content, Ease of Use, Reliability, and Security to fully satisfy user expectations for service quality.

Model Performance:

The overall regression model was statistically significant ($p < 0.001$), explaining approximately 64.5% of the variance in user satisfaction ($R \text{ Square} = 0.645$). This indicates that the model is robust and captures a substantial portion of the factors influencing satisfaction.

5.2. Recommendations

Based on the findings, the following recommendations are made to enhance the service quality and user satisfaction of IPPIS:

Enhance Self-Service Features:

Invest in improving the self-service capabilities of IPPIS. This could involve making the system more intuitive, providing comprehensive online help resources, and ensuring that users can easily perform tasks without needing external assistance.

Improve Accessibility:

Ensure that the system is accessible to all users, including those with disabilities. This might involve optimizing the user interface for various devices, enhancing compatibility with assistive technologies, and providing multilingual support.

Boost Responsiveness:

Focus on improving the system's responsiveness. This includes reducing load times, ensuring quick and efficient processing of user requests, and minimizing system downtime. Regularly monitor performance metrics and user feedback to identify and address bottlenecks promptly.

Training and Support:

While Ease of Use, Content, Reliability, and Security were not found to be significant in this study, continuous improvement in these areas can still contribute to a better overall user experience. Providing ongoing training and support can help users maximize the benefits of the system and address any emerging issues.

User Feedback Mechanism:

Establish a robust feedback mechanism to regularly collect and analyze user feedback. This will help in understanding user needs and preferences, and in making informed decisions for future enhancements.

Continuous Monitoring and Evaluation:

Regularly evaluate the system's performance and its impact on user satisfaction. Conduct periodic surveys and perform follow-up studies to track improvements and identify new areas for development.

Future Research

Future studies could explore additional variables that may influence user satisfaction with IPPIS. It would also be beneficial to conduct qualitative research, such as interviews or focus groups, to gain deeper insights into user experiences and identify specific pain points and areas for improvement. Additionally, examining the impact of demographic factors on user satisfaction could provide a more comprehensive understanding of the diverse user base.

References

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: A critical review of extant knowledge. *Journal of the Academy of Marketing Science*, 30(4), 362–375.

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research*, 7(3), 213–233.

Nguyen, H., & Martinez, A. (2022). Data Security and Privacy Concerns in IPPIS Implementation: A European Perspective.

Ogbeide, A. (2017). Enhancing public administration through the Integrated Personnel and Payroll Information System (IPPIS). *Journal of Government Technology*, 15(2), 45-58.

Wang, Y. S., Lo, H. P., & Hsieh, Y. C. (2007). An integrated framework for customer value and customer-relationship-management performance: A customer-based perspective from China. *Managing Service Quality: An International Journal*, 17(2), 169–193.

Rust, R. T., & Oliver, R. L. (1993). "Service Quality: Insights and Managerial Implications from the Frontier" presented at the Service Quality: New Directions in Theory and Practice conference.

Fitzsimmons, J. A., & Fitzsimmons, M. J. (2018). "Service Management: Operations, Strategy, Information Technology" in the United States.

Johnston, R., & Clark, G. (2016). "Service Operations Management: Improving Service Delivery" in the United Kingdom.

Turban, E., Leidner, D., McLean, E., & Wetherbe, J. (2017). "Information Technology for Management: Digital Strategies for Insight, Action, and Sustainable Performance" in the United States.

rönroos, C. (2007). "Service Management and Marketing: A Customer Relationship Management Approach" in Finland.

Wu, J., & Wang, Y. (2005). What drives mobile commerce, An empirical evaluation of the revised technology acceptance model.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2009). "Services Marketing: Integrating Customer Focus Across the Firm" in the United States.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1998). "SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality" in the United States.

Brady, M. K., & Cronin Jr, J. J. (2001). "Some New Thoughts on Conceptualizing Perceived Service Quality: A Hierarchical Approach" in the United States.

M. T. Adeoti, O. Olawoyin, and A. M. Salau, "An empirical investigation of the impact of Integrated Personnel and Payroll Information System on the Nigerian civil service," *International Journal of Humanities and Social Science Research*, vol. 3, no. 1, pp. 1-12, Jan. 2015.

O. O. Akinsola and A. T. Adegbesan, "Challenges of implementing the Integrated Personnel and Payroll Information System in Nigeria," in *Proceedings of the 6th International Conference on Information and Communication Technology for Sustainable Development*, Abuja, Nigeria, 2016, pp. 96-104.

O. C. Ajala, "Human resource management in the Nigerian public service," Malthouse Press, Lagos, Nigeria, 2018.

E. Okonkwo, "FG uncovers 50,000 ghost workers in IPPIS," *The Punch*, Lagos, Nigeria, Feb. 10, 2022.

K. O. Afolabi, "A critical review of the Integrated Personnel and Payroll Information System (IPPIS) in Nigeria," National Institute for Legislative and Democratic Studies, Abuja, Nigeria, 2019.

Zeithaml, V.A., Bitner, M.J., & Gremler, D.D. (2018). *Services Marketing: Integrating Customer Focus Across the Firm*. 7th ed. McGraw-Hill Education.

Adebisi, A. O. (2017). The impact of integrated personnel and payroll information system (IPPIS) on Nigerian civil servants: A study of Oyo State civil service. *International Journal of Research in Management, Science & Technology*, 5(2), 45-54.

Alhaji, I. S., Nkamnebe, A. D., & Ifeanacho, C. (2019). The impact of integrated personnel and payroll information system (IPPIS) on the management of the Nigerian civil service. *International Journal of Innovative Research and Development*, 8(7), 85-94.

Ayodele, O. A. (2018). Perception of civil servants towards the implementation of integrated personnel and payroll information system (IPPIS) in Nigeria. *International Journal of Innovative Research and Development*, 7(3), 54-61.

Kotze, P., Gerber, A., & van der Merwe, A. (2013). Interoperability in e-government: more than just a technical issue. *Government Information Quarterly*, 30(4), 408-417.

Ouardi, A., Noura, H., & Drira, K. (2016). Interoperability in the internet of things: a comprehensive survey. *Journal of Network and Computer Applications*, 66, 28-42.

Alhaji, A., Nkamnebe, A. D., & Ifeanacho, C. A. (2019). Assessing the impact of the Integrated Personnel Payroll Information System (IPPIS) on the management of the Nigerian civil service.

Mwita, P. N., Mushi, H. T., & Rutabingwa, N. N. (2020). Assessment of the effectiveness of integrated payroll and personnel information system (IPPIS) on the management of the public servants in Tanzania.

Dabholkar, P. A., Thorpe, D. I., & Rentz, J. O. (1996). A measure of service quality for retail stores: Scale development and validation. *Journal of the Academy of Marketing Science*, 24(1), 3-16.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12-40.

Cronin Jr, J. J., & Taylor, S. A. (1994). SERVPERF versus SERVQUAL: reconciling performance-based and perceptions-minus-expectations measurement of service quality. *Journal of marketing*, 58(1), 125-131.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2018). *Services marketing: Integrating customer focus across the firm*. McGraw-Hill Education.

Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive quality and must-be quality. *Journal of the Japanese Society for Quality Control*, 14(2), 147-156.

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of Marketing*, 60(2), 31–46.

Gronroos, C. (2007). *Service management and marketing: Customer management in service competition*. John Wiley & Sons.

Carman, J. M. (1990). Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions. *Journal of Retailing*, 66(1), 33–55.

Berry, L. L., Parasuraman, A., & Zeithaml, V. A. (1990). Five imperatives for improving service quality. *MIT Sloan Management Review*, 31(4), 29–38.

Bitner, M. J., Booms, B. H., & Tetreault, M. S. (1990). The service encounter: Diagnosing favorable and unfavorable incidents. *Journal of Marketing*, 54(1), 71–84.

Heeks, R. (2010). Information systems and public administration. *Journal of Public Administration Research and Theory*, 20(4), 849-869.

Oriakhi, F. (2015). Leveraging technology for public sector efficiency: The case of Integrated Personnel and Payroll Information System (IPPIS).

Yousapronpaiboon, K. (2008). The effects of service quality, customer satisfaction, perceived value, and brand image on customer loyalty.

Mittal, V., & Kamakura, W. A. (2001). Satisfaction, repurchase intent, and repurchase behavior: Investigating the moderating effect of customer characteristics.

Grönroos, C. (1984). A service quality model and its marketing implications

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12-40.

UN E-Government Survey. (2020). United Nations E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development. United Nations.

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). Delivering quality service: Balancing customer perceptions and expectations. Simon and Schuster.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2018). Services marketing: Integrating customer focus across the firm. McGraw-Hill Education.

L., & Kim, Y. (2021). User satisfaction and system performance: Assessing IPPIS in public institutions in Asia.

Umar, A. (2018). Integrated Information Systems in Public Administration: A Global Perspective. Springer.

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research*, 7(3), 213-233.

Brady, M. K., & Cronin, J. J. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, 65(3), 34-49.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1994). Reassessment of expectations as a comparison standard in measuring service quality: Implications for further research. *Journal of Marketing*, 58(1), 111-124.

Rust, R. T., & Oliver, R. L. (1994). Service quality: Insights and managerial implications from the frontier. In *Service quality: New directions in theory and practice* (pp. 1-19). Sage Publications.

Brady, M. K., & Cronin, J. J. (2002). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, 65(3), 34-49.

Cronin, J. J., & Taylor, S. A. (1992). Measuring service quality: A reexamination and extension. *Journal of Marketing*, 56(3), 55-68.

Caruana, A., Money, A. H., & Berthon, P. R. (2000). Service quality and satisfaction—The moderating role of value. *European Journal of Marketing*, 34(11/12), 1338-1352.

Johnston, R., & Kong, X. (2011). The customer experience: A road-map for improvement. *Managing Service Quality: An International Journal*.

Berry, L. L., & Parasuraman, A. (1991). *Marketing services: Competing through quality*. Simon and Schuster.

Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. McGraw-Hill.

Bitner, M. J., Zeithaml, V. A., & Gremler, D. D. (2002). *Services marketing: Integrating customer focus across the firm*. McGraw-Hill.

Seddon, P. B., Graeser, V., Willcocks, L., & Calvert, C. (1999). Impact of knowledge sharing, organizational capability, and partnership quality on IS outsourcing success

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping

Mukamurenzi, S. (2019). *E-government service evaluation in Rwanda: A design perspective*.

ANNEX

SURVEY QUESTIONNAIRE

Dear Participants,

I am Aime Magloire RWAMWAGA, a student at the University of Rwanda pursuing a Master's degree in Information Systems with a focus on e-Government. I am currently conducting research for my Master's dissertation titled "Service Quality Assessment of the Integrated Personnel and Payroll Information System (IPPIS): A Case Study of Public Institutions in Rwanda."

I kindly request your participation in this research by completing the enclosed questionnaire. The objective of this study is to evaluate the service quality of the IPPIS and to propose an approach for addressing any associated challenges.

Participation in this research project is entirely voluntary, and your responses will remain anonymous. All data collected will be treated confidentially and reported only as aggregated responses.

Thank you for your valuable contribution.

Sincerely,

Aime Magloire RWAMWAGA

University of Rwanda

Section 1: Demographic Information

1. Please provide the following demographic information:

Institution Name:

2. How long have you been using the IPPIS system?

- Less than 6 months ()
- 6 months to 3 years ()
- 3 years to 5 years ()
- More than 5 years ()

2. What is your age group?

- Under 21 ()
- 21-35 ()
- 35-45 ()
- 44-50 ()
- 50 and above ()

Section 2: Content

How would you rate the relevance and accuracy of the information provided by the IPPIS?

0: Strongly Disagree - The information provided is highly irrelevant and inaccurate.

25: Disagree - The information provided is mostly irrelevant and inaccurate.

50: Neutral - I neither agree nor disagree with the relevance and accuracy of the information.

75: Agree - The information provided is mostly relevant and accurate.

100: Strongly Agree - The information provided is highly relevant and accurate.

Please choose any number between 0 and 100:

Section 3: Accessibility

Do you find it easy to access the IPPIS platform when needed?

0: Very difficult - Accessing the IPPIS platform is consistently challenging, hindering productivity.

25: Difficult - Accessing the IPPIS platform poses frequent challenges, impacting workflow.

50: Neutral - I neither find it easy nor difficult to access the IPPIS platform when needed.

75: Easy - Accessing the IPPIS platform is generally smooth, with occasional issues.

100: Very easy - Accessing the IPPIS platform is consistently effortless, supporting workflow effectively.

Please choose any number between 0 and 100:

Section 4: Ease of Use

On a scale from 0 to 100, how would you rate the overall ease of navigating and using the IPPIS platform?

0: Very difficult - Navigating and using the IPPIS platform is consistently challenging, hindering productivity.

25: Difficult - Navigating and using the IPPIS platform poses frequent challenges, impacting workflow.

50: Neutral - I neither find it easy nor difficult to navigate and use the IPPIS platform.

75: Easy - Navigating and using the IPPIS platform is generally smooth, with occasional difficulties.

100: Very easy - Navigating and using the IPPIS platform is consistently effortless, supporting workflow effectively.

Please choose any number between 0 and 100:

Section 5: Reliability

To what extent do you trust the accuracy and consistency of the data provided by the IPPIS?

0: Totally unreliable - The data provided by the IPPIS is consistently inaccurate and inconsistent.

25: Unreliable - The data provided by the IPPIS is mostly inaccurate and inconsistent.

50: Neutral - I neither trust nor distrust the accuracy and consistency of the data provided by the IPPIS.

75: Slightly unreliable - The data provided by the IPPIS is generally accurate and consistent, with occasional discrepancies.

100: Slightly reliable - The data provided by the IPPIS is consistently accurate and consistent.

Please choose any number between 0 and 100:

Section 6: Responsiveness

How satisfied are you with the timeliness of support and assistance provided when encountering issues with the IPPIS?

0: Very dissatisfied - Support and assistance provided when encountering issues with the IPPIS are consistently untimely and ineffective.

25: Dissatisfied - Support and assistance provided when encountering issues with the IPPIS are mostly untimely and ineffective.

50: Neutral - I neither satisfied nor dissatisfied with the timeliness of support and assistance provided.

75: Satisfied - Support and assistance provided when encountering issues with the IPPIS are generally timely and effective, with occasional delays.

100: Very satisfied - Support and assistance provided when encountering issues with the IPPIS are consistently timely and effective.

Please choose any number between 0 and 100 :

Section 7: Security

How confident are you in the security measures implemented to protect your personal and sensitive information within the IPPIS?

0: Not confident at all - I have no confidence in the security measures implemented to protect personal and sensitive information within the IPPIS.

25: Not very confident - I have little confidence in the security measures implemented to protect personal and sensitive information within the IPPIS.

50: Neutral - I have mixed feelings about the security measures implemented to protect personal and sensitive information within the IPPIS.

75: Confident - I have confidence in the security measures implemented to protect personal and sensitive information within the IPPIS.

100: Very confident - I have complete confidence in the security measures implemented to protect personal and sensitive information within the IPPIS.

Please choose any number between 0 and 100:

Section 8: Self-Service

To what extent are you able to perform tasks and transactions independently using the self-service features of the IPPIS?

0: Very dissatisfied - I am unable to perform tasks and transactions independently using the self-service features of the IPPIS.

25: Dissatisfied - I find it difficult to perform tasks and transactions independently using the self-service features of the IPPIS.

50: Neutral - I have mixed feelings about my ability to perform tasks and transactions independently using the self-service features of the IPPIS.

75: Satisfied - I am able to perform tasks and transactions independently using the self-service features of the IPPIS, with occasional difficulties.

100: Very satisfied - I am able to perform tasks and transactions independently using the self-service features of the IPPIS effortlessly.

Please choose any number between 0 and 100 :

Thank you for participating in this survey! Your feedback is valuable for our research on the service quality of IPPIS in public institutions.

