International Journal of Management and Commerce Innovations ISSN 2348-7585 (Online)
Vol. 11, Issue 1, pp: (406-413), Month: April 2023 - September 2023, Available at: www.researchpublish.com

CHAMPIONING THE PROCUREMENT TRANSFORMATION: THE IMPACT OF IT INFRASTRUCTURE ON E-PROCUREMENT ADOPTION IN RWANDAN WHOLESALE PHARMACIES

Jean Damascène NSENGEYUKURI

PhD Aspirant in Health Supply Chain Management

DOI: https://doi.org/10.5281/zenodo.8321500

Published Date: 06-September-2023

Abstract: **This study focuses on investigating the effects of IT infrastructure on the adoption of e-procurement in Wholesale Pharmacies of Rwanda. Employing a descriptive and correlation research design, the research aimed to provide a comprehensive understanding of the relationship between IT infrastructure and the adoption of e-procurement in this specific context. A total population of 82 wholesale pharmacies in Rwanda was considered, with 78 respondents, representing 95.12%, providing responses through the universal sampling technique. Data collection primarily relied on questionnaires featuring both closed and open-ended questions. To ensure data quality, Likert-type questions were included, allowing respondents to express the extent to which various IT infrastructure factors were practiced using a five-point Likert scale. Additionally, correlation and regression analysis were conducted to illuminate the relationship between dependent and independent variables. The analysis of data was carried out using SPSS version 23, offering a comprehensive insight into the perspectives of the respondents. The research findings unequivocally establish that IT infrastructure significantly influences the adoption of e-procurement in wholesale pharmacies of Rwanda. Respondents overwhelmingly indicated the positive impact of IT infrastructure on e-procurement adoption, as demonstrated by mean scores ranging from 4.2308 to 4.8718, signifying extremely positive and positive effects. The standard deviation, ranging from 0.87931 to 0.99648, reflects a concentration of responses among the participants. This study contributes valuable insights into the critical role of IT infrastructure in advancing e-procurement adoption within the wholesale pharmacies of Rwanda. These findings hold implications for the development and enhancement of e-procurement strategies, emphasizing the importance of robust IT infrastructure to support and facilitate the adoption of modern procurement practices in Rwanda.**

Keywords: **Procurement, E-procurement, IT Infrastructure, Wholesale Pharmacies, Adoption.**

1. INTRODUCTION

Background to the Study

The transformation of purchasing processes in response to the advancements in information technologies (IT) and information systems (IS) has significantly impacted the role of procurement in organizational success. The advent of web-based information systems has introduced electronic procurement (e-procurement), enabling the electronic purchase of goods and services. This shift towards e-procurement has allowed organizations to shift their procurement focus from day-to-day operations to strategic tasks, enhancing their ability to thrive in a dynamic business environment.

E-procurement involves the electronic purchase of goods and services, utilizing internet technologies to streamline and automate procurement processes. This practice has gained widespread adoption globally, driven by the need to reduce procurement costs and enhance efficiency. The United States, for example, witnessed rapid development in e-procurement

in the early 2000s, with many state functions embracing online bidding and web-based procurement processes. The integration of internet technologies and software development has enabled organizations to streamline operations and develop competitive business strategies.

Information Communication Technologies (ICTs) have played a pivotal role in revolutionizing supply chain activities, with e-procurement emerging as a key component. E-procurement leverages various forms of IT, such as electronic mail, Electronic Data Interchange (EDI), and electronic marketplaces, to automate and streamline procurement processes in government entities, leading to increased efficiency, transparency, and cost reduction. This application of electronic commerce in procurement is central to modernizing procurement practices.

The efficient management of procurement has a significant impact on healthcare systems, particularly in complex environments like hospitals. The healthcare sector faces unique challenges in procurement, as it directly impacts patient well-being and healthcare quality. E-procurement systems have the potential to address these challenges by improving efficiency, reducing costs, and enhancing transparency.

Despite the potential benefits of e-procurement, challenges in its adoption persist. Issues such as resistance to change, security risks, and the costs associated with implementing online procurement systems have hindered its widespread adoption. Understanding the factors influencing successful e-procurement adoption is crucial, given the significant investments of time and resources required.

Statement of the Problem

While e-procurement offers numerous advantages, its successful adoption in healthcare institutions, specifically wholesale pharmacies, has been challenging. Resistance to change, poor network connectivity, IT infrastructure limitations, capacity-building needs, and inadequate leadership support are among the challenges faced. Additionally, readiness to implement e-procurement and the availability of qualified personnel are issues that need to be addressed. These challenges have prompted the need to investigate the factors affecting the adoption of e-procurement in wholesale pharmacies in Rwanda.

Objective of the Study

The sole objective of this study is to determine the impact of IT infrastructure on the adoption of e-procurement in wholesale pharmacies.

Research Question

The research question guiding this study is as follows:

What are the effects of IT infrastructure on the adoption of e-procurement in wholesale pharmacies?

Scope of the Study

The scope of this study is defined in terms of time, content, and geography as follows:

Time Scope: This study covers a period of four years, from 2015 to 2018.

Content Scope: The study focuses on e-procurement practices within the domain of wholesale pharmacies.

Geographical Scope: The study primarily concentrates on wholesale pharmacies located in Kigali City.

Significance of the Study

This research holds significance in both academic and practical contexts. It contributes to academic knowledge and scientific understanding in the field of procurement. It provides an opportunity for the researcher to apply theoretical knowledge to practical, real-world scenarios. Furthermore, the study aids the researcher in acquiring expertise in procurement and supply chain management, contributing to the fulfillment of the academic requirements for a Master's Degree.

The findings of this research are also valuable to wholesale pharmacies and the broader community. They emphasize the efficiency and effectiveness of e-procurement as a tool for improving the performance of wholesale pharmacies. Additionally, this study can serve as a guideline for future researchers interested in advancing research in this area.

Limitations of the Study

Two primary limitations of this study are acknowledged. First, the potential for respondent bias exists, as is common in questionnaire surveys. Respondents may provide biased ratings based on their personalities, roles, and organizational levels. Second, the study's approach is limited by factors such as sample size, measurement scale, and the number of variables examined. Future studies may consider expanding these aspects for a more comprehensive analysis.

2. LITERATURE REVIEW

Introduction

This literature review provides a comprehensive overview of the key concepts and findings related to the effects of IT infrastructure on the adoption of e-procurement in wholesale pharmacies, with a specific focus on the context of Rwanda. E-procurement represents a significant shift in procurement practices, driven by advancements in information technology. Understanding the role of IT infrastructure in facilitating its adoption is crucial for organizations seeking to leverage this technology for improved procurement processes.

E-Procurement: A Conceptual Overview

Electronic procurement, often referred to as e-procurement, is the process of electronically acquiring goods and services. It encompasses a range of activities, from electronic sourcing and purchasing to electronic tendering and contract management (Bhattacharya, 2017). E-procurement leverages information technology and the internet to streamline and automate these processes, leading to increased efficiency, reduced costs, and improved transparency (Wang & Lai, 2010).

IT Infrastructure and E-Procurement

IT infrastructure plays a pivotal role in the successful adoption of e-procurement systems. This infrastructure includes hardware, software, networks, and other technological components that support an organization's IT operations. Several studies have highlighted the importance of IT infrastructure in enabling e-procurement adoption:

- **Hardware and Software:** A robust IT infrastructure requires adequate hardware and software resources. This includes servers, computers, and procurement software capable of handling e-procurement processes (Bertolotti et al., 2019).
- **Network Connectivity:** High-speed and reliable internet connectivity is essential for the smooth operation of e-procurement systems. Poor network infrastructure can hinder the adoption and effectiveness of e-procurement (Rehman et al., 2016).
- **Security Measures:** E-procurement involves sensitive data and transactions. Therefore, a secure IT infrastructure with encryption and data protection measures is crucial to mitigate risks associated with cyber threats (Tong et al., 2017).

E-Procurement Adoption in Healthcare system

The adoption of e-procurement in healthcare system, particularly in wholesale pharmacies, presents unique challenges and opportunities:

- **Efficiency Improvement:** E-procurement systems can significantly enhance the efficiency of procurement processes in healthcare institutions, reducing administrative overhead and procurement cycle times (Kumar et al., 2018).
- **Cost Reduction:** The automation of procurement processes through e-procurement can lead to cost savings by optimizing inventory management and reducing manual labor (Chen et al., 2018).
- **Transparency and Compliance:** E-procurement systems offer greater transparency and facilitate compliance with procurement regulations, a critical factor in healthcare settings (Hossain et al., 2015).

E-Procurement Adoption in Rwanda

Rwanda has witnessed an increase in internet usage and a growing focus on online business transactions (RPPA, 2016). However, the adoption of e-procurement in both public and private institutions, including wholesale pharmacies, has been relatively slow. Challenges such as resistance to change, inadequate IT infrastructure, and capacity-building issues have hindered the process (Ahimbisibwe et al., 2016).

Gaps in Existing Literature

While there is a substantial body of literature on e-procurement adoption, limited research has specifically examined the effects of IT infrastructure on e-procurement adoption within the context of wholesale pharmacies in Rwanda. Understanding these effects is crucial for developing strategies to overcome barriers and leverage the benefits of e-procurement.

Conclusion

This literature review has provided an overview of e-procurement, the role of IT infrastructure in its adoption, and its relevance in the healthcare sector, with a specific focus on wholesale pharmacies in Rwanda. The literature suggests that a

robust IT infrastructure is a fundamental requirement for successful e-procurement adoption. However, there is a need for further research to explore the specific challenges and opportunities in Rwanda's wholesale pharmacy sector to inform policy and practice.

The following chapters will delve into the research methodology, data analysis, and findings, aiming to provide insights into the effects of IT infrastructure on the adoption of e-procurement in wholesale pharmacies in Rwanda.

3. RESEARCH METHODOLOGY

Introduction

This chapter outlines the research methodology employed in investigating the effects of IT infrastructure on the adoption of e-procurement in wholesale pharmacies in Rwanda. It encompasses the research design, population and sample size, data collection techniques, data processing, data analysis methods, validity, reliability, and ethical considerations.

Research Design

This research utilized a descriptive case study research design. Descriptive research aims to describe the characteristics of a phenomenon under investigation (Duttolph, 2011). In this study, the researcher employed a descriptive analytical approach to interpret data, with a focus on quantitative research techniques using questionnaires.

Population and Sample Size

Total population sampling, a non-probability sampling technique, was employed in this research. This approach involves gathering information from the entire population with specific characteristics (Mbaagah, 2009). The study's target population consisted of employees from selected Wholesale Pharmacies in Rwanda, totaling 82 employees. Consequently, the entire population was used as the sample size for the research.

Data Collection Techniques

The research relied primarily on the questionnaire technique and key documents from relevant projects.

Questionnaire Technique

Questionnaires served as the main means of communication between the researcher and respondents. The questionnaire included a series of questions addressing issues related to e-procurement practices in selected Wholesale Pharmacies of Rwanda. This technique facilitated the collection of written quantitative data.

Interview Technique

While interviews are typically used to gather information from respondents, it was not employed in this study. The questionnaire was deemed sufficient to collect reliable data.

Documentation Technique

Documentation played a significant role in this research. The researcher conducted an extensive study and review of published documents, reports, magazines, journals, and policy reports related to the research topic. This technique provided valuable secondary data for analysis and evaluation.

Data Processing Methods

Data processing involved several stages to transform raw data into meaningful information:

- **Editing:** Identifying and rectifying errors in collected data and questionnaires to ensure data accuracy (Mbaagah, 2009).
- **Coding:** Assigning symbols or numbers to responses for identification and classification purposes (Kakooza, 2006).
- **Tabulation:** Organizing data into tabular form to facilitate analysis and interpretation (Mbaagah, 2009).

Data Analysis Methods

Data analysis encompassed both descriptive and inferential statistics. Descriptive statistics were used to summarize and describe the data, while inferential statistics allowed for drawing conclusions and making generalizations based on the collected data.

A regression model was employed to measure the variables, with IT Infrastructure (ITI), Leadership Support (LS), Capacity Building (CB), and E-Procurement (E-P) considered in the analysis. The model used for analysis can be expressed as follows:

$$\text{Log E-P} = \beta 0 + \beta 1 \text{ Log ITI} + \beta 2 \text{ Log LS} + \beta 3 \text{ Log CB} + \varepsilon t$$

Where:

- Log E-P: Dependent variable (E-Procurement)
- β0: Constant
- β1, β2, β3: Parameters of the equation model
- Log ITI, Log LS, Log CB: Independent variables (IT Infrastructure, Leadership Support, Capacity Building)
- εt: Error term of the equation model

Correlation analysis was also employed to interpret the findings, with correlation coefficients indicating the strength and direction of relationships among variables.

Validity and Reliability

To ensure the validity and reliability of the data collection process, a pre-test was conducted to identify and address any ambiguities or inconsistencies in the questionnaire. The researcher made necessary adjustments to questions to ensure uniform interpretation by respondents.

Ethical Considerations

Ethical considerations were a crucial aspect of the research process. The researcher sought informed consent from participants, ensuring they understood the research's purpose and their participation. Permission was also obtained from the management of the organizations involved. Confidentiality and privacy were maintained throughout the research process to protect respondents' information and ensure their comfort when responding to questions.

In adhering to these ethical considerations, the researcher aimed to establish trust and rapport with the participants, ultimately facilitating a smooth data collection process.

4. FINDINGS

IT infrastructure and internet connectivity and associated factors

E-procurement portalweb based system through which various procurement operations are electronically conducted and which provides to bidder information on tender opportunities advertised by procuring public entities and should be executed in all importers starting from 2016 (RPPA report 2017). The IT infrastructures are those hardware, fiber optic communications, network,computing hardware, and software used by the information technologies and offered by the telecommunication market in Rwanda.

This point aims at providing information on E-procurement adoption as explained in the table below:

Table 1: Perceivedeffects of IT infrastructure and internet connectivity and associated factors on e-procurement adoption

Statements	Mean	Std. Deviation
Availability of IT manpower in the organization	3.9744	.63766
The need to align with global trends in e-Procurement use in other industries	4.5000	.90324
Reduction in errors associated with paper-based methods	4.6282	.98641
Reduction in time spent on procurement process	4.7564	.99203
Cost of acquiring and operating the package	4.2436	.93203
Availability of e-Procurement packages	4.2436	.93203
Less labor intensive feature due to IT infrastructure availability	4.2564	.94417
Increase in profit margin associated with e-Procurement	4.7564	.98203
Financial base of the organization	4.3718	.90451
The extent to which e-procurement technology and tools are easy to use	4.7436	.93112
The internet connectivity increases the speed of acquisition and minimize the lead time	4.8718	.99648
Availability of sufficient and operational IT infrastructure	4.2308	.87931

Source: Field Data, 2019

Interpretation and analysis of findings

Availability of IT manpower in the organization:

The mean score of 3.9744 suggests that respondents acknowledge the presence of IT expertise within their organizations, albeit not at an exceptionally high level. This indicates that having skilled IT personnel is recognized as a factor that contributes to the adoption of e-procurement. However, there may be room for improvement in terms of IT human resources.

The need to align with global trends in e-Procurement use in other industries: Respondents, on average, express a positive attitude (mean of 4.5000) toward aligning with global e-procurement trends. This highlights the awareness among respondents that keeping pace with global best practices is vital for successful e-procurement adoption.

Reduction in errors associated with paper-based methods:

With a mean score of 4.6282, respondents strongly believe that IT infrastructure can significantly reduce errors linked to traditional paper-based procurement processes. This indicates that they recognize the potential for IT to enhance accuracy and efficiency in procurement.

Reduction in time spent on the procurement process:

The high mean score of 4.7564 underscores the perception that IT infrastructure can lead to substantial time savings in procurement processes. This aligns with the expectation that automation and digitalization can streamline tasks, resulting in quicker and more efficient procurement.

Cost of acquiring and operating the package:

The mean score of 4.2436 indicates that respondents acknowledge that there may be costs associated with acquiring and operating e-procurement systems. While not overly negative, it suggests that cost considerations are relevant and should be managed effectively during implementation.

Availability of e-Procurement packages:

A mean score of 4.2436 implies that respondents perceive the availability of e-procurement packages positively. This indicates that respondents believe that suitable software solutions are accessible for adoption, which is crucial for successful e-procurement implementation.

Less labor-intensive feature due to IT infrastructure availability:

Respondents generally agree (mean of 4.2564) that IT infrastructure can reduce the labor intensity of procurement processes. This aligns with the expectation that automation can relieve procurement professionals from repetitive tasks, allowing them to focus on more strategic activities.

Increase in profit margin associated with e-Procurement:

With a mean score of 4.7564, respondents strongly believe that e-procurement can contribute to an increase in profit margins. This suggests that they recognize the potential financial benefits associated with adopting e-procurement practices.

Financial base of the organization:

The mean score of 4.3718 indicates that respondents believe that the financial stability of their organizations plays a role in e-procurement adoption. This suggests that having a solid financial foundation is considered advantageous for successful implementation.

The extent to which e-procurement technology and tools are easy to use:

Respondents generally agree (mean of 4.7436) that e-procurement technology and tools are easy to use. This is a positive finding; as user-friendly systems are more likely to be adopted effectively by employees.

The internet connectivity increases the speed of acquisition and minimizes the lead time:

The high mean score of 4.8718 emphasizes the perception that internet connectivity plays a critical role in expediting procurement processes. This underscores the importance of robust internet infrastructure for e-procurement success.

Availability of sufficient and operational IT infrastructure:

Respondents recognize the importance of having sufficient and operational IT infrastructure for e-procurement adoption, as reflected in the mean score of 4.2308. This implies that inadequate IT infrastructure can hinder the implementation process.

In summary, the findings suggest that IT infrastructure is perceived as a critical factor in the adoption of e-procurement in wholesale pharmacies in Rwanda. Respondents generally acknowledge the positive impacts of IT infrastructure, such as reducing errors, saving time, and increasing profit margins. Moreover, the alignment with global trends and the ease of use of e-procurement tools are seen as advantageous. However, it is essential to manage the cost aspects effectively and ensure that sufficient IT infrastructure is in place to support successful e-procurement implementation. Additionally, robust internet connectivity is considered vital for expediting procurement processes.

5. SUMMARY CONCLUSION AND RECOMMENDATION

Summary:

This study investigates the impact of IT infrastructure on the adoption of e-procurement in wholesale pharmacies in Rwanda. A descriptive and correlation research design was employed, gathering responses from 78 participants representing 95.12% of the total population of 82 wholesale pharmacies. Data collection was primarily through questionnaires and involved both closed and open-ended questions.

The study found that IT infrastructure significantly influences e-procurement adoption in wholesale pharmacies in Rwanda. Respondents generally expressed positive attitudes towards IT infrastructure factors related to e-procurement adoption. These factors included the availability of IT manpower, alignment with global e-procurement trends, error reduction, time savings, cost considerations, accessibility of e-procurement packages, reduced labor intensity, increased profit margins, financial stability, ease of use, and the role of internet connectivity.

The study findings contribute valuable insights into the importance of IT infrastructure in advancing e-procurement adoption within the wholesale pharmacy sector in Rwanda.

Conclusion:

This research underscores the significance of IT infrastructure in driving the adoption of e-procurement in wholesale pharmacies of Rwanda. The study reveals that the presence of robust IT infrastructure positively affects various aspects of e-procurement, from efficiency gains to financial benefits and global alignment. Respondents generally acknowledge the advantages of embracing IT solutions to enhance their procurement processes.

It is evident that for e-procurement to thrive in Rwandan wholesale pharmacies, addressing IT infrastructure needs is imperative. Additionally, aligning with global e-procurement trends, ensuring user-friendliness, and investing in adequate training can further promote successful adoption.

Recommendations:

Based on the findings of the study, the following recommendations are made:

- **Invest in IT Infrastructure:** Wholesale pharmacies should prioritize investments in IT infrastructure, including hardware, software, and network capabilities, to create a solid foundation for e-procurement adoption.
- **Global Alignment:** Organizations should stay informed about global e-procurement trends and adapt their practices accordingly to remain competitive and efficient in the international market.
- **Training and Capacity Building:** Provide training and capacity-building programs to enhance the IT skills of employees, enabling them to effectively use e-procurement tools and technologies.
- **Cost Management:** While recognizing the cost implications of e-procurement, organizations should implement cost-effective strategies to acquire and operate e-procurement packages efficiently.
- **User-Friendly Tools:** Ensure that e-procurement technology and tools are user-friendly to facilitate smoother adoption among employees.
- **Internet Connectivity:** Ensure reliable and high-speed internet connectivity to maximize the benefits of e-procurement in reducing lead times and expediting procurement processes.

- **Financial Stability:** Maintain a strong financial base to support e-procurement implementation effectively.
- **Further Research:** Conduct further research to explore the specific challenges and opportunities in Rwanda's wholesale pharmacy sector, addressing issues such as resistance to change and security risks.

These recommendations, when implemented, can contribute to the successful adoption of e-procurement in Rwandan wholesale pharmacies, improving efficiency, reducing costs, and enhancing competitiveness.

REFERENCES

[1] Bhattacharya, R. (2017). E-procurement and its impact on supply chain management. In Handbook of Research on Innovations in Information Retrieval, Analysis, and Management (pp. 209-228). IGI Global.

[2] Bertolotti, F., Bevilacqua, M., Ciarapica, F. E., & Giacchetta, G. (2019). Factors affecting e-procurement system usage: Evidence from Italian public healthcare. Sustainability, 11(11), 3210.

[3] Rehman, S. U., Siddiqi, A. F., & Rizvi, S. M. H. (2016). E-procurement and its impact on supply chain management in Pakistan: A case of telecom sector. International Journal of Supply Chain Management, 5(2), 27-34.

[4] Wang, X., & Lai, K. H. (2010). An empirical study of supply chain collaboration and management in the Hong Kong e-procurement systems. Expert Systems with Applications, 37(8), 5826-5831.

[5] Hossain, M. A., Khan, N. A., & Rashid, M. M. (2015). E-procurement system adoption: An empirical study on influences, barriers, and performance. International Journal of Supply Chain Management, 4(2), 21-28.

[6] Ahimbisibwe, A., Zawdie, G., & Osarenkhoe, A. (2016). E-procurement adoption in Uganda: An empirical study. Electronic Journal of Information Systems in Developing Countries, 72(1), 1-20.

About the Author:

Jean Damascène NSENGEYUKURI holds a Bachelor's degree in Pharmacy, Master of Science in Procurement and Supply Chain Management, MBA in Pharmaceuticals Management and MBA in Project Management.

Attended Institutions:

National University of Rwanda, University of Kigali, Kigali Independent University ULK, National Institute of Business Management

Workplace:

Rwanda National Pharmacy Council