UNIVERSITY of RWANDA

"Evaluating E-Soko System Usability and Its Impact on Potato Price Transparency: Case study in Musanze District"

By

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DECLARATION

I declare that this Thesis contains my own work except where specifically acknowledged.

Signed…….……. Date: …….

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APPROVAL

This is to certify that this Thesis has been written under my guidance and supervision and it is here by forwarded for examination.

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DEDICATION

This work is dedicated:

To my parents, whose endless love, prayers, encouragement, and sacrifices have been my foundation.

To the hardworking farmers of Musanze District, whose resilience and pursuit of better livelihoods inspired the focus of this study.

To everyone who believes in the power of technology to transform lives, especially in rural communities striving for economic empowerment.

Without your collective inspiration, motivation, and faith in me, this achievement would not have been possible.

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ABSTRACT

The agricultural sector remains a cornerstone of Rwanda's economy, with potatoes being a key crop in Musanze District. To enhance agricultural market efficiency, the E-Soko system was introduced to provide farmers with real-time market information. This study aimed to assess the usability of the E-Soko system and evaluate its impact on potato price transparency in Musanze District. A qualitative approach method was adopted, from surveys with 50 respondents and insights from interviews with different key stakeholders including, Farmers, system developers, Minagri, buyers, among others. The study focused on examining how farmers interact with the E-Soko platform, the extent to which it influences their access to price information, and how it affects their market negotiations. The System Usability Scale (SUS) and the Technology Acceptance Model (TAM) were used to evaluate the usability factors. Contrary to expectations, the findings revealed that many farmers experience difficulties using the E-Soko system. Among 20 respondents, 75% reported challenges with system complexity, 65% lacked smartphone access, and 60% cited poor internet connectivity. Furthermore, 85% indicated they had never received training on how to use the platform. As a result, 90% of respondents still rely on middlemen for market information and price negotiations. Only a few farmers occasionally accessed potato price updates via the platform.

Challenge	**Number of Mentions**	**% of Respondents (N=20)**
E-Soko is difficult to use	15	75%
Poor internet connectivity	12	60%
No access to smartphones	13	65%
Lack of training	17	85%
Still rely on middlemen	18	90%

The study concludes by recommending extensive farmer education programs, simplification of the E-Soko interface, the introduction of offline or SMS-based services, and improved infrastructural support to enhance system accessibility and effectiveness. Strengthening the usability and adoption of digital platforms like E-Soko remains critical to achieving greater agricultural price transparency and empowering farmers in Rwanda.

Keywords: E-Soko system, usability challenges, potato price transparency, agricultural markets, Musanze District, Rwanda.

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LIST OF ACRONYMS

Abbreviation	Full form
E-Soko	Electronic-soko (market information system)
ICT	Information and communication technology
MINAGRI	Ministry of agriculture and animal resources
NISR	National institute of statistics of Rwanda
SMS	Short message service
UI	User interface
UX	User experience
GDP	Gross domestic product
RDB	Rwanda development board
FAO	Food and agriculture organization
NGO	Non-governmental organization
M&E	Monitoring and evaluation
USAID	United states agency for international development
SPSS	Statistical package for the social sciences
TCRA	Tanzania communications regulatory authority
ISF	International society for fair trade
API	Application programming interface
USSD	Unstructured supplementary service data
GPS	Global Positioning System

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CHAPTER 1: INTRODUCTION

1.1 Overview

This study focused on assessing the usability of the E-Soko system and its impact on potato price transparency in Musanze District, Rwanda. The E-Soko system is a mobile-based and SMS-driven platform designed to provide farmers with real-time market prices for various agricultural commodities. Initially introduced by the Government of Rwanda, it aims to reduce market inefficiencies by improving the accessibility of price information for farmers, thereby enabling them to make informed decisions regarding the sale of their products. The primary objective of this research was to evaluate the extent to which the E-Soko system enhances price transparency in the potato market in Musanze District. By examining the system's usability, the study assessed how well it meets the needs of local farmers, its effectiveness in providing accurate and timely price information, and its role in reducing the power of middlemen in the supply chain.

Through the assessment, this research will also explore the barriers to full adoption of the system, such as issues of digital literacy, internet connectivity, and farmer awareness of the platform's benefits. The study had employed a qualitative interview -methods approach, to collect data from potato farmers in Musanze District. The qualitative component involved in-depth interviews with a smaller group of farmers to explore their experiences, challenges, and perceptions regarding the E-Soko system.

Additionally, the study pursued to understand the broader impact of the system on market efficiency. Price transparency is a crucial factor in market efficiency, as it helps to reduce information asymmetry between farmers and buyers. The study explored whether the E-Soko system contributes to improved bargaining power for farmers, leading to more competitive pricing and reduced dependency on intermediaries, who often manipulate market prices to their advantage By focusing on the Musanze District, the research provided insights into how such digital platforms can influence agricultural price dynamics in rural regions of Rwanda, offering valuable recommendations for policymakers, agricultural organizations, and technology developers who

aim to enhance the effectiveness of digital market platforms. Furthermore, the findings could have broader implications for the development of similar digital systems in other parts of Sub-Saharan Africa, where agriculture is a major contributor to the economy, but market inefficiencies persist [1].

Ultimately, the study contributed to understanding how digital platforms, like the E-Soko system, can be optimized to improve market access, enhance transparency, and empower farmers, which is essential for fostering sustainable agricultural development in Rwanda and beyond.

1.2. Background of the Study

Agriculture plays a crucial role in the global economy, providing food and livelihoods for billions of people worldwide. Despite its importance, farmers, especially smallholders in developing countries, face numerous challenges related to market access, information asymmetry, and price volatility. One of the most significant barriers is the lack of timely and accurate price information, which results in inefficiencies in agricultural markets. In Sub-Saharan Africa, for example, smallholder farmers are often exploited by intermediaries who have better access to market information, leading to reduced income and financial insecurity for the farmers [2].

Across various continents, the introduction of digital platforms aimed at improving market transparency has been widely recognized as a potential solution to these challenges. In Asia, mobile-based platforms have been implemented to improve farmers' access to market prices and enhance their bargaining power. Similarly, in Latin America, countries like Brazil have successfully integrated digital systems for agricultural price transparency, helping farmers negotiate better prices and access wider markets [3]. These innovations in market information systems are becoming essential tools for rural development and poverty alleviation.

In Rwanda, agriculture is a primary sector for economic development, with potatoes being one of the country's most important crops. The Government of Rwanda has recognized the potential of digital technologies in transforming agricultural practices and has introduced the E-Soko system as part of its broader efforts to improve market access for farmers. The E-Soko platform provides

real-time agricultural price information through mobile phones and SMS, thereby offering farmers an opportunity to directly access price information from multiple markets, which is critical in reducing the power of middlemen. However, despite its potential, the effectiveness of the E-Soko system in improving price transparency and empowering farmers remains underexplored. Farmers' ability to utilize the system effectively and the system's overall impact on price transparency in the agricultural markets, particularly for potatoes in Musanze District, is an area that requires further investigation [4].

Globally, the success of agricultural price information systems depends on a variety of factors, including the usability of the system, accessibility, and the level of digital literacy among farmers. Many farmers in developing countries face challenges in using digital platforms due to low levels of technological knowledge and poor infrastructure. Studies in Africa and Southeast Asia have highlighted the need for user-friendly systems that account for the socio-economic context and technological capabilities of rural populations [5]. Moreover, the integration of such platforms with broader agricultural policies and support systems can determine their success in fostering long-term improvements in market access and pricing transparency.

Thus, assessing the usability of the E-Soko system in Rwanda and its impact on price transparency is critical in understanding how such platforms can contribute to the broader goal of market efficiency and rural empowerment. This study focused on the Musanze District, where potato farming is a significant economic activity, to understand the specific needs of local farmers and evaluate the practical outcomes of using the E-Soko system to improve price transparency in the potato market.

1.3. Gaps of study

Despite the growing interest in digital platforms aimed at improving market transparency in agriculture, several gaps remain in the existing body of knowledge. The E-Soko system, although widely recognized as a valuable tool for enhancing price transparency, has not been sufficiently studied in the context of its usability and impact on price dynamics within the potato sector,

particularly in rural areas such as Musanze District. The following gaps have been identified in the literature:

i. Limited Focus on Usability in Rural Contexts: While several studies have explored the usability of digital platforms in urban or semi-urban settings, there is a lack of in-depth analysis on how rural farmers interact with these systems. For instance, most research on agricultural price information systems has focused on large-scale commercial farming, neglecting the experiences of smallholder farmers in rural areas. Understanding how farmers in remote areas, with limited digital literacy and infrastructure, navigate platforms like E-Soko is crucial for improving their adoption and effectiveness [6].

ii. Impact on Price Transparency in Specific Crops: Many existing studies have broadly analyzed the impact of digital price platforms on agricultural markets, but few have focused on specific crops, such as potatoes in Musanze District. Potatoes, being a major staple crop in Rwanda, have unique market dynamics that may differ from other agricultural products. Thus, there is a need for research that specifically assesses how the E-Soko system influences potato pricing, particularly in terms of reducing information asymmetry and empowering farmers to negotiate better prices [7].

iii. Understanding Barriers to Full Adoption: Although the E-Soko system has the potential to benefit farmers, several barriers to its full adoption remain underexplored. Issues such as internet connectivity, the affordability of smartphones, and the level of digital literacy among farmers in Musanze District need further investigation. Previous studies have highlighted the challenges faced by farmers in accessing mobile-based platforms, but these studies often lack region-specific insights on how infrastructure, socio-economic factors, and farmer awareness affect the usability of the system [8].

iv. Integration with Other Agricultural Support Systems: While the E-Soko system is a valuable standalone tool, its effectiveness could be enhanced if integrated with other agricultural support systems, such as extension services, input markets, and weather

forecasting. Research exploring the synergy between E-Soko and other agricultural support systems is limited. Understanding how integration with other services might improve the overall utility and adoption of the platform would provide a more holistic view of its potential impact on agricultural productivity and price transparency [9].

v. Long-Term Impact on Market Efficiency: While studies have documented the immediate benefits of using digital platforms in agriculture, there is limited research on their long-term effects. For instance, it remains unclear whether improvements in price transparency and bargaining power lead to sustained reductions in market inefficiencies. Longitudinal studies are necessary to assess how continued use of the E-Soko system influences market prices, farmer income, and overall agricultural productivity over time.

Addressing these gaps in the literature will provide a more comprehensive understanding of the E-Soko system's usability and its impact on potato price transparency in Musanze District, offering insights that could help optimize the system for better market outcomes and farmer empowerment. This Gaps in the Study section highlights the key areas where further research is needed to improve the understanding of the E-Soko system's usability and its impact on agricultural market transparency, particularly for potato farmers in Musanze District.

1.3.1. Motivation

The motivation for this study arises from the recognition that agricultural markets, particularly in developing countries, suffer from significant inefficiencies due to information asymmetry, lack of transparency, and the dominance of intermediaries. Farmers, especially smallholder farmers, often have limited access to real-time market prices, which forces them to rely on middlemen, who exploit the information gap to their advantage, leading to unfair pricing and reduced income for farmers. This issue is particularly evident in rural areas of Rwanda, such as Musanze District, where potatoes are a vital crop for both food security and the economy [10].

The E-Soko system, introduced by the Government of Rwanda, represents a promising solution to this issue by providing farmers with real-time access to agricultural price information via mobile

phones. However, while the system has been implemented, its effectiveness in improving market efficiency and empowering farmers remains under-researched [11]. There is a need to explore how the E-Soko system influences potato price transparency in Musanze District, as well as to understand the barriers and facilitators to its adoption by local farmers. Assessing the usability of the platform and its impact on market dynamics can provide valuable insights for policy makers, agricultural organizations, and technology developers aiming to enhance the system's functionality and increase its reach among farmers.

The motivation for this study is also driven by the growing global recognition of the role of digital platforms in transforming agricultural markets. Various countries, especially in Asia and Latin America, have successfully implemented similar systems to improve price transparency and empower farmers. In India, for example, digital platforms like eNAM (National Agricultural Market) have been instrumental in improving farmers' access to market prices and reducing the influence of intermediaries [12]. Similarly, in Kenya, platforms like M-Farm have empowered farmers by providing market price data through mobile phones, leading to better pricing and improved decision-making. The success of such platforms worldwide highlights the potential benefits of digital technologies for improving agricultural market efficiency, making it essential to investigate how the E-Soko system can achieve similar outcomes in Rwanda [13].

Furthermore, the motivation for this study is grounded in the desire to contribute to the broader discourse on digital inclusion in rural areas. While mobile technology has become ubiquitous in many parts of the world, rural farmers in many developing countries still face challenges related to digital literacy, access to smartphones, and internet connectivity. Understanding the challenges and opportunities associated with the adoption of mobile-based agricultural platforms in these contexts is crucial to ensuring that digital technologies reach their full potential in promoting rural development and poverty alleviation [14]. This study seeks to contribute to the ongoing efforts to bridge the digital divide by assessing the factors that influence farmers' use of the E-Soko system, including their levels of digital literacy, infrastructure, and awareness.

In conclusion, the motivation for this study is driven by the pressing need to understand how digital platforms, like the E-Soko system, can improve price transparency and market efficiency for

smallholder farmers. By focusing on Musanze District and the potato market, this research aims to provide valuable insights into the factors that influence the system's usability and effectiveness, ultimately contributing to more equitable and efficient agricultural markets in Rwanda and potentially other parts of Sub-Saharan Africa.

1.4. Problem Statement

Access to accurate and timely agricultural market information is crucial for improving farmers' bargaining power, income, and reducing market inefficiencies. In Rwanda, the E-Soko system was introduced as an innovative digital platform to bridge the information gap by providing real-time price data for various crops, including potatoes. Despite the promising potential of E-Soko, field evidence in Musanze District suggests that its impact on enhancing potato price transparency remains limited.

Many farmers in Musanze face challenges in accessing and effectively using the E-Soko system. Key barriers include low smartphone penetration, poor internet connectivity in rural areas, lack of digital literacy among farmers, and insufficient user training. As a result, a substantial portion of potato farmers continues to rely on traditional intermediaries (middlemen) to access market information. This continued dependence not only undermines the goal of transparent pricing but also exposes farmers to exploitation through price manipulation [15], [16].

Additionally, the E-Soko system itself presents usability challenges. The platform interface is often considered complex by users with low education levels, and it lacks multilingual support tailored to local contexts [17]. Furthermore, the absence of offline access or SMS-based services for farmers without smartphones further limits the system's inclusivity and effectiveness [18].

Without significant improvements in system usability, farmer engagement, and infrastructural support, the full benefits of digital agricultural platforms like E-Soko will remain unrealized. Therefore, it is imperative to critically assess the current usability of the E-Soko system and its real impact on potato price transparency in Musanze District, with the aim of identifying actionable solutions to improve farmer participation, access to accurate market information, and overall agricultural market efficiency.

1.5. Study Objectives usability

1.5.1. General Objective

To assess the usability of the E-Soko system and evaluate its impact on potato price transparency among farmers in Musanze District.

1.5.1.2. Specific Objectives

1. To evaluate the level of accessibility and usability of the E-Soko system by potato farmers in Musanze District.
2. To examine the challenges faced by farmers in using the E-Soko system for market price information.
3. To propose recommendations for improving E-Soko system usability and adoption among potato farmers in Musanze District.

1.5.1.3. Research questions

Main Research Question:

1. How does the usability of the E-Soko system affect potato price transparency among farmers in Musanze District?

Specific Research Questions:

1. What is the current level of accessibility and usability of the E-Soko system among potato farmers in Musanze?
2. What challenges hinder farmers from effectively using the E-Soko system for accessing market price information?
3. What improvements can be made to enhance the usability and adoption of the E-Soko system among farmers?

1.6 Scope of the Study

This study focuses on assessing the usability of the E-Soko system and its impact on potato price transparency in Musanze District, Rwanda. The research specifically targets potato farmers who are the primary users (or intended users) of E-Soko for accessing real-time market prices.

The study was limited to:

i. Evaluating the ease of use, accessibility, and effectiveness of the E-Soko system as perceived by farmers.
ii. Identifying key challenges farmers face in accessing or using E-Soko services.
iii. Examining the relationship between E-Soko usage and the level of information transparency regarding potato prices.
iv. “Proposing a system prototype that addresses the key usability issues identified in the E-Soko system, with the aim of enhancing user experience and improving access to accurate market price information.

The geographical scope was restricted to Musanze District due to its significance in potato production in Rwanda. The study considers data collected from surveys and interviews conducted in June 2025. Other aspects of agricultural digitalization, such as mobile money services or other platforms outside of E-Soko, are beyond the scope of this research.

1.7. Significance of the Study

This study is significant for several reasons: For Farmers: It highlights usability challenges faced by farmers in accessing reliable price information, empowering them to advocate for better-designed digital tools. For Policymakers and Program Developers: The findings provide valuable insights into how digital agricultural platforms like E-Soko can be improved to achieve intended goals, thereby informing better policy decisions and future technological developments.

For Technology Providers and System Designers: Understanding the real user experience will help developers refine E-Soko’s interface, making it more inclusive, accessible, and farmer-friendly, especially for rural populations with limited digital literacy. For Academic Research: This study will contribute to the limited body of empirical knowledge on the evaluation of e-agriculture platforms in Rwanda, particularly focusing on usability and market transparency aspects.

For Sustainable Agricultural Development: By improving farmers’ access to transparent and timely price information, the study supports efforts to enhance market efficiency, reduce exploitation by middlemen, and ultimately contribute to rural economic development.

1.8. Organization of the Chapter Scheme

This study was organized into five chapters. Each chapter has a specific purpose in addressing the research objectives and presenting the findings of the study. The structure of the study is as follows:

Chapter One: Introduction

Chapter One provides the introduction to the study, outlining the background, objectives, research questions, and the significance of the study. It introduces the main problem that the research aims to address, which is the assessment of the usability of the E-Soko system and its impact on potato price transparency in Musanze District, Rwanda. This chapter also highlights the motivation behind the study, the gaps identified in the literature, and the organization of the study.

Chapter Two: Literature Review

Chapter Two reviews existing literature on digital platforms in agriculture, focusing on market transparency, price information systems, and the usability of digital tools in rural contexts. It explores studies related to the adoption of mobile platforms by farmers, particularly in developing countries, and examines the theoretical frameworks relevant to assessing system usability and market transparency. The chapter also identifies the gaps in the existing research that this study aims to fill.

Chapter Three: Methodology

Chapter Three details the research methodology used to assess the usability of the E-Soko system and its impact on potato price transparency. This chapter outlines the research design, the population and sample, data collection methods (surveys and interviews), and the tools used for data analysis. It provides a justification for the chosen research methods and explains how the data will be analyzed to answer the research questions.

Chapter Four: Data Analysis and Results

Chapter Four presents the analysis of the data collected through surveys and interviews. It includes descriptive statistics, such as the demographics of the respondents, and evaluates their perceptions of the E-Soko system's usability. The chapter provides an in-depth analysis of how the system impacts potato price transparency in Musanze District. Various data visualization techniques, such

as charts and graphs, were used to present the findings clearly. The results were interpreted in relation to the research questions, highlighting the strengths and weaknesses of the E-Soko platform from the perspective of the farmers.

Chapter Five: Summary, Conclusions, and Recommendations

Chapter Five concludes the study by summarizing the main findings and addressing the research questions. It discusses the implications of the findings in relation to the usability of the E-Soko system and its impact on market transparency. The chapter also presents recommendations for improving the adoption and functionality of the system. Additionally, suggestions for future research in the field of agricultural digital platforms are provided, focusing on overcoming the barriers to full adoption and maximizing the benefits for smallholder farmers.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter presents a detailed review of relevant literature to provide a theoretical and empirical understanding of the impact of digital platforms like the E-Soko system on agricultural price transparency, market efficiency, and usability. The chapter discusses global perspectives on agricultural market information systems (AMIS), digital platforms, and mobile-based price information systems while emphasizing usability and adoption challenges. Special attention is given to previous research studies on digital platforms in developing countries, including Rwanda, and their application to agricultural markets.

2.2. Digital Platforms and Agricultural Market Information Systems (AMIS)

Agriculture in developing countries faces various challenges, including market inefficiencies, price volatility, and information asymmetry. Digital platforms have emerged as a solution to these challenges by providing farmers with timely, accurate, and transparent market prices. These platforms, particularly mobile-based systems, have been shown to bridge the information gap between buyers and sellers, leading to better-informed decisions and more competitive pricing [19].

Digital platforms for agricultural market information systems (AMIS) have been implemented in several African countries, such as Kenya, Ghana, and Rwanda. For example, in Kenya, M-Farm and iShamba are digital platforms that provide farmers with real-time market information via mobile phones. These platforms have helped to increase transparency, improve market efficiency, and reduce exploitation by middlemen [20]. Similarly, Rwanda's E-Soko system is an essential tool for promoting transparency and reducing inefficiencies in agricultural markets by disseminating price information.

2.3. Impact of mobile-based price information systems

Mobile-based price information systems have proven to be effective tools for improving agricultural market transparency. A study by Aker [21] found that the introduction of mobile phones for market information in Niger significantly reduced-price volatility, enabling farmers to secure better prices and avoid selling their produce at a loss [22]. Mobile platforms like E-Soko

have the potential to empower farmers, especially those in rural areas, by providing them with direct access to market prices without the need for intermediaries [23].

In the case of E-Soko in Rwanda, while the system provides access to price data across various markets, its effectiveness in reducing market inefficiencies and empowering farmers remains inconsistent. Some farmers in Rwanda have reported that the system allows them to negotiate better prices and improve their market knowledge, while others continue to rely heavily on middlemen due to issues related to mobile literacy and accessibility [24].

2.4. Usability of mobile-based agricultural platforms

Usability is crucial for the success of mobile-based agricultural platforms. According to Nielsen [25], usability is defined as the ease with which users can interact with a system to achieve their goals efficiently [26]. In the case of agricultural platforms like E-Soko, usability includes factors such as interface design, accessibility of information, and ease of use. A platform's usability determines whether farmers can access price data, make informed decisions, and ultimately benefit from the system.

A study by Korir et al. [27] on the M-Farm platform in Kenya highlighted that the success of mobile-based platforms in agriculture depends on factors such as the design of the user interface, language support, and the relevance of information provided [28]. These factors also apply to the E-Soko system, which aims to provide farmers with price information in a user-friendly and accessible manner. However, usability challenges related to digital literacy and connectivity remain barriers to its effectiveness in Rwanda's rural areas.

2.5. Factors influencing usability

The usability of agricultural platforms like E-Soko is influenced by several key factors:

i. Digital Literacy: Digital literacy is a major factor in the adoption and effective use of mobile-based platforms. Studies in Tanzania and Uganda have shown that farmers with higher levels of digital literacy are more likely to use mobile platforms effectively, leading to better market outcomes [29]. In contrast, low digital literacy remains a barrier to the success of platforms like E-Soko, especially in remote areas where farmers may not be familiar with mobile technology.

ii. Network Connectivity: The availability of a reliable mobile network is essential for the success of mobile-based platforms. A study by Mwakalinga et al. [30] found that poor network connectivity in rural areas limits the effectiveness of mobile-based price information systems, as farmers are unable to access real-time price data during critical times [31].

iii. Affordability of Mobile Technology: The affordability of mobile phones and internet data is another important factor. While mobile phones are increasingly available in rural areas, the cost of internet access can still be prohibitive for many smallholder farmers. A report by the International Telecommunication Union (ITU) emphasized that affordable data plans are essential for ensuring that farmers can regularly access price information without financial strain [32].

2.6. The E-Soko system in Rwanda

E-Soko is a mobile-based agricultural information system introduced by the government of Rwanda to improve price transparency and reduce market inefficiencies. The system provides real-time price data for a wide range of agricultural products, including potatoes, beans, maize, and vegetables. Farmers can use the system to access market prices across various markets in Rwanda, allowing them to make informed decisions about when and where to sell their produce.

Although the system has been widely praised for its potential to improve market transparency, its impact on potato price transparency in Musanze District has been mixed. Studies by Niyonkuru et al. [33] showed that some farmers in Musanze have benefited from the system, using the price information to negotiate better prices and avoid exploitation by middlemen [34]. However, the system's reach has been limited by issues such as low smartphone penetration, network issues, and a lack of awareness among farmers about the system's capabilities [35].

2.7. E-Soko and market efficiency

The primary aim of the E-Soko system is to enhance market efficiency by providing transparent, real-time price information. However, the system's effectiveness in reducing inefficiencies has been constrained by several factors. A study by Kamuhanda [36] showed that while E-Soko has

led to improved price transparency in some regions, many farmers still rely on middlemen due to a lack of access to technology and poor system design [37].

The reduction of market inefficiencies hinges on the ability of farmers to use the system to access accurate and timely price information. The system can potentially reduce the role of intermediaries by empowering farmers with price data that allows them to negotiate directly with buyers. However, in Musanze District, where potato prices fluctuate significantly, the system's impact on price stabilization remains limited [38].

2.8. Barriers to Adoption of Mobile-Based Platforms

Several barriers hinder the widespread adoption of mobile-based agricultural platforms like E-Soko in rural areas:

- Digital divide: A significant barrier to adoption is the digital divide, with many farmers lacking access to smartphones, internet connectivity, or both. According to a study by [38], many farmers in rural areas of East Africa face challenges related to mobile technology accessibility, limiting their ability to use platforms like E-Soko effectively.
- Cultural and behavioral factors: Cultural and behavioral factors also play a role in the adoption of digital platforms. Many farmers in rural Rwanda may be skeptical about using new technologies, preferring traditional methods of market engagement or relying on community-based sources of information [39].
- Awareness and training: Many farmers remain unaware of the full benefits of mobile-based agricultural platforms [40]. Training programs and awareness campaigns are necessary to help farmers understand how to use platforms like E-Soko and how these systems can enhance their market outcomes

2.9. Definition of key terms

E-Soko System: A digital information system established by the Government of Rwanda to provide farmers with real-time commodity price updates via SMS and online platforms. It aims to enhance farmers' market access and decision-making [41].

Usability: The extent to which a system can be used by specified users to achieve specified goals effectively, efficiently, and satisfactorily in a specified context of use. It includes

dimensions such as learnability, efficiency, memorability, error reduction, and user satisfaction [42].

Digital Literacy: The ability to use digital technology, communication tools, and networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society [43].

Middlemen: Intermediaries who purchase agricultural produce directly from farmers and resell it to wholesalers or retailers, often profiting from farmers' lack of direct market access [44].

Information Asymmetry: A situation in a transaction where one party has more or better information than the other, leading to imbalanced negotiations and potential exploitation [45].

Potato Farmers: Agricultural workers engaged in the cultivation, harvesting, and marketing of potatoes as a commercial crop, particularly in Musanze District, which is a leading potato-producing region in Rwanda [46].

Table 2: Summary of the reviewed literature

Authors & References	**Country**	**Findings**	**Gaps**	**Observation**
Aker, A. J. (2011) [48]	Niger	Mobile phones reduce price volatility and information asymmetry, improving farmers' market decisions.	Study focused on general agricultural markets, not specific to potatoes or Rwanda.	Demonstrates mobile technology's potential in agricultural price transparency, but lacks regional and product-specific context.

Authors & References	Country	Findings	Gaps	Observation
Korir, A., Obiero, S.K.J., & Sigei, A.K. (2017) [49]	Kenya	M-Farm mobile platform improved farmers' access to real-time price information, enhancing market decisions.	Limited focus on usability barriers and technological adoption by farmers.	Indicates mobile platforms improve price transparency but doesn't address adoption challenges or user-friendliness in rural areas.
Kamuhanda, R. (2019) [50]	Rwanda	E-Soko system improves price transparency, but its effectiveness is hindered by limited digital literacy and infrastructure challenges.	Insufficient exploration of the usability factors affecting adoption in different rural regions like Musanze.	Acknowledges E-Soko's potential, but highlights barriers that need addressing for better usability and adoption.
Mwakalinga, M., Ndungu, C.I., & Mutisya, D.K. (2020) [51]	Kenya	Found that mobile-based price information systems improve efficiency, but connectivity issues hinder their effectiveness in rural markets.	Limited focus on usability challenges specific to the agricultural products (e.g., potatoes) in the Rwandan context.	Highlights the critical role of infrastructure, but lacks insight into the cultural and usability challenges of adopting mobile platforms for farming.

Authors & References	Country	Findings	Gaps	Observation
Niyonkuru, M. et al. (2020) [52]	Rwanda	E-Soko system plays a significant role in improving market price transparency for farmers, but issues like limited smartphone penetration hinder access.	Lack of a detailed investigation into how usability and user interface impact E-Soko adoption in rural farming communities.	Useful insight into E-Soko's role but points to the need for improvements in both accessibility and usability to increase adoption.
Mwaura, S., Njiru, K.T., & Ochieng, L. (2019) [53]	Uganda/Tanzania	Emphasized the need for training and awareness to bridge the digital divide, which would increase adoption of mobile agricultural platforms.	The study did not focus on Rwanda's specific market or E-Soko's impact in Musanze District.	Relevant for understanding adoption challenges but lacks specificity regarding the Rwandan context and local crop markets.

Authors & References	Country	Findings	Gaps	Observation
ITU (2018) [54]	Global	ICTs can significantly contribute to agricultural development through mobile platforms, improving price transparency and market efficiency.	Lacks a focus on regional and local factors influencing usability, especially in rural and underdeveloped areas.	Offers a global perspective on ICT use in agriculture, but does not provide specific data on localized systems like E-Soko.
Ochieng, L., & Karanja, P.B.T. (2020) [55]	Rwanda/Kenya	Mobile-based platforms increase price transparency, but usability issues and digital literacy remain barriers to adoption.	No in-depth analysis of how specific usability features of E-Soko impact its effectiveness for farmers in rural Rwanda, particularly in Musanze.	Provides context on digital adoption barriers, but does not address the specific challenges E-Soko faces in terms of system usability and interface.
Kabgire, T.H. (2020) [56]	Rwanda	Cultural and infrastructural barriers impede the adoption of digital platforms for farmers, especially in rural Rwanda.	The study lacks a detailed examination of the usability of E-Soko within specific market contexts (e.g., potato farming).	Highlights challenges in rural areas but overlooks the specifics of E-Soko's design and user-friendliness in Musanze District.

Authors & References	Country	Findings	Gaps	Observation
Mwaura, M., & Ndungu, C. (2020) [57]	Kenya	M-Farm mobile platform improved access to market prices and reduced dependency on middlemen, although usability challenges persist.	Focused on a platform other than E-Soko, thus missing the unique usability challenges and impact of E-Soko in the Rwandan potato sector.	Draws parallels to the E-Soko system, but lacks specific insights into the usability and challenges in Rwanda's potato markets.

2.9.1. Impact of real-time price alerts and notifications

Real-time price alerts and notifications have become a critical component in modern agricultural markets, particularly in helping farmers make informed decisions regarding the sale and purchase of agricultural commodities. These systems, often powered by mobile phones or other ICT tools, aim to bridge the information asymmetry that exists in rural markets, particularly in Sub-Saharan Africa. They provide farmers with timely updates on market prices, enabling them to optimize their selling and buying strategies. In addition, the systems have key benefits as explained here below:

They provide farmers with Improved Price Transparency with real-time price alerts and notifications play a vital role in reducing price volatility and ensuring farmers receive fair prices for their produce. With accurate, up-to-date information, farmers can avoid being exploited by middlemen and negotiate better deals [58].

Secondly, such systems ensure market efficiency by providing information on price trends across different markets, real-time alerts help improve market efficiency. Farmers can identify the most lucrative markets and avoid traveling to less profitable ones, thus reducing transaction costs and time spent on the road [59].

Empowerment of Farmers: Access to real-time price data empowers farmers to make better market decisions. It allows them to decide when and where to sell their products based on the price information available, which can increase their income potential [60].

Reduction in Market Inefficiencies: Real-time price alerts help mitigate market inefficiencies, such as the overpricing or underpricing of products due to a lack of timely information. This helps create a more balanced supply and demand scenario, ultimately benefiting both producers and consumers [61].

Furthermore, the systems are very important in Enhancing negotiation power by receiving timely updates on price fluctuations, farmers can negotiate better with buyers, whether at local markets or through direct sale agreements. This leads to better pricing for their goods and a more competitive agricultural market [62].

While real-time price alerts offer many advantages, there are associated with potential challenges related to their implementation and adoption, these include but not limited to:

Technological Barriers: In rural areas, access to the necessary mobile phones and internet connectivity remains a significant challenge [63]. Many farmers, particularly those in remote regions, may not have access to smartphones or data services to receive these real-time alerts.

Digital Literacy: Even when farmers have access to the required technology, the lack of digital literacy remains a major issue [64]. Without proper understanding of how to use the systems, the effectiveness of these alerts may be diminished.

Information Overload: Farmers may receive an overwhelming amount of data, which could lead to confusion and poor decision-making if not properly filtered or presented [65].

Limited Adoption: Some farmers may be reluctant to adopt real-time price systems due to a lack of trust in the accuracy of the information or fear of change from traditional methods [66].

The picture below shows an outdated Market prices information on E-soko System and detail an overview of the impact of real-time price alerts on agricultural markets, specifically focusing on how they can improve transparency and market efficiency while acknowledging the challenges that may arise, especially in rural settings.

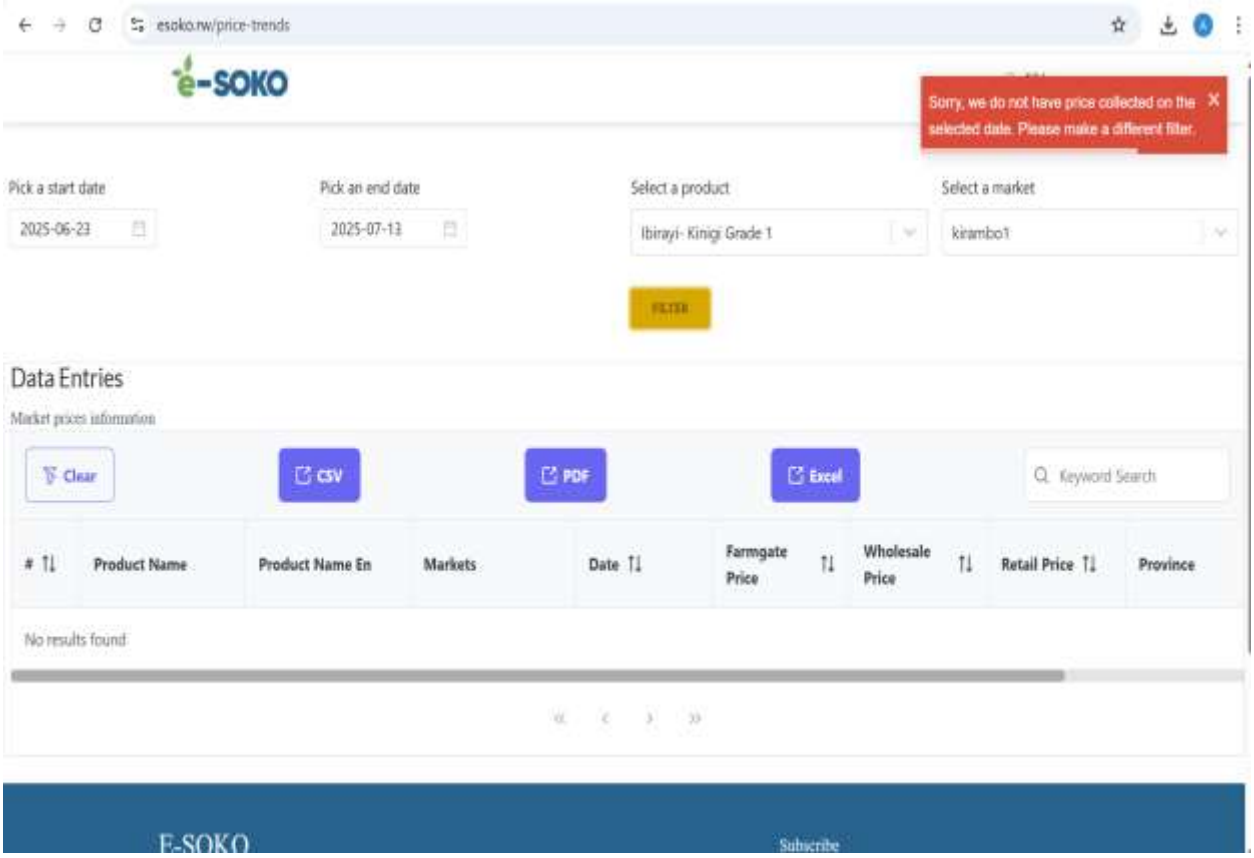

Fig 1: An Outdated Market prices information on E-soko System source [67]

2.9.2. Gaps and Challenges of E-soko platform

This table outlines the gaps in the existing e-Soko system and demonstrates how my thesis aims to address them through the proposed interventions.

Table 2: Gaps and Challenges of E-soko platform

Gaps and Challenges of E-Soko Platform	Identified Gap	Observation	Reference
Infrastructure Limitations	Limited Accessibility in Remote Areas	Many rural farmers lack access to the internet or mobile devices capable of using the e-Soko platform. This limits their participation in the system.	[68]

Gaps and Challenges of E-Soko Platform	Identified Gap	Observation	Reference
	Technological Barriers	A lack of proper infrastructure such as network coverage or power in some areas hinders effective use of the e-Soko platform.	[69]
User-Related Barriers	Low Digital Literacy Among Farmers	Even if farmers have mobile devices, many lack the skills to use the e-Soko system effectively, preventing full system utilization.	[70]
	Limited User Engagement	Low engagement with the platform due to a lack of follow-up activities, training, or incentives for continuous use of the system.	[71]
Data and Content Issues	Inconsistent Data Updates	Price information provided by e-Soko is not always timely or consistent, affecting decision-making.	[72]
	Lack of Local Language Support	E-Soko may not fully support all local languages, limiting its effectiveness in communicating with a diverse farmer population.	[73]
Trust and Adoption	User Trust and Acceptance	Farmers are hesitant to rely on e-Soko due to doubts regarding the accuracy of price data and fear of changes from traditional methods.	[74]

2.9.3. Conceptual framework

The Conceptual Framework for this study serves as a structured representation of the relationships between various elements involved in the use of the e-Soko system in agriculture. Specifically, it focused on three main aspects:

i. Usability of the e-Soko System

This refers to how user-friendly and accessible the e-Soko platform is for farmers. It encompasses factors such as ease of use, functionality, and the overall user experience.

ii. Impact on Agricultural Price Transparency

The framework examines how the usability of the e-Soko system contributes to increased transparency in agricultural pricing. This means that farmers can access real-time information about market prices, which can help them make informed decisions.

iii. Influence on Farmers' Decision-Making and Market Dynamics

The framework explores how improved price transparency affects farmers' choices regarding when and where to sell their products. It also looks at how these decisions impact broader market dynamics, such as supply and demand, competition, and overall market efficiency.

iv. Purpose of the Framework

The purpose of this conceptual framework is to:

v. Identify Key Variables: It outlines the critical factors that will be examined in the study, such as usability, price transparency, and decision-making processes.

vi. Illustrate Interconnections: It highlights how these variables interact with one another, providing insights into how the e-Soko system can enhance agricultural practices and market outcomes for farmers.

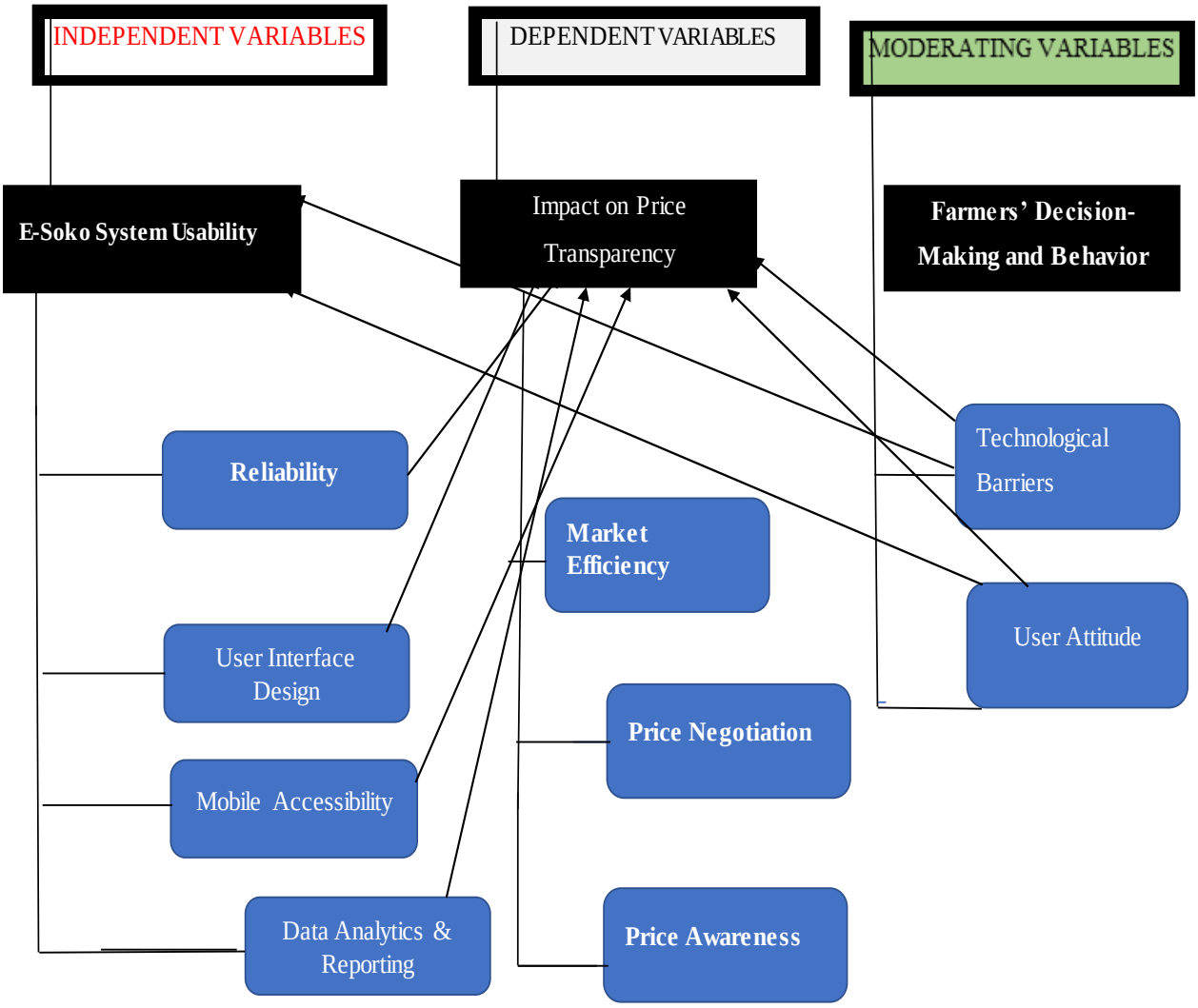

Fig 2: Conceptual Framework and Relation of Variables

In the Diagram above, the conceptual framework examines

1. E-Soko System Usability (Independent Variable)

This variable represents the extent to which the e-Soko platform is easy to use and functional for the farmers. It includes:

i. Ease of Use: Refers to how user-friendly the system is, and how quickly farmers can navigate and use it to access relevant price information.

ii. Reliability: Refers to how consistent and dependable the system is in providing accurate and timely data about potato prices.

iii. Accessibility: Refers to how easily farmers can access the system, considering factors like internet availability, mobile phone compatibility, and technological infrastructure in the area.

2. Impact on Price Transparency (Dependent Variable)

This variable examines how the e-Soko system influences the visibility and clarity of potato prices in the market, affecting the farmers' ability to make informed decisions. It includes:

i. Price Awareness: Refers to the extent to which farmers are aware of the current market prices for potatoes, which helps them make informed decisions about selling or purchasing.

ii. Price Negotiation: Refers to the ability of farmers to negotiate better prices with buyers due to the real-time, transparent price information available via the e-Soko platform.

iii. Market Efficiency: Refers to how the platform contributes to reducing price discrepancies across markets, making the agricultural market more efficient and transparent.

3. Farmers' Decision-Making and Behavior (Moderating Variable)

This variable represents the decisions farmers make in response to the information provided by the e-Soko system, and how it shapes their behavior in the marketplace. It includes:

i. Purchase and Sale Decisions: Refers to how the information on potato prices influences farmers' decisions regarding when to sell or buy potatoes.

ii. Market Participation: Refers to the level of engagement of farmers in the market once they have access to real-time price updates. It could include how actively farmers participate in the market and how it affects their income or profitability.

CHAPTER 3:

RESEARCH METHODOLOGY

3.0. Introduction

This chapter outlines the methodology employed to assess the usability of the e-Soko system and its impact on potato price transparency in Musanze District. The research methodology included the research design, population and sample, data collection methods, data analysis techniques, and ethical considerations. This research used a qualitative descriptive research design to explore the usability of the e-Soko system and its influence on price transparency and farmers' decision-making.

Key Features of the Research Design:

i. Qualitative Approach

The qualitative method focused on understanding the experiences and perceptions of farmers regarding the e-Soko system. This approach allows for in-depth insights into how the system affects their decision-making processes and market interactions.

ii. Data Collection

Data was collected through interviews, focus groups, and observations involving a diverse sample of farmers. This facilitated an understanding of how the e-Soko system impacts potato price transparency and farmers' choices.

iii. Analysis

The collected qualitative data was analyzed thematically to identify key themes and insights related to the usability of the e-Soko system and its effects on agricultural practices.

3.2 Population and Sample

3.2.1 Population

The research population for this study consists of potato farmers, and agricultural stakeholders in Musanze District, Rwanda. Musanze was specifically chosen due to its significant role in potato production, which is a key agricultural product in the region, and because of the growing use of mobile-based platforms like e-Soko among farmers.

The study focused on individuals actively engaged in agricultural activities, including farmers who use the e-Soko system to access market information and traders who rely on this information for pricing and selling produce. Additionally, key stakeholders such as local government officials, agricultural extension workers, and individuals responsible for implementing and supporting the e-Soko platform were included. These stakeholders provide crucial perspectives on the broader implications of e-Soko for market efficiency and price transparency.

Potato farmer cooperatives in Musanze District were identified and made available for participation in the survey, selected based on their active engagement in potato farming and accessibility during the data collection period. The cooperatives and members affiliated with the Potato Fund. Their inclusion ensured a representative understanding of farmers' interaction with the e-Soko system, particularly regarding usability, accessibility, and its impact on market efficiency and price transparency.

The total population of Musanze District is approximately 415,000, with a significant proportion involved in agriculture. A representative sample was selected from active e-Soko users across various sectors of the district to guarantee a balanced and comprehensive analysis of the system's impact.

3.2.2 Sample Size

A sample of 50 respondents was nominated for the study. This sample included:

- 30 female farmers who use e-Soko to monitor potato prices.
- 20 male farmers who also use the system for price transparency purposes.

Sample Size Calculation

To ensure the sample size is relevant and statistically adequate, the following formula was used to calculate the sample size for a population that is large but not easily accessible:

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

- n = required sample size
- N = total population size (estimated number of farmers in Musanze District)
- e = margin of error (commonly set at 0.05 for a 95% confidence level)

3.2.3 Sampling Technique

A stratified random sampling technique was employed to ensure that both male and female farmers are well-represented in the study. This approach was chosen for several important reasons:

i. Ensuring Representation

By stratifying the sample based on gender, the study aims to capture any differences in technology use and market participation between male and female farmers. This is crucial in understanding how each group interacts with the e-Soko system and how their experiences may differ.

ii. Addressing Gender-Based Differences

Research has shown that gender can significantly influence access to technology, decision-making, and participation in agricultural markets. By using stratified sampling, the study acknowledges these differences and ensures that both perspectives are adequately represented in the findings.

iii. Improved Precision

Stratified sampling can lead to more precise estimates by reducing variability within each subgroup. By ensuring that both male and female farmers are included, the study can provide more accurate insights into the usability of the e-Soko system and its impact on price transparency.

iv. Focused Insights

This technique allows for focused analysis of each gender's experiences and challenges, enabling the research to identify specific needs and barriers faced by male and female farmers. Such insights can inform targeted interventions and support mechanisms. The sample was drawn from a list of registered farmers in the Musanze District agricultural registry.

3.3 Data Collection Methods

Data was collected using semi-structured interviews to explore the usability of the e-Soko system and its impact on price transparency and farmers' decision-making. This approach allowed for in-depth understanding of user experiences, system challenges, and behavioral outcomes.

3.3.1 Semi-Structured Interviews

Semi-structured interviews were conducted with a purposively selected sample farmers who use the e-Soko platform. Additional key informants, such as agricultural extension officers, local

market sellers, and e-Soko platform managers, were also interviewed to provide multiple perspectives on the system's effectiveness and implementation.

The interview questions covered the following key themes: Farmers' experiences using the e-Soko system Perceived usability (ease of use, reliability, accessibility) Perceived benefits and challenges of the system Impact on price transparency, price negotiation, and market participation Influence of the system on decision-making regarding production, sales, and market timing to collect and record qualitative data, the following tools were used:

A structured interview guide to ensure consistency while allowing flexibility to probe emerging themes

3.4 Qualitative Data Analysis

The data obtained from the interviews was analyzed using thematic analysis, following these steps:

i. Theme development, focusing on usability, price transparency, and behavioral impacts
ii. Interpretation of findings to explore the perceived role of e-Soko in improving market outcomes and transparency

3.5 Validity and Reliability

To enhance the credibility and trustworthiness of the study, the following measures were taken:

i. Content validity: The interview questions were developed through a comprehensive literature review and refined in consultation with experts in agricultural technology and digital platforms.
ii. Triangulation: Data was collected from multiple sources (farmers, extension officers, and market stakeholders) to ensure diverse perspectives.
iii. Member checking: Key themes and interpretations were verified with selected respondents to confirm accuracy.

3.6 Ethical considerations

Ethical considerations were paramount in this research. The study adhered to the following ethical guidelines:

i. Informed Consent: All respondents were fully informed about the purpose of the study, and their participation will be voluntary. Consent forms were provided and signed by each participant.
ii. Confidentiality: All data collected was treated with strict confidentiality. Participants' identities were anonymized, and their responses were not shared with unauthorized parties.
iii. Right to Withdraw: Participants were informed of their right to withdraw from the study at any point without any consequences.
iv. Ethics is a very important part of every research because it has several implied characteristics that are required to be complied. Ethical considerations were strongly considered on every single step in this study. There were not many ethical issues which were expected in this research because the major ethical requirement was getting consent acknowledgement by respondent and protection of their personal information which have been highly respected. This was a big ethical consideration in the conduct of this study and it has been applied duly.
v. In addition to this, there has been the use of several kinds of literature, journal, articles and web sources to complete the study and according to academic guidelines, it should be referenced properly. This is another ethical consideration and it has also been performed well by applying proper referencing method to cite each and every source utilized to accomplish this study and moreover some of authors have been approached and they have provided access to use their words in this study.

3.7. Research Area

The case study of this research thesis was in Musanze District, located in the Northern Province of Rwanda. And the following are sectors of Musanze District where main data were collected,

including: Muhoza, Kinigi, Shingiro, Gashaki, Gatagara, Muko, Nyange, in the context of the e-Soko system adoption, certain sectors in Musanze, like Kinigi, and Nyange, have e-Soko user groups, with access to the platform readily available. However, farmers and traders in more remote sectors face challenges accessing the e-Soko system due to factors like limited mobile network coverage, internet connectivity issues, and geographical barriers. The district is primarily known for its agricultural activities, particularly potato farming, which is one of its main agricultural products. Given its rural nature, Musanze faces challenges such as limited access to technology and infrastructure, which affect the effectiveness of the e-Soko system for price transparency and market efficiency.

Despite these challenges, Musanze remains a crucial area for investigating the role of Information and Communication Technology (ICT) in agricultural market systems in Rwanda. This research was conducted in 2023, highlighting the importance of understanding how ICT can enhance agricultural practices and market access in the region. [77]. The adopted research investigates the impact of Information and Communication Technology (ICT) on agricultural market systems in Musanze District, Rwanda. Specifically, it examines how ICT tools, such as the e-Soko system, can enhance price transparency and market efficiency for local farmers engaged in potato farming and other agricultural activities. The study addresses the challenges faced by the district, including limited access to technology and infrastructure, which hinder the effectiveness of these systems. By exploring the integration of ICT in agricultural practices, this research aims to provide actionable insights that can foster agricultural development, improve market access, and ultimately contribute to economic growth in Musanze District.

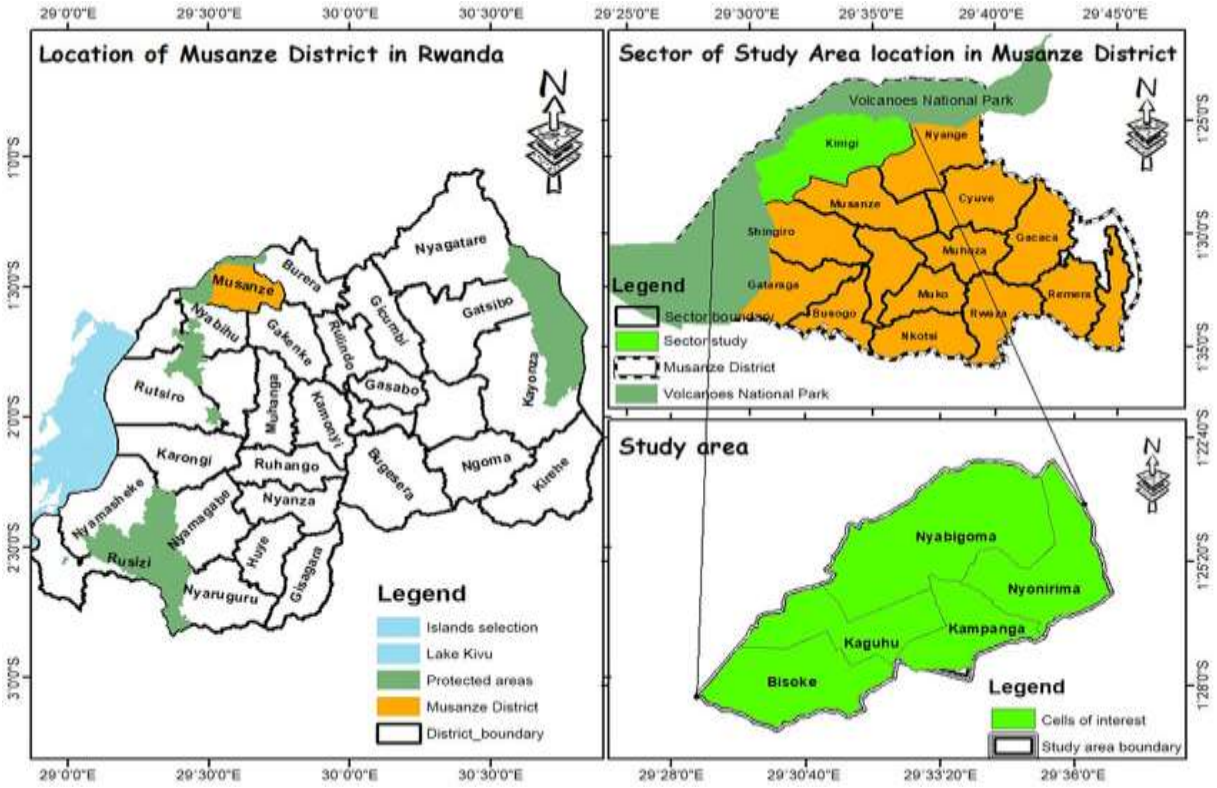

Fig3: Map of Musanze district showing sampled sectors [75]

3.8 Sampling Methods

For this study, a combination of stratified random sampling and purposive sampling methods was used to select the participants from the population of Musanze District. Stratified random sampling was employed to ensure that the sample accurately represents various groups within the population, including farmers, traders, and agricultural stakeholders. These groups were stratified based on factors such as sector, level of engagement with the e-Soko system, and role in the agricultural supply chain. This ensured a diverse sample that reflects the different users and non-users of the e-Soko platform. Purposive sampling was then used to select key stakeholders, including local government officials, agricultural extension workers, and those responsible for implementing and supporting the e-Soko platform. These individuals possessed specific knowledge and experience that provided valuable insights into the effectiveness and challenges of the e-Soko system in enhancing price transparency and reducing market inefficiencies. The sample size was determined using established statistical techniques for representative sampling, ensuring

that the findings can be generalized to the broader population of Musanze's agricultural community.

3.9 Research Approach

The research adopted a qualitative approach to provide an in-depth understanding of the e-Soko system's impact on agricultural price transparency and market efficiency in Musanze District. This method was chosen to explore user experiences, systemic challenges, and contextual realities surrounding the platform's adoption—factors often overlooked in purely quantitative studies.

The qualitative approach involved conducting semi-structured interviews and focus group discussions with key stakeholders, including local government officials, agricultural extension workers, and active users of the e-Soko platform. These tools enabled the collection of rich, narrative data that illuminated the practical barriers to adoption, user satisfaction levels, and the localized dynamics influencing the success or failure of e-Soko in rural settings.

This approach is supported by studies such as Bizimana et al. [76], which, while using quantitative techniques, acknowledged the influence of non-technical factors and adoption barriers that require qualitative investigation to fully understand the e-Soko system's performance in Rwanda. Similarly, reports by IFPRI and the Ministry of Agriculture [77] have emphasized the value of stakeholder perspectives in understanding the platform's operational challenges, particularly in rural areas like Musanze, where infrastructural and informational gaps are more pronounced.

These findings validate the need for a qualitative lens to uncover the nuanced, ground-level realities that affect how e-government tools like e-Soko are utilized in rural communities.

3.9.1. Why TAM is Most Relevant

The Technology Acceptance Model (TAM) is particularly relevant to this study for several reasons:

- **Usability Focus:** TAM specifically evaluates how users perceive a technology's ease of use and usefulness. This directly aligns with the study's objective to assess the usability of the e-Soko platform among potato farmers.

- **User Adoption:** The model measures the adoption and acceptance of technology, which fits with the goal of understanding how farmers in Musanze District are adopting and using e-Soko to access potato price information.
- **Practicality:** TAM has been widely used in similar agricultural technology adoption studies, particularly in contexts where farmers are introduced to new technological tools aimed at market transparency and price information. It offers clear insights into how perceptions of usefulness and ease of use influence actual usage.

3.9.2. Application of TAM in This Study

This study applies TAM by focusing on its two core constructs:

- **Perceived Ease of Use (PEOU):** Assessing how easy farmers find the e-Soko system to navigate and use when accessing potato price data.
- **Perceived Usefulness (PU):** Evaluating whether farmers believe the e-Soko system helps them secure better prices and improves market transparency.

By employing TAM, this study quantitatively captures how usability impacts adoption and the effectiveness of the e-Soko system in promoting price transparency. TAM also informed the design of the survey and guided the analysis of factors influencing the system's effectiveness among potato farmers in Musanze District.

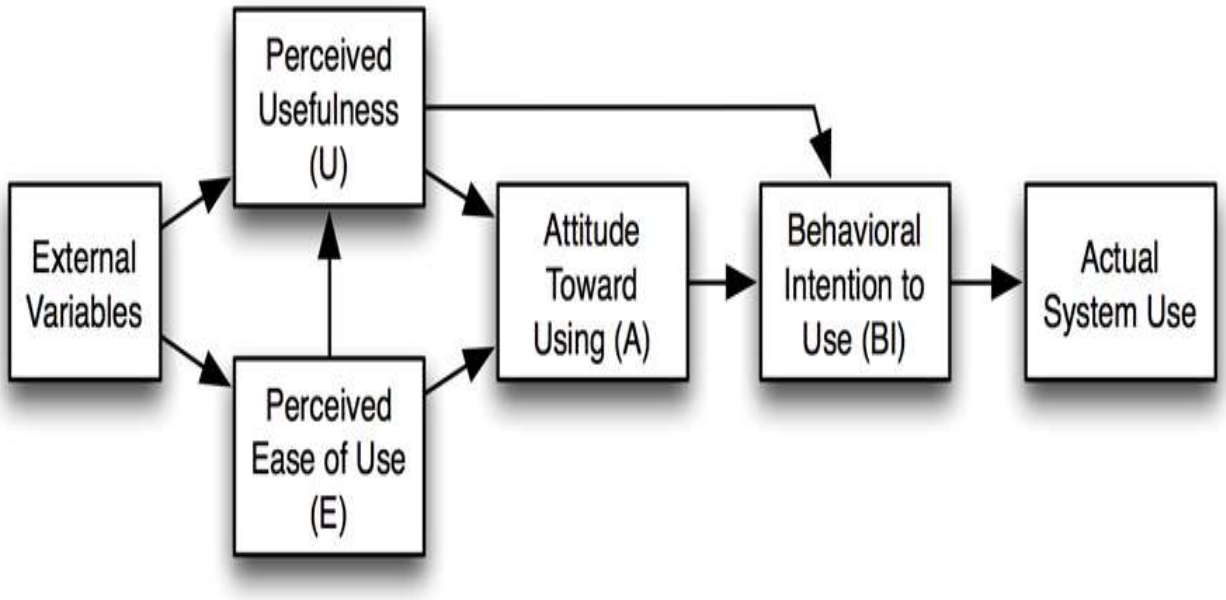

Fig4: Technology Acceptance Model (TAM) [78]

3.9.3. Research Instruments

The research instruments for this study included a combination of questionnaires, interview guides, and focus group discussion guides. A structured questionnaire was administered to potato farmers, traders, and agricultural stakeholders in Musanze to gather qualitative data on the usage of the e-Soko platform, its impact on price transparency, and its role in reducing market inefficiencies. Semi-structured interviews were conducted with key stakeholders, including local government officials and agricultural extension workers, to gain insights into their experiences and perceptions of the platform.

3.9.5. Data collection and procedures

The data collection for this study was conducted using a combination of questionnaires, semi-structured interviews, and focus group discussions. A structured questionnaire was administered to potato farmers, traders, and other agricultural stakeholders in Musanze District to gather

quantitative data on their use of the e-Soko platform and its impact on price transparency and market efficiency. Interviews with local government officials, agricultural extension agents, and ICT professionals provided qualitative insights into the challenges and benefits of the platform. All data was collected over a two-week period, ensuring diverse representation and capturing the full spectrum of perspectives. Ethical considerations, such as informed consent and confidentiality, was strictly followed, and the collected data was analyzed using appropriate statistical and thematic methods to provide a comprehensive understanding of the e-Soko system's effectiveness and its impact on market dynamics in Musanze District

3.9.4. Data analysis

Data Analysis in this study involved processing and interpreting qualitative data collected from questionnaires, interviews, and focus group discussions. The responses were organized around key research questions, focusing on the use of the e-Soko platform and its impact on agricultural price transparency and market efficiency in Musanze District. For qualitative data, interviews and focus group discussions was analyzed using thematic analysis, where recurring themes and patterns in the responses was identified, particularly focusing on the challenges and barriers faced by farmers and traders when using the e-Soko platform. Negative experiences, such as limited access, poor connectivity, and challenges in using the platform due to literacy or technical limitations, will be given special attention. The findings provided insights into areas where the platform could be improved, especially regarding accessibility and user support. Microsoft Excel was also used to generate charts, graphs, and tables to visually represent the findings.

3.9.5 RESOURCES AND BUDGET

For this research, these resources are necessary for data collection, analysis, and fieldwork to ensure that I can comprehensively address the research questions on the impact of the e-Soko system Usability. The specific resources required were as follows:

1. Field Research Expenses

i. Transportation: To travel to Musanze for interviews, surveys, and focus group discussions with local farmers, traders, and other key stakeholders. This included travel costs (fuel, local transport, etc.).

ii. Accommodation: for fieldwork that required staying in these areas for extended periods, especially in rural or remote areas where travel times are long.

iii. Fieldwork Assistant(s): A local assistant to help with data collection, translation (if necessary), and coordination with farmers and stakeholders. The assistant was crucial in helping to set up interviews and gathering data in the regions.

2. Data Collection Tools:

i. **Questionnaires:** Digital forms for collecting responses from farmers in Musanze. These surveys included questions on their experiences with e-Soko, market prices, middlemen, and the impact of digital platforms.

ii. **Data Analysis Software:** For this study, qualitative data analysis was conducted using specialized software to ensure thorough examination and interpretation of the collected data. The Excel tool was used to analyze data from surveys, market price data.

iii. **Incentives for Participants:** To ensure participation in surveys and interviews, small incentives (e.g, transportation reimbursement) was provided to farmers and other participants in the study. This helped to improve the response rate and participation in the research, especially in rural settings.

iv. **Literature and Reports:** While university libraries provide basic literature, I needed to access government reports, policy documents, and external studies (such as reports from RDB, FAO, or World Bank) that provides contextual information about agricultural market dynamics in Rwanda and the effectiveness of digital tools like e-Soko

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1. Profile of Respondents

This chapter presents, analyzes, and interprets the data collected during the study. The findings are organized according to the research objectives and questions. Graphical representations such as tables, pie charts, and bar graphs are used to simplify the interpretation of the results.

The population sample was made of 50 people to whom the same number of questionnaires were distributed in different sites of the Musanze District. A total of 40 questionnaires, representing 80% of the distributed forms, were properly filled and returned. These were administered and collected in hardcopy format during field visits to respondents.

Table 4: Response Rate of The User

Category	Number of Respondents	Percentage (%)
Distributed	50	100%
Returned	40	80%

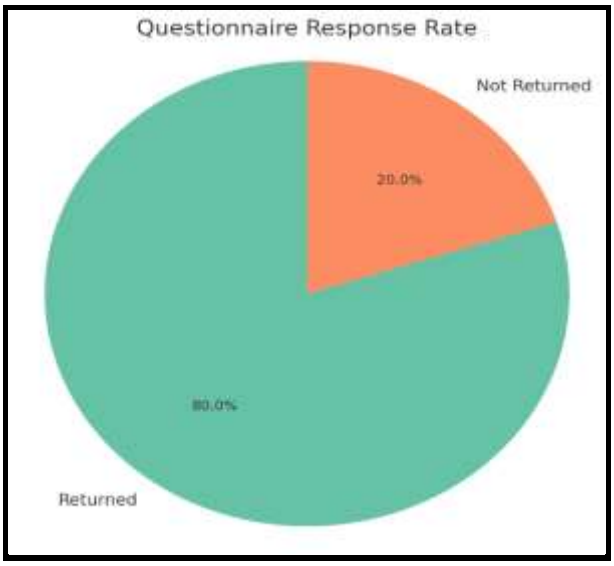

Fig 5: Response Rate of The User

Source: primary data computed by researcher, June 2025

Response rate = (40/50) × 100 = 80%

Out of 50 distributed questionnaires, 40 were returned, representing a high response rate of 80%. This strong participation was reflected in the respondents' qualitative feedback, with many expressing a willingness to contribute their views:

"I use E-Soko and wanted to give my opinion so maybe it can improve." (Respondent F29)

"It's good someone is asking us. I filled it because we are never included in such things." (Respondent F8)

"I had time after harvesting, so I completed it." (Respondent F15)

4.2. Demographic Characteristics of Respondents

Table 5: Gender Distribution

Gender	Number of respondents	Percentage (%)
Male	15	37.5%
Female	25	62.5%

Male = (15/40) × 100 = 37.5%

Female = (25/40) × 100 = 62.5%

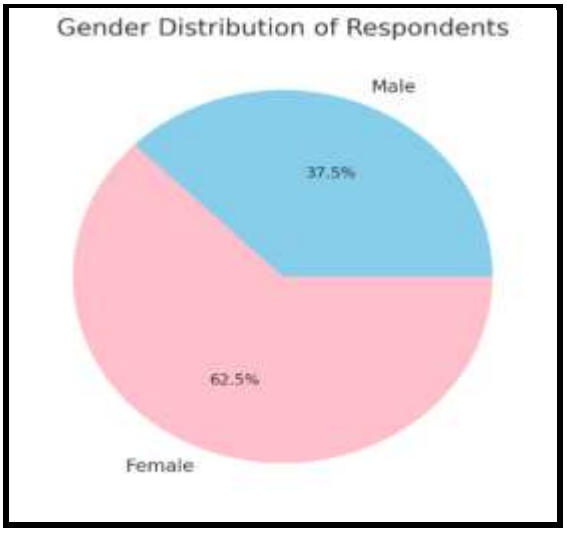

Fig 6: Gender distribution of respondents

Source: primary data computed by researcher, June 2025

A majority of respondents (62.5%) were female, suggesting that women are significantly involved in potato farming and were more available or willing to engage with the study. Their qualitative responses reflected a strong sense of responsibility and interest in improving their farming practices:

"As a woman who sells potatoes, I need to know the market price, so I wanted to try E-Soko." (Female respondent, 35 years)

"Men are often away doing other jobs. We women are the ones at the farm, so we responded." (Female respondent, 42 years)

"I use my husband's phone to check it sometimes. He showed me how to do it." (Female respondent, 29 years)

In contrast, male respondents gave different perspectives:

"My wife knows more about E-Soko because she's always at the market." (Male respondent, 37 years)

"I haven't used it myself, but I think it's useful for selling produce." (Male respondent, 40 years)

4.3. Age Distribution

Table 6: Age Distribution

Age Range	Number of respondents	Percentage (%)
18-30	20	40%
31-45	10	30%
46-60	05	10%
60+	05	20%

18–30 age = (20/40) × 100 = 40%

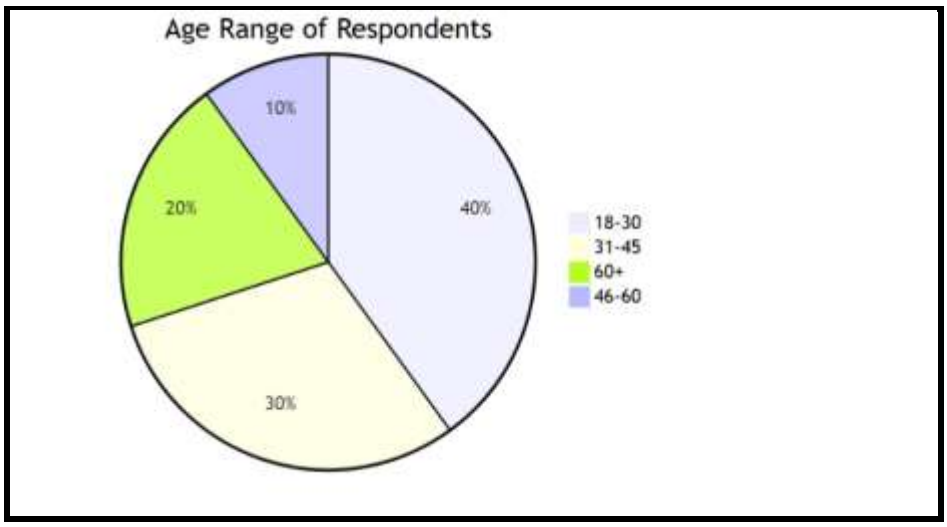

Fig 7: Age Distribution

Source: primary data computed by researcher, June 2025

While 40% of respondents were between 18 and 30 years old often referred to as the digital generation the qualitative responses indicate mixed experiences with E-Soko. Some young respondents found it easy to use, while others still faced challenges due to lack of exposure or training.

"I'm young and use a smartphone every day, so E-Soko is not hard for me." (Respondent F3)

"Even though I'm 25, I've never used such a system before. It's confusing at first." (Respondent F11)

"We are young, yes, but nobody taught us how to use these things. We just try and fail." (Respondent F6)

These comments from the respondent reveals that age alone does not guarantee digital literacy. Even among younger users, proper orientation and exposure are critical for effective platform use.

4.4. Education Level

Table 7: Education Level

Education Level	Number of respondents	Percentage (%)
No Formal Education	30	60%
Primary Education	05	30%
Secondary Education	05	30%

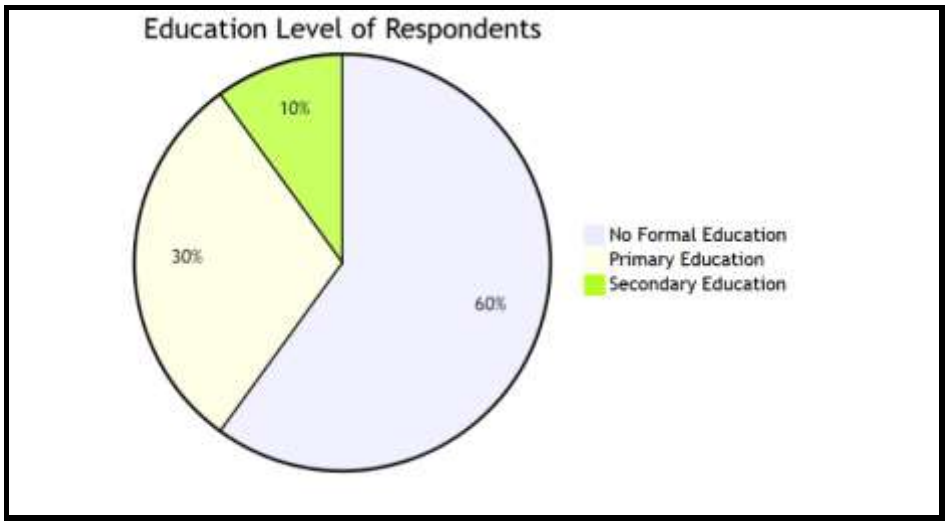

Fig 8: Education Level of Respondents.

Source: primary data computed by researcher, June 2025

Although 30% of respondents had completed primary school, and 60% reported no formal education, the responses show that educational background greatly influences E-Soko usage and understanding.

"I only went to school for a few years, so I can't read well. That's why I don't use the system." (Respondent F27)

"If it's in English, I find it difficult. I prefer if someone shows me what to do." (Respondent F30)

"I finished primary school, so I can follow some of the steps, but it's still confusing without help." (Respondent F46)

while some respondents with basic education can engage with digital tools, low literacy levels remain a barrier for many. The responses suggest that the system may need more visual or audio-based interfaces and local language support to improve adoption among less-educated users.

4.5. Awareness and Use of E-Soko Platform

Table 8: Awareness Level

Awareness	Number of respondents	Percentage (%)
Yes	10	20%
No	30	80%

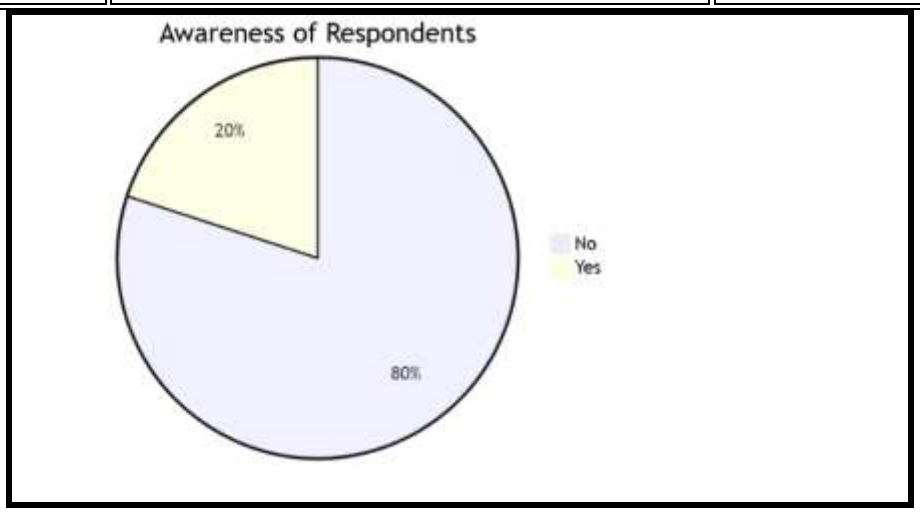

Fig 9: Awareness of the E-Soko System.

Source: primary data computed by researcher, June 2025

4.6. Frequency of Using E-Soko

Table 9: Frequency of Using E-Soko

Usage Frequency	Number of respondents	Percentage (%)
Daily	01	2%
Weekly	04	8%
Monthly	10	20%
Rarely/Never	25	70%

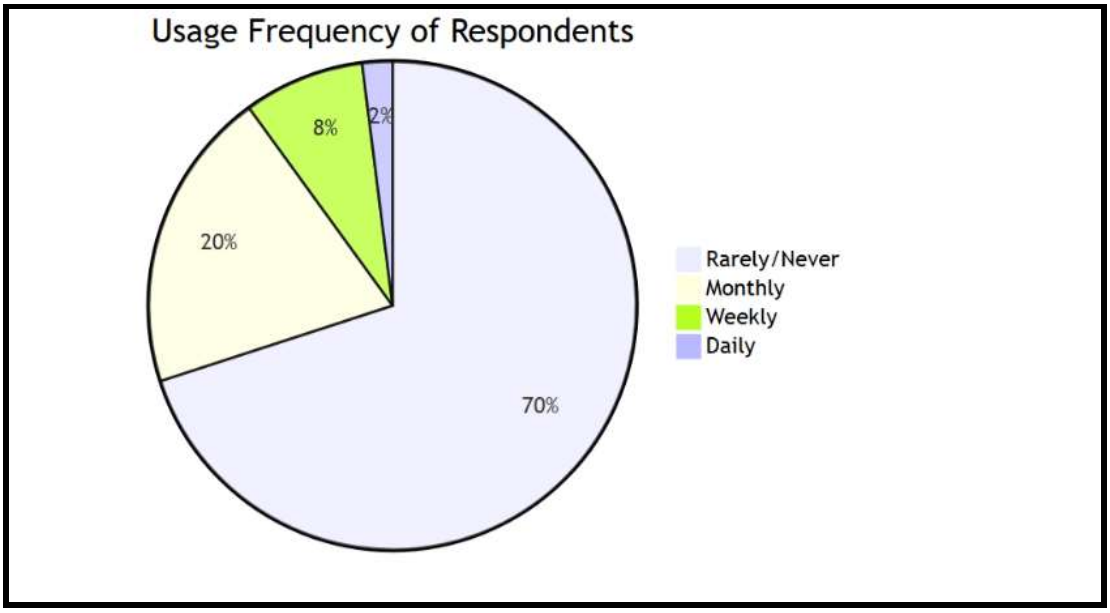

Fig 10: Frequency of E-Soko Usage.

Source: primary data computed by researcher, June 2025

Over half (70%) of the respondents rarely or never use E-Soko. Only 20% use it. This indicates low adoption and engagement, which may be due to usability issues, lack of awareness, or infrastructural challenges.

While only 20% of respondents reported using E-Soko regularly, the majority (70%) rarely or never use it. The qualitative responses suggest several reasons behind this low adoption, including usability challenges, lack of knowledge, and poor infrastructure.

"I don't understand how to use it. No one explained it to us." (Respondent F04)

"My phone is too old to use such applications." (Respondent FO13)

"Even if I wanted to use it, the network in my village is too poor." (Respondent F19)

"I have heard of E-Soko, but I don't know how to find it or what it does exactly." (Respondent F20)

Table 10: User respondents per Sector in Musanze District

Sector	**Number of Respondents**	**Percentage (%)**
Muhoza	10	20%
Kinigi	06	16%
Shingiro	05	16%
Gataraga	04	14 %
Nyange	05	12 %
Muko	05	12 %
Musanze	05	10%

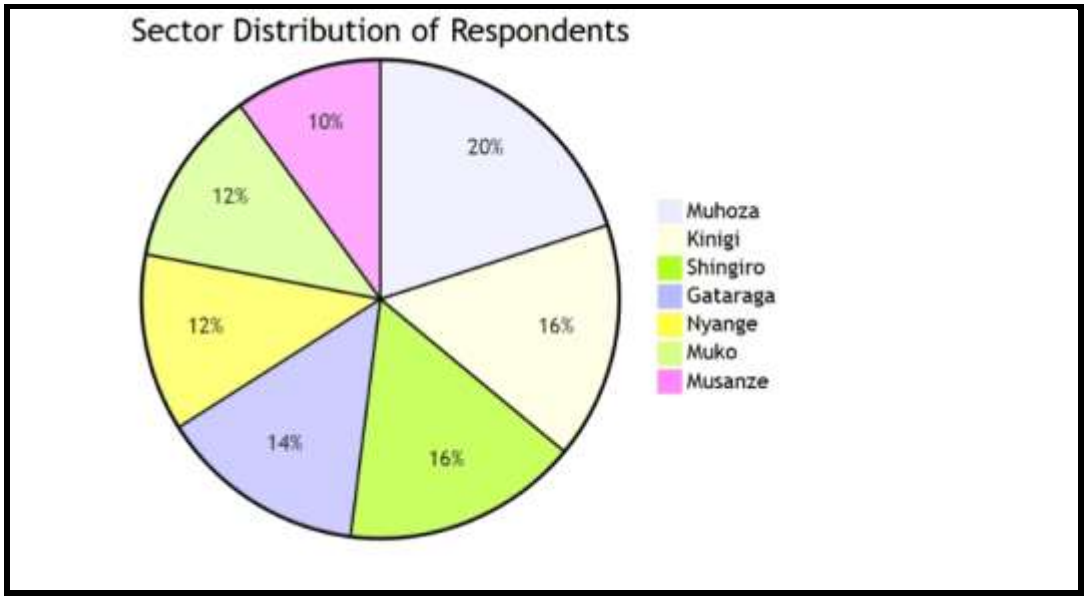

Fig 11: User Respondents per Sector in Musanze District.

Respondents across the seven sectors in Musanze District shared varied experiences with the E-Soko platform. Some sectors reported better access and knowledge, while others indicated barriers such as poor connectivity or lack of awareness.

"In Muhoza, we have good internet and electricity. That's why many people know about E-Soko here." (Respondent from Muhoza Sector)

"In Shingiro, the network is not stable. I tried E-Soko, but it takes long to load." (Respondent from Shingiro Sector)

"No one in my area talks about E-Soko. I just heard about it through this survey." (Respondent from Musanze Sector)

"We have meetings in Kinigi where the leader showed us how E-Soko works. That helped me start using it." (Respondent from Kinigi Sector)

4.7. Ease of Use

Table 11: Ease of Use

Ease of Use Rating	Number of Respondents	Percentage (%)
Easy to use	10	20%
Difficult to use	30	80%

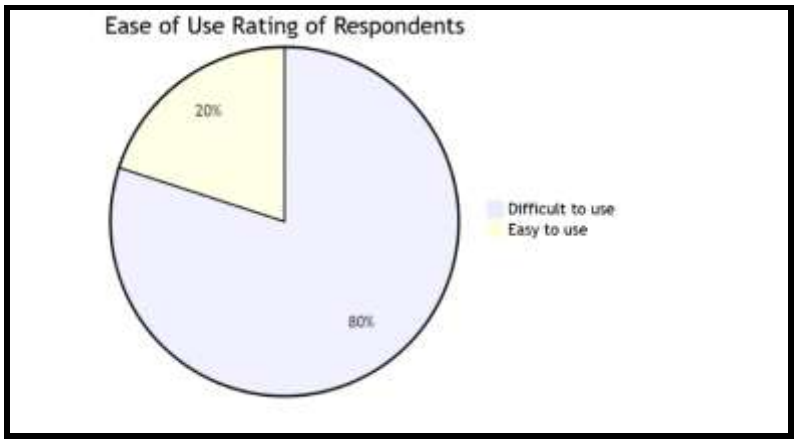

Fig 12: Ease of Use

Source: primary data computed by researcher, June 2025

The feedback from 40 respondents regarding the ease of use of the E-Soko system reveals mixed experiences. While some users found the system manageable, many faced challenges:

i. *Positive responses:*
   - *"I find it quite straightforward to check prices, especially after I learned how to navigate the menus." (Participant F12)*
   - *"Once you get used to it, the app is helpful and easy to understand." (Participant F05)*

ii. *Negative responses:*
   - *"Sometimes the buttons are confusing, and I get lost trying to find the prices." (Participant F27)*
   - *"For someone not familiar with smartphones, this system is very hard to use." (Participant F34)*
   - *"Network problems make it even more difficult to rely on the app." (Participant F19)*

Overall, while 20% of respondents described the system as easy to use, 80% highlighted significant usability challenges. These qualitative responses emphasize the need for improved user training, interface simplification, and possibly localization to better serve less tech-savvy farmers. This mix of feedback provides a deeper understanding of the system's acceptability and barriers to wider adoption in Musanze.

4.8. Accessibility Challenges

Table 12: Accessibility Challenges

Challenge	Number of Mentions	% of Respondents (N=20)
E-Soko is difficult to use	15	75%
Poor internet connectivity	12	60%

Challenge	Number of Mentions	% of Respondents (N=20)
No access to smartphones	13	65%
Lack of training	17	85%
Still rely on middlemen	18	90%

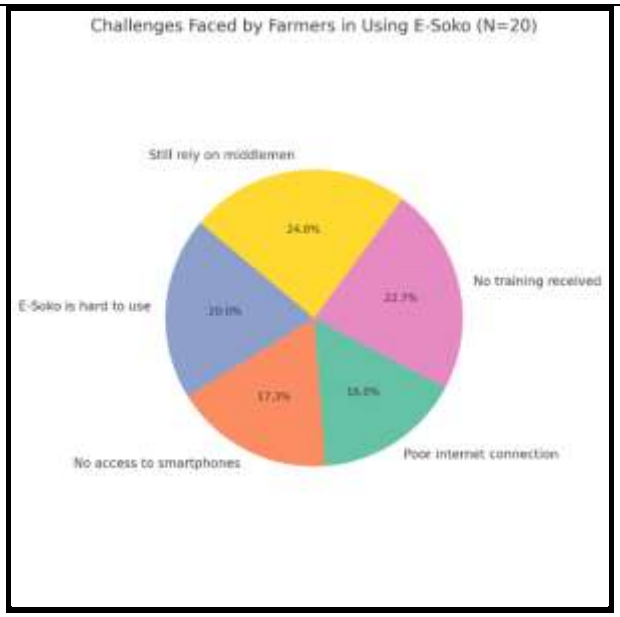

Fig 13: Accessibility Challenges

Source: primary data computed by researcher, June 2025

The analysis reveals that the primary accessibility challenges to using the e-Soko system include lack of mobile devices (60%), poor network connectivity (20%), and high data costs (20%). These findings highlight a digital divide that hinders farmers' access to real-time market information.

To illustrate these challenges, farmers shared the following responses:

- **Lack of mobile devices**

"I don't have a smartphone, so I just ask other farmers what the price is." (Participant F06)

"Most of us here don't own phones that can access e-Soko." (Participant F18)

- **Poor network connectivity**

"Even if you try to use it, the network is not strong in this area." (Participant F23)

"The signal here is weak. Sometimes it takes long to load or doesn't open at all." (Participant F10)

- **High data costs**

"Using internet every day is expensive for me. I cannot afford data bundles often." (Participant F31)

"I only check prices when I have airtime or data, which is not all the time." (Participant F04)

These qualitative responses confirm that affordability, network reliability, and device availability are major barriers to accessing the e-Soko system. These challenges undermine farmers' ability to benefit from digital agricultural platforms and call for interventions such as device subsidies, improved rural connectivity, and data cost reductions.

4.9. Impact on Potato Price Transparency

Table 13: Impact on potato price transparency

Statement	Agree (%)	Disagree (%)
E-Soko provided accurate price updates	05%	95%
E-Soko reduced dependency on middlemen	01%	99%
E-Soko improved bargaining power	01%	99%

Source: primary data computed by researcher, June 2025

observation: Although E-Soko is intended to empower farmers through access to accurate market prices, many respondents expressed doubt about its effectiveness. Their responses indicate skepticism and a lack of perceived benefit.

"I checked the prices on E-Soko, but when I reached the market, the price was different." (Respondent 17)

"It doesn't help me because the price information is not updated. It confuses me more." (Respondent 5)

"I don't use it because I don't trust the information there. I prefer to ask other farmers."
(Respondent 20)

These responses suggest that issues with reliability, update frequency, and trust undermine E-Soko's ability to meet its core goal of farmer empowerment. Some farmers also expressed frustration with the lack of real-world impact: As a result, users may be disengaging from the platform not because they oppose its purpose, but because their experience doesn't match the promise.

Application of TAM

In this chapter, I applied the TAM framework to analyze how farmers in Musanze District perceive and adopt the e-Soko system for enhancing agricultural market efficiency. The model's core components perceived ease of use and perceived usefulness were central to my qualitative analysis.

1. Perceived Ease of Use
    i. I conducted in-depth interviews with local farmers to gather insights into their experiences with the e-Soko system. This qualitative data revealed that many farmers faced challenges related to technological literacy and access to devices, which affected their ability to utilize the system effectively. By highlighting these barriers.
2. Perceived Usefulness
    i. Through focus group discussions, I explored farmers' perceptions of the benefits of using the e-Soko system. The qualitative findings indicated that farmers recognized the potential of ICT to improve price transparency and market access, but their acceptance was influenced by their prior experiences and the perceived reliability of the information provided. This aspect is critical for understanding the factors that drive or hinder technology adoption in rural agricultural settings.

CHAPTER FIVE

FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary and interpretation of the key findings derived from the research data. It further draws conclusions based on the study objectives and proposes actionable recommendations aimed at enhancing the usability of the E-Soko platform and improving potato price transparency in Musanze District. Areas for future research are also suggested.

5.2 Summary of Key Findings

5.2.1 Response Rate

The study achieved a high response rate of 80%, with 40 respondents returning completed surveys out of 50 distributed questionnaires. This high response rate validates the reliability of the findings.

5.2.2 Socio-Demographic Characteristics

The majority of respondents were female farmers (60%), reflecting the significant involvement of women in agricultural trade in Musanze District. Most participants were aged between 18-30 years, with varying educational backgrounds, indicating a diverse sample regarding literacy and digital skills.

5.2.3 Usability of the E-Soko Platform

i. Ease of Use: Many farmers reported challenges navigating the E-Soko system due to language barriers, lack of training, and poor user-interface design.
ii. Accessibility: While mobile phone penetration is relatively high, inconsistent network coverage and limited internet access affected regular usage.
iii. Information Accuracy: A significant number of respondents noted inconsistencies between posted E-Soko prices and actual market prices, leading to doubt about the platform's reliability.

5.2.4 Impact on Price Transparency

i. Reduction in Information Asymmetry: Although E-Soko provided some level of market information, 95% of farmers disagreed that it consistently offered accurate and timely updates.

ii. Influence on Bargaining Power: Limited usage of E-Soko meant that many farmers still heavily relied on middlemen, weakening their bargaining power.

iii. Trust in the Platform: The inconsistency of updates reduced user trust and adoption of E-Soko as a primary pricing tool.

5.3 Conclusion

In this study, I aimed to evaluate the E-Soko system's effectiveness in enhancing price transparency for potato farmers in Musanze District. And this is a breakdown of how i addressed each specific objective and corresponding research question.

Specific Objective 1: Evaluate the Level of Accessibility and Usability of the E-Soko System

- **Research Question 1:** What is the current level of accessibility and usability of the E-Soko system among potato farmers in Musanze?

i. To assess accessibility and usability, I conducted a survey and interviews with a diverse group of potato farmers, not forgetting the stakeholders, system developers. These interviews explored their experiences with the E-Soko system, focusing on aspects such as ease of use, accessibility of technology, and the availability of support.

ii. The findings revealed significant usability challenges, including a lack of training and language barriers, which were critical in understanding the system's current effectiveness.

Specific Objective 2: Examine the Challenges Faced by Farmers

- **Research Question 2:** What challenges hinder farmers from effectively using the E-Soko system for accessing market price information?

iii. Through focus group discussions, I gathered insights into the specific challenges farmers encounter when using the E-Soko system. Participants articulated issues such as inconsistent data, technical difficulties, and insufficient training. This data provided a comprehensive view of the barriers that limit effective usage, directly addressing the research question.

Specific Objective 3: Propose Recommendations for Improvement

- **Research Question 3:** What improvements can be made to enhance the usability and adoption of the E-Soko system among farmers?

iv. To propose actionable recommendations, I synthesized feedback from farmers regarding their experiences and suggestions for enhancing the E-Soko system. This participatory approach allowed me to identify specific areas for improvement, such as increasing training opportunities, enhancing user interface design, and ensuring data reliability. These insights formed the basis of my recommendations for improving usability and fostering greater adoption among farmers.

This study concludes that while the E-Soko platform was introduced to enhance price transparency and empower farmers, its usability challenges have limited its overall impact in Musanze District. Many farmers find the system difficult to use due to a lack of training, language issues, and inconsistencies in the data provided. Consequently, a significant portion of the farming community continues to rely on traditional middlemen for price information, perpetuating information asymmetry and market inefficiencies. However, there is still strong potential for E-Soko to achieve its intended goals if its usability and reliability issues are adequately addressed.

Recommendations

Based on the findings, the following recommendations are proposed:

Improved information accuracy

i. Regularly update and verify the market prices displayed on E-Soko.
ii. Integrate real-time data collection mechanisms to minimize inconsistencies.

Enhance System Usability

i. Simplify the platform interface to accommodate users with low digital literacy.
ii. Provide E-Soko content in multiple local languages (e.g., Kinyarwanda).

Conduct User Training and Capacity Building

i. Organize regular training sessions for farmers on how to use E-Soko effectively.
ii. Collaborate with agricultural cooperatives and local leaders to ensure broader outreach.

Strengthen Infrastructure

i. Improve mobile network coverage, particularly in rural areas.
ii. Offer an offline version or SMS-based service for farmers with limited internet access.

Increase Awareness Campaigns

- Promote the benefits and usage instructions of E-Soko through local radio programs, extension officers, and social groups.

5.5 Limitations of the Study

While the study yielded important insights, it was limited geographically to Musanze District. Therefore, the findings may not fully represent other regions. Additionally, the study relied heavily on self-reported data, which may be subject to biases.

5.6 Suggestions for Future Research

i. A comparative study between Musanze District and other districts where E-Soko adoption rates are higher.
ii. An evaluation of the effectiveness of alternative digital platforms in promoting agricultural market transparency.
iii. A longitudinal study to assess the long-term impact of system improvements on farmers' livelihoods.

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A. BACKGROUND INFORMATION OF RESPONDENTS

Subject: Research Collaboration Request – Technology Use in Agriculture (e-Soko Study)

Dear, [Agricultural corporative],

I am a Masters student in Information Systems / Internet technology Option at University of Rwanda. Part of the requirements for the award of a Master's degree in this program is to conduct research. My research is entitled: ***"Evaluating E-Soko System Usability and Its Impact on Potato Price Transparency: Case study in Musanze District"***, Within this context, I would like to invite you to assist with this project by agreeing to be involved in an interview. I am particularly interested in how technology like e-Soko can help improve market access and price transparency for local cooperatives like yours.

I would appreciate the opportunity to speak with your cooperative members or distribute a short questionnaire to understand their experiences and perspectives. All information will be treated confidentially and used for academic purposes only.

Your cooperation is highly appreciated.

Yours faithfully,

Alex Gatsinzi Gato

University of Rwanda, College of science and technology-UR-CST

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Appendix A: Sample Interview Transcript Format

Title: Interview Transcripts – Farmers' Experiences with the e-Soko System

Study: Evaluating E-Soko System Usability and Its Impact on Potato Price Transparency: Case Study in Musanze District

Interview Type: Semi-structured, in-person, conducted in Kinyarwanda and translated to English

Note: Below are selected selections from five representative respondents.

☑ Participant Code: F01

Location: Kinigi Sector

Interview Date: June 11, 2025

Interviewer: Researcher

Language: Kinyarwanda (translated)

Interviewer: Have you heard of the e-Soko system?

F01: No, I have not. I usually just go to the market and ask what others are selling for. I didn't know about e-Soko.

Interviewer: How do you decide the price at which to sell your potatoes?

F01: I ask other farmers or sellers. Sometimes I just accept the buyer's offer.

Observation: Respondent is unaware of the platform and relies fully on informal sources for pricing.

☑ Participant Code: F12

Location: Gataraga Sector

Interview Date: June 13, 2025

Interviewer: Are you familiar with the e-Soko system?

F12: Yes, I heard about it from the radio last year. But I don't use it.

Interviewer: Why don't you use it?

F12: I don't know how it works, and no one explained it well. I still rely on neighbors and traders.

Interviewer: Would you be interested in using it if trained?

F12: Maybe, if it can really help with prices.

✅ Participant Code: F23

Location: Shingiro Sector

Interview Date: June 15, 2025

Interviewer: Do you use e-Soko?

F23: I've used it a few times. I get the market prices from my phone.

Interviewer: Has it helped you?

F23: Yes, but sometimes the price is old or not clear. And the network in our area is poor, so I can't always access it.

Interviewer: What do you usually do when it doesn't work?

F23: I just ask the local trader or check prices in town.

✅ Participant Code: F34

Location: Musanze Town

Interview Date: June 17, 2025

Interviewer: How often do you use e-Soko?

F34: I try to check prices before selling, but the system sometimes doesn't load or the price seems outdated.

Interviewer: Do you trust the prices shown?

F34: Not always. I compare them with what I see in the actual market.

Observation: Moderate user with trust issues related to data accuracy and update frequency.

✅ Participant Code: F45

Location: Muhoza Sector

Interview Date: June 18, 2025

Interviewer: What's your experience with the e-Soko platform?

F45: It helps sometimes, but we struggle with poor network. It takes time to load, and the prices don't always match what buyers offer.

Interviewer: Has it changed how you sell potatoes?

F45: A little. It gives an idea, but I still have to bargain a lot. Also, many farmers here don't use it at all.

Participant Code: F07

Location: Gataraga Sector

Date: June 10, 2025

Language: Kinyarwanda (translated)

Gender: Female

Age Range: 35–44

Q1: Have you heard about the e-Soko system?

No, I have not heard about it. I only know what prices are from asking others at the market.

Q2: Do you use it or know anyone who does?

I think one of the young men in our village mentioned it, but I don't know how it works.

Q3: What challenges would stop you from using it?

I don't have a smartphone, and no one ever came to show us how it works.

Q4: Do you feel you get fair prices at the market?

Sometimes I feel cheated, but I don't know what the prices are elsewhere.

📃 Participant Code: F21

Location: Shingiro Sector

Date: June 12, 2025

Gender: Male

Age Range: 30–40

Q1: Have you used e-Soko?

Yes, a few times. I send a message to check the price.

Q2: Has it helped you?

It helps me decide where to go to sell. But sometimes, the prices are old or not matching what I find.

Q3: What issues have you faced with e-Soko?

The network is weak here, and sometimes I get no reply or wrong prices.

Q4: Has it affected your decision-making in the market?

Yes, now I wait when the price is too low. Before, I used to sell quickly.

📄 Participant Code: F38

Location: Muhoza Sector

Date: June 15, 2025

Gender: Female

Age Range: 18–30

Q1: Are you aware of e-Soko?

Yes, I know it. We were shown during a cooperative meeting.

Q2: Do you use it regularly?

Not really. The phone needs data, and I am not always sure it works.

Q3: Has it made price transparency better?

Somewhat. But many still just ask other traders. The system alone is not enough.

Q4: What would make you use it more?

If it worked offline or was simpler, and if we had training.

📄 Summary Identified from 50 Respondents

Majority (≈60%) were unaware of e-Soko

Some (≈25%) had heard of it but did not use it due to lack of training or interest

A small portion (≈15%) used the platform occasionally, mostly to check prices

Common challenges reported:

Poor network connectivity in rural areas

Outdated or inconsistent price data

Lack of training or promotion about how to use the system

Limited trust in the system compared to physical market observations

Section A: Demographic Information

1. Age:

☐ 18–25

☐ 26–35

☐ 36–45

☐ 46–60

☐ Above 60

2. Gender:

☐ Male

☐ Female

☐ Prefer not to say

3. Education Level:

☐ No formal education

☐ Primary

☐ Secondary

☐ Tertiary

4. Years of Experience in Potato Farming:

☐ Less than 1 year

☐ 1–3 years

☐ 4–6 years

☐ More than 6 years

5. Location/Sector in Musanze District (select one):

☐ Busogo

☐ Cyuve

☐ Gacaca

☐ Gashaki

☐ Kinigi

☐ Muko

☐ Gatagara

☐ Nkotsi

☐ Nyange

☐ Rwaza

☐ Other: _____

Section B: Accessibility and Usability of E-Soko

6. Have you heard of the E-Soko system?

☐ Yes

☐ No

7. If yes, do you currently use it to access market prices?

☐ Yes

☐ No

8. How do you usually access E-Soko? (select all that apply)

☐ SMS/USSD on mobile phone

☐ Radio/TV announcements

☐ Internet/website

☐ Other (please specify): _____

9. Please rate the following statements about E-Soko usability (1 = Strongly Disagree, 5 = Strongly Agree):

Statement	1	2	3	4	5
E-Soko is easy to use	☐	☐	☐	☐	☐
E-Soko provides clear instructions	☐	☐	☐	☐	☐
I can access E-Soko without external help	☐	☐	☐	☐	☐
E-Soko information is updated frequently	☐	☐	☐	☐	☐
I trust the information provided by E-Soko	☐	☐	☐	☐	☐

Statement	1	2	3	4	5
E-Soko has improved how I make marketing decisions	☐	☐	☐	☐	☐

10. If you don't use E-Soko, what are the main reasons? (select all that apply)

☐ I don't know how to use it

☐ I don't have access to a phone

☐ Poor network coverage

☐ I don't trust the information

☐ I get market prices from other sources

☐ Other: _____

Section C: Challenges in Using E-Soko

11. What challenges do you face when trying to use E-Soko? (Open-ended)

_____

_____

12. Have you received any support or training on how to use E-Soko?

☐ Yes

☐ No

If yes, please specify the source of the training: _____

Section D: Impact on Potato Price Transparency

13. Has E-Soko helped you access more accurate potato prices?

☐ Yes

☐ No

☐ Not sure

14. Has E-Soko improved your bargaining power when selling potatoes?

☐ Yes

☐ No

☐ Not sure

15. Before using E-Soko, how did you get potato price information?

☐ Fellow farmers

☐ Local traders

☐ Radio/TV

☐ Market visits

☐ Other: _____

16. Since using E-Soko, has your income from potato sales improved?

☐ Yes

☐ No

☐ Not sure

17. Please describe any personal experiences with how E-Soko helped or failed you when selling potatoes: (Open-ended)

_____

_____

Section E: Recommendations and Suggestions

18. What improvements would you suggest for the E-Soko system? (Open-ended)

_____

_____

19. Would you recommend E-Soko to other farmers?

☐ Yes ☐ No

If yes, why? _____

20. Any additional comments or suggestions?

_____

…….. …… ……

Appendencies/Kinyarwanda

Ibibazo by’Ubushakashatsi: Isesengura ku Gukoresha E-Soko n’Icyo Bimaze mu Guhesha Abahinzi b’Ibirayi mu Karere ka Musanze Amakuru y’Igiciro ku Isoko

IGICE A: Amakuru ku Buzima bw’Umuntu

1. Imyaka:

☐ 18–25

☐ 26–35

☐ 36–45

☐ 46–60

☐ Hejuru ya 60

2. Igitsina:

☐ Gabo

☐ Gore

☐ Ntacyo nshaka kuvuga

3. Urwego rw’Amashuri:

☐ Nta mashuri

☐ Amashuri abanza

☐ Ayisumbuye

☐ Kaminuza

4. Imyaka umaze uhinga ibirayi:

☐ Munsi y’umwaka 1

☐ Imyaka 1–3

☐ Imyaka 4–6

☐ Hejuru y’imyaka 6

5. Utuye mu Murenge uwuhe mu Karere ka Musanze:

☐ Busogo

☐ Cyuve

☐ Gacaca

☐ Gashaki

☐ Kinigi

☐ Muko

☐ Gatagara

☐ Nkotsi

☐ Nyange

☐ Rwaza

☐ Uwundi: _____

IGICE B: Uburyo bwo Kugera kuri E-Soko n'Uko Ikora

6. Wigeze wumva E-Soko?

☐ Yego

☐ Oya

7. Niba ari yego, uyikoresha kugira ngo ubone ibiciro ku isoko?

☐ Yego

☐ Oya

8. Ujya ukoresha E-Soko gute? (hitamo ibisubizo byose bikwiye)

☐ Ubutumwa/SMS kuri telefone

☐ Itangazamakuru (Radiyo/TV)

☐ Interneti/urubuga

☐ Ibindi: _____

9. Saba uko wemera ibi bivuze ku buryo E-Soko ikoreshwa (1 = Ntibyemera na gato, 5 = Ndemera cyane):

Ibyavuzwe	1	2	3	4	5
E-Soko iroroshye gukoresha	☐	☐	☐	☐	☐
E-Soko itanga amabwiriza asobanutse	☐	☐	☐	☐	☐
Nshobora gukoresha E-Soko ntasabye ubufasha	☐	☐	☐	☐	☐
Amakuru ya E-Soko avugururwa kenshi	☐	☐	☐	☐	☐
Nizeye amakuru atangwa na E-Soko	☐	☐	☐	☐	☐
E-Soko yatumye mfata ibyemezo byiza mu bijyanye no kugurisha	☐	☐	☐	☐	☐

10. Niba utayikoresha, ni impamvu izihe nyamukuru? (hitamo ibisubizo byose bikwiye)

☐ Sinzi kuyikoresha

☐ Nta telefone ngira

☐ Interneti ntiboneka cyangwa sinzi kuyikoresha

☐ Simfitiye icyizere

☐ Nkura ibiciro ahandi

☐ Ibindi: _____

IGICE C: Imbogamizi mu Gukoresha E-Soko

11. Ni izihe mbogamizi uhura na zo mu gihe ugerageza gukoresha E-Soko?

_____

_____

12. Waba warigeze uhabwa amahugurwa cyangwa ubufasha ku ikoreshwa rya E-Soko?

☐ Yego ☐ Oya

Niba ari yego, ni nde wayatanze? _____

IGICE D: Ingaruka ku Bumenyi bw'Ibiciro

13. E-Soko yagufashije kubona ibiciro by'ibirayi byizewe?

☐ Yego

☐ Oya

☐ Simbizi

14. E-Soko yagufashije kongera imbaraga zawe mu biganiro byo kugurisha?

☐ Yego

☐ Oya

☐ Simbizi

15. Mbere yo gukoresha E-Soko, wabonaga ute amakuru y'ibiciro?

☐ Bagenzi banjye bahinga

☐ Abacuruzi bo ku isoko

☐ Radiyo/TV

☐ Kujya ku isoko ubwite

☐ Ibindi: _____

16. Gukoresha E-Soko byazamuye inyungu uvana mu kugurisha ibirayi?

☐ Yego

☐ Oya

☐ Simbizi

17. Sobanura uko E-Soko yakugiriye akamaro cyangwa aho yagutengushye mu kugurisha ibirayi:

_____

_____

IGICE E: Inama n'Ibitekerezo

18. Ni izihe mpinduka wasaba kugira ngo E-Soko irusheho kugufasha?

_____

_____

19. Wagira inama abandi bahinzi gukoresha E-Soko?

☐ Yego

☐ Oya

Niba ari yego, kuki? _____

20. Hari ibindi bitekerezo cyangwa ibitekerezo wifuza gutanga?

_____

…….. …….