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COLLEGE OF BUSINESS AND MANAGEMENT SCIENCES (CoBAMS)

SCHOOL OF STATISTICS AND PLANNING

DEPARTMENT OF PLANNING AND APPLIED STATISTICS.

DETERMINANTS OF SMARTPHONE OWNERSHIP AMONG HOUSEHOLDS OF AGANGA PARISH, APAC DISTRICT, UGANDA.

BY

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23/U/16568/PS

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JULY, 2026

DECLARATION

I, Oguta Robinson, declare that this special project report is original work and has never been presented for any academic award in any institution of higher learning.

Signature .....

Date.....20th July, 2026.....

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APPROVAL

This work has been submitted to CoBAMS in partial fulfillment of a degree in Bachelor of Science in Quantitative Economics with my approval.

Signature.....

Date.....20/7/26.....

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DEDICATION

I dedicate this dissertation to the Almighty God for His abundant grace, wisdom, protection, and strength throughout my academic journey. His unfailing love, guidance, and blessings have enabled me to overcome challenges and successfully reach this important milestone.

I also dedicate this work to my beloved parents, Mr. Egir Sam and Mrs. Arao Molly, whose unwavering financial, moral, and spiritual support laid the foundation for my education and personal growth. Their sacrifices, encouragement, and belief in my abilities have been a constant source of inspiration throughout my studies.

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LIST OF ABBREVIATIONS

3G	Third Generation Mobile Network Technology
4G	Fourth Generation Mobile Network Technology
CI	Confidence Interval
CoBAMS	College of Business and Management Sciences
Dr.	Doctor
H_0	Null Hypothesis
ICT	Information and Communication Technology
M&E	Monitoring and Evaluation
MoWT	Ministry of Works and Transport
N	Sample Size
OR	Odds Ratio
p-value	Probability Value (level of statistical significance)
p	Estimated proportion of population with characteristic
q	$1 - p$ (complement of p)
R^2 (Pseudo R^2)	Coefficient of Determination in Logistic Regression
SDG	Sustainable Development Goals
TAM	Technology Acceptance Model
UGX	Uganda Shillings
UTAUT	Unified Theory of Acceptance and Use of Technology
Wald χ^2	Wald Chi-Square
Z	Z-score (standard normal value at confidence level)
χ^2	Chi-Square

ABSTRACT

This study examined determinants of smartphone ownership among households in Aganga Parish, Apac District, Uganda. It was motivated by the increasing importance of smartphones in enabling access to communication, mobile banking, education, and information services, alongside persistent rural disparities in ownership. The study used a cross-sectional quantitative design involving 384 households, with data analyzed using descriptive statistics, chi-square tests, and binary logistic regression.

Findings showed that 59.9% of households owned smartphones, while 40.1% did not. Most respondents were self-employed (71.6%) and earned low incomes below UGX 300,000, with 78.7% relying on solar energy for charging. Key reasons for ownership were business use (34.3%) and communication (32.6%), while main barriers included high cost (43.5%), poor network coverage (18.2%), and limited electricity access (15.6%).

Chi-square results indicated significant associations between ownership and education, income, employment status, power access, network coverage, peer influence, and age ($p < 0.05$), while gender was not significant. The logistic regression model was statistically significant (Wald $\chi^2 = 83.75$, $p < 0.001$; pseudo $R^2 = 0.4575$). Key determinants were income, education, power access, network coverage, and peer influence. Households with strong network coverage had significantly higher odds of owning a smartphone (OR = 5.38, $p < 0.001$), while peer influence increased likelihood over 7 times. Age, gender, and employment were not significant.

The study concludes that smartphone ownership is mainly driven by structural factors such as affordability, infrastructure, and social influence rather than demographic characteristics. It recommends improving rural incomes, expanding electricity and network infrastructure, promoting digital literacy, leveraging peer influence, and enhancing affordability through subsidies and flexible payment schemes.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This study assesses the determinants of smartphone ownership among households of Aganga parish, Apac district (U). This chapter presents the background to the study, statement of the problem, objectives of the study, research hypotheses, significance of the study, and the scope of the study. It provides a clear foundation for examining the above factors. Smartphone is a mobile phone with advanced features such as internet access, touchscreen interface, camera, storage capacity, and the ability to download and use applications, while Smartphone Ownership is the possession and regular personal use of a smartphone by an individual. Digital technology has significantly transformed communication, access to information, education, trade, and service delivery. However, smartphones ownership is not equally distributed, especially in rural areas. Understanding the determinants that influence smartphone ownership in rural settings is necessary for promoting development and reducing digital inequality.

1.1 Background.

Globally, smartphones have transformed the way people communicate, learn, conduct business, and access services (Sarwar & Soomro, 2013). The rapid expansion of mobile technology has increased access to digital platforms across many countries (Steinbock, 2005). According to the International Telecommunication Union (ITU), mobile connectivity has grown significantly over the past two decades, with smartphones playing a central role in digital participation. In developed countries, smartphone ownership is high due to higher income levels, reliable electricity, strong internet infrastructure, and high literacy rates (West, 2015). In developing countries, ownership is increasing but remains influenced by affordability, infrastructure, and education levels (Briceño-Garmendia & Estache, 2004). Smartphones are now essential for accessing digital banking, online education, agricultural information, and government services (Kamal & Bablu, 2023). As global economies become more digital, individuals without smartphones risk exclusion from important social and economic opportunities (Helsper, 2008).

In Uganda, the telecommunications sector has grown rapidly due to increased investment in network infrastructure and expansion of mobile services. Smartphones are widely used in urban

centers for communication, mobile banking, online learning, and entrepreneurship (Rashid & Elder, 2009). Despite this growth, smartphone ownership in rural areas remains lower compared to urban areas. Factors such as income level, education, occupation, gender disparities, electricity access, and network coverage influence smartphone ownership patterns (Porter, 2012). While national policies emphasize digital transformation, many rural communities still face barriers that limit equal participation in the digital economy (Salemink et al., 2017).

Aganga Parish is a rural area in Apac district, Northern Uganda, whose community member's livelihoods are largely dependent on agriculture and small-scale economic activities. While some residents own smartphones and use them for communication, business, and social networking, others rely on basic mobile phones or do not own phones at all. In rural settings like Aganga Parish, smartphone ownership may be influenced by income level, education level, employment status, and access to electricity and network services. However, there is limited documented evidence explaining the specific factors that determine smartphone ownership within the parish.

Understanding these determinants is important for promoting digital inclusion and ensuring that rural residents benefit from technological advancement.

1.2 Problem Statement.

Smartphones are necessary for accessing digital financial services, educational resources, health information, market prices, and communication platforms (van Zanden, 2023). They play a vital role in improving livelihoods and supporting socioeconomic development. However, in Aganga Parish, smartphone ownership appears to be uneven. While some individuals own smartphones and actively use them, others lack access to such devices. This inequality may limit certain members of the community from accessing information and opportunities that require digital connectivity.

Despite the importance of smartphones in modern society, there is limited empirical evidence explaining the key factors influencing smartphone ownership in Aganga Parish. Without a clear understanding of these determinants, efforts to promote digital inclusion in the parish may not effectively address the actual barriers faced by residents. Therefore, this study seeks to examine the determinants of smartphone ownership in Aganga Parish.

1.3 Objectives of the Study.

1.3.1 General Objective.

To examine the socioeconomic and infrastructural factors influencing smartphone ownership among households in Aganga Parish.

1.3.2 Specific Objectives.

To examine the relationship between income level and smartphone ownership in Aganga Parish.

To determine the influence of education level on smartphone ownership in Aganga Parish.

To determine the effect of power access on smartphone ownership in Aganga Parish.

To examine the influence network coverage on smartphone ownership in Aganga Parish.

To determine the influence of employment status on smartphone ownership in Aganga parish.

To examine the effect of peer influence on smartphone ownership among households of Aganga parish.

1.4 Research Hypotheses.

H_{01}: There is no significant relationship between income level and smartphone ownership among households in Aganga Parish.

H_{02}: There is no significant effect of education level on smartphone ownership among households in Aganga Parish.

H_{03}: Power access has no significant effect on smartphone ownership among households in Aganga Parish.

H_{04}: Network coverage has no significant relationship with smartphone ownership among households in Aganga Parish.

H_{o5}: Employment status has no significant relationship with smartphone ownership among households of Aganga parish.

H_{o6}: There is no significant effect of peer influence on smartphone ownership among households of Aganga parish.

1.5 Significance of the Study

This study is important because it provides clear evidence on the factors influencing smartphone ownership in a rural setting. The findings will help policy makers and local government leaders to design practical interventions that address barriers such as low income, limited education, and poor infrastructure. By understanding which factors significantly affect ownership, authorities can develop more effective programs aimed at improving digital inclusion, rural connectivity, and access to essential online services (Omweri, 2024). This can contribute to improved service delivery, financial inclusion, and socioeconomic development in Aganga Parish and similar rural communities.

The study will benefit telecommunication service providers, development partners, and non-governmental organizations by providing reliable data to guide investment and community support programs. Service providers can use the findings to design affordable smartphone packages or improve network coverage in under-served areas. Development organizations can design appropriate digital literacy and empowerment programs based on the identified needs of the community. Academically, the study will also contribute to existing knowledge on technology adoption in rural contexts and serve as a reference for future researchers interested in digital inclusion and rural development.

1.6 Scope of the Study

This study will be conducted in Aganga Parish and will focus on individuals and households within the parish boundaries. It will examine smartphone ownership and analyze six key determinants relevant to a rural setting: income level, education level, employment status, power access, network coverage, and peer influence. The study will consider the current status of smartphone

ownership at the time of data collection, with the aim of understanding the existing patterns and influencing factors within the parish.

1.7 Conceptual framework.

This indicates the linkage between the independent variables i.e. socio-economic and infrastructure determinants of smartphone ownership and the dependent variable. It also clearly shows control variables relevant to the study. It breaks down the broad ideas into key variables as shown below.

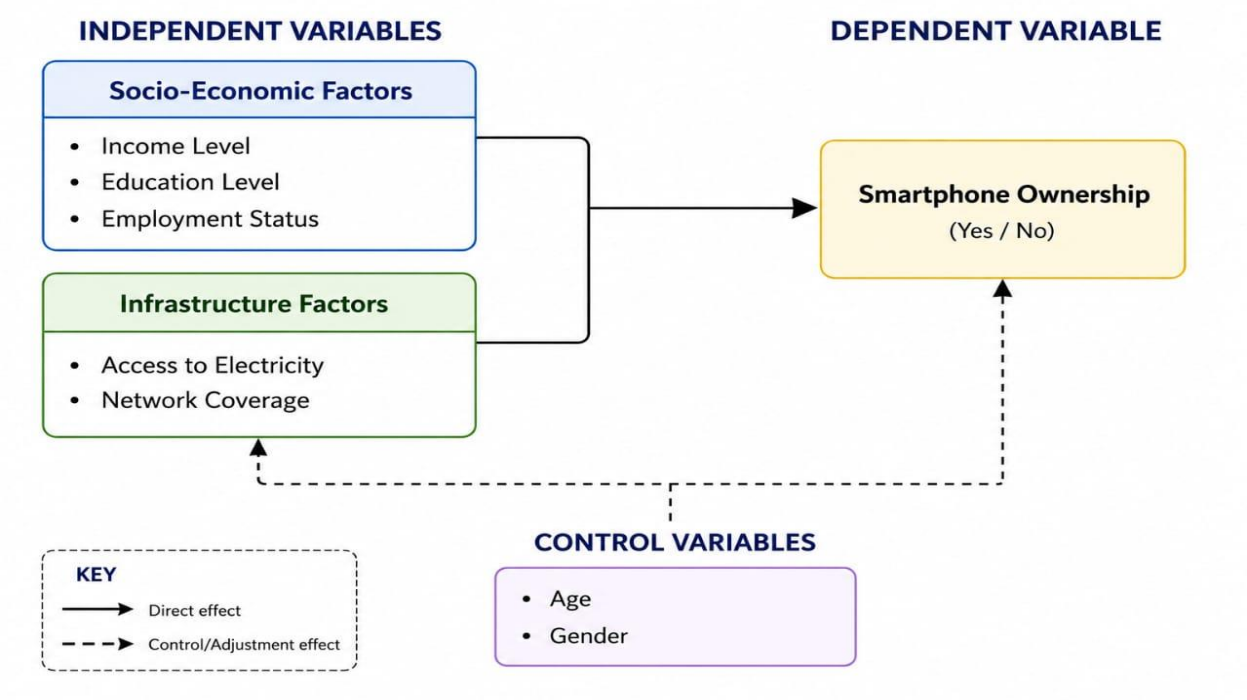


Figure 1.1: Conceptual Framework for Determinants of Smartphone Ownership among Households in Aganga Parish.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter reviews existing literature related to smartphone ownership and its determinants, especially in rural settings. It focuses on socioeconomic and infrastructural factors identified in previous studies, drawing evidence from global, regional, and rural research. The review identifies key theoretical and empirical contributions to understanding technology adoption and highlights gaps that justify the need for this study.

2.1 Theoretical Perspectives on Technology Adoption

Technology adoption and ownership studies are often grounded in established behavioral and social theories such as the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and socioeconomic frameworks of digital divide (Sipior et al., 2011). These models suggest that individuals' decisions to adopt technology (like smartphones) are shaped by perceived usefulness, ease of use, social influence, and facilitating conditions such as income, education, and infrastructure. Although these models have been widely applied in urban and organizational contexts, fewer studies explicitly apply them to rural smartphone ownership, particularly in low-income areas.

2.2 Conceptual Literature

2.2.1 Socio-Economic Determinants of Smartphone Ownership.

Income Level: Income level remains the most foundational determinant of technology ownership globally and regionally. Within sub-Saharan Africa, individuals with higher disposable household incomes exhibit a significantly higher probability of owning smartphones (Chabossou et al., 2008). This discrepancy is driven not only by the upfront capital required to purchase an internet-enabled device but also by the ongoing operational expenses, including mobile data bundles and battery charging fees. In resource-constrained rural settings, low household income acts as a severe structural barrier. For instance, in rural Malawi, pervasive poverty severely restricts technology adoption, a challenge compounded by a lack of supporting infrastructure like grid electricity (Gbadeyan et al., 2024). While earlier regional research focused broadly on basic mobile phones,

these economic hurdles are profoundly amplified for smartphones due to their higher baseline cost. In rural Uganda, where subsistence agriculture dominates, seasonal income fluctuations mean that smartphone ownership is often deprioritized in favor of immediate household survival needs (Sekabira, 2017).

Education Level: Education level heavily dictates an individual's digital literacy, awareness of technological affordances, and cognitive capability to navigate complex user interfaces. Higher educational attainment correlates strongly with smartphone ownership, as formal schooling equips individuals with the language and technical skills necessary to appreciate and utilize internet-enabled devices (Alshammari et al., 2018). The relationship between education and digital adoption is largely mediated by user attitudes and perceived self-efficacy. Behavioral research among smallholder farmers in developing rural economies demonstrates that baseline digital skills and a proactive attitude toward technology significantly shape an individual's intention to adopt and utilize smartphones (Landmann et al., 2021). In a parish setting, formal education lowers the psychological barrier to technology, transitioning the smartphone from a perceived luxury or entertainment device into a functional tool for agricultural, financial, and social utility (Misbachudin, 2025).

Employment Status: Employment status functions as both a source of steady income and a driver of technological necessity. Formal employment or engagement in non-farm entrepreneurial activities drastically increases the likelihood of smartphone ownership compared to unpaid family labor or traditional subsistence farming (Nsabimana & Funjika, 2019). In rural East Africa, individuals engaged in petty trade, off-farm businesses, or local civil service (such as teaching or health work) utilize smartphones as essential business infrastructure to communicate with suppliers, monitor market prices, and access mobile money ecosystems. Conversely, seasonal agricultural laborers face irregular cash flows, making the financial commitment of maintaining a smartphone difficult to sustain.

2.2.2 Infrastructural Determinants

Power Access: The utility of a smartphone is structurally tethered to reliable electricity. In many rural communities across sub-Saharan Africa, households face severe friction in maintaining

phone battery life due to a lack of grid electricity connection (Jaglin, 2019). This infrastructural deficit forces residents to rely on commercial solar charging kiosks, incurring regular financial and time costs that diminish the incentive to invest in a smartphone. Because smartphones consume substantially more power than basic feature phones, a lack of consistent, affordable domestic power access acts as a direct deterrent to upgrading to internet-enabled devices in off-grid communities (Alstone, 2015).

Network Coverage: The value proposition of a smartphone relies heavily on its connectivity. Poor mobile network infrastructure, particularly the absence of stable 3G or 4G data networks, drastically reduces the functionality of an internet-enabled device (Raghunandan et al., 2025). When users cannot reliably access digital applications, browsing, or communication platforms, the economic justification for buying a smartphone collapse. In rural Uganda, network topography remains uneven; while basic voice signal may be present, the weak mobile data connectivity characteristic of remote parishes routinely discourages users from transitioning away from legacy feature phones (Shah et al., 2017).

2.2.3 Demographic Characteristics

Age: Large population datasets consistently reveal a stark demographic divide in digital adoption: younger individuals are disproportionately more likely to adopt and intensively use smartphones than older cohorts (Horwood et al., 2021). This digital divide is often driven by age-related variations in digital literacy, tech-confidence, and social networks. While younger generations exhibit higher adaptability and actively seek smartphones for socialization, entertainment, and digital labor, older adults in rural settings frequently encounter steep learning curves and lack the confidence to operate touchscreen interfaces, often preferring simplified voice-only devices (Chen et al., 2023).

Gender: Gender disparities remain highly pronounced in rural African technological landscapes, reflecting entrenched socio-economic inequalities. Empirical evidence indicates that men are significantly more likely than women to own mobile and internet-enabled devices in rural African environments (Deen-Swarray et al.). This digital gender gap is rooted in asymmetric control over household financial resources, unequal access to educational opportunities, and cultural norms that

sometimes restrict women's independent mobility or technological autonomy. Consequently, women in rural parishes are frequently relegated to sharing devices within the household rather than exercising independent ownership.

Peer Pressure: Peer pressure is an important social determinant of smartphone ownership, particularly in rural communities where social networks are close-knit and individuals often seek acceptance within their peer groups. As more community members, friends, or relatives acquire smartphones, others may feel compelled to own one to avoid social exclusion, maintain social connections, and participate in digital communication platforms. Studies have shown that peer influence significantly affects technology adoption decisions, including smartphone ownership. In rural settings, smartphones may also serve as symbols of modernity and social status. Individuals may therefore acquire smartphones not only for their functional benefits but also to conform to prevailing social norms and expectations within their communities. Evidence from rural Uganda and other developing-country contexts suggests that social relationships and community interactions play a key role in shaping mobile phone adoption and usage patterns.

2.3 Urban-Rural Digital Divide

Several studies emphasize the existence of a digital divide, a disparity in technology access and use between urban and rural areas. Rural residents are less likely to own smartphones than urban counterparts, partly due to weaker infrastructure, lower income, and reduced access to education and digital services (Salemink et al., 2017). Research using multi-national data shows that urban residents are significantly more likely to own mobile technology than rural dwellers (Caragliu & Del Bo, 2023). These disparities highlight the importance of examining contextual differences in technology ownership.

2.4 Empirical Studies in Developing and Rural Contexts

Empirical research on smartphone ownership specifically in rural settings is still emerging. A recent study across rural farming households in China found that socio-economic factors such as education, income, and peer technology use are significant determinants of smartphone usage (Ma et al., 2018). Research in rural India also identifies cognitive and behavioral drivers of smartphone use related to attitudes, social norms, and perceived utility, emphasizing that adoption drivers can

vary considerably in rural environments compared to urban setting (Islam et al., 2020). Studies in sub-Saharan Africa have focused more broadly on mobile phone ownership and its implications for service delivery, such as public health campaigns and agricultural communication, demonstrating that rural households with phone access often have better information networks and health outcomes than those without. However, these studies frequently do not distinguish between basic mobile phones and smartphones, even though the latter provide internet access and advanced applications, which have different adoption dynamics.

2.5 Research Gap

Although there is growing research on mobile phone ownership and technology adoption in rural areas, very limited research investigates the determinants of *smartphone* ownership at the micro-community or parish level in sub-Saharan Africa. Most existing studies either focus on basic mobile phone ownership, examine technology use for specific services (such as health interventions), or analyze broader urban–rural digital divides. Few studies comprehensively assess how socio-economic factors (income, education, gender, occupation) and infrastructural constraints (electricity, network coverage) combine to influence smartphone ownership in rural communities like Aganga Parish. This gap highlights a clear need for localized empirical evidence to inform policy, infrastructure planning, and digital inclusion strategies in under-served rural settings.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology used to conduct the study on the determinants of smartphone ownership in Aganga Parish. It describes the research design, study population, sample size determination, sampling techniques, data collection methods and tools, measurement of variables, data analysis techniques, ethical considerations, and limitations of the study. The purpose of this chapter is to explain how the research study was conducted in a systematic, valid, and reliable manner.

3.1 Research Design

The study adopted a cross-sectional descriptive research design using a quantitative approach. A cross-sectional design was appropriate because data was collected from respondents at a single point in time to examine the relationship between selected determinants and smartphone ownership. The descriptive design will enable the researcher to describe the characteristics of the population, while the analytical component allowed examination of the relationships between independent variables (income level, education level, employment status, and infrastructure access) and the dependent variable (smartphone ownership). The quantitative approach is suitable because it allows statistical testing of the null hypotheses and objective measurement of relationships among variables.

3.2 Study Area

The study was conducted in Aganga Parish. The parish is rural, with most residents engaged in agriculture and small-scale economic activities. Access to infrastructure such as electricity and mobile network coverage varies across households, making it an appropriate setting for examining determinants of smartphone ownership.

3.3 Study Population

The study population consist of adult residents (18 years and above) living in Aganga Parish at the time of the study. Adults were targeted because they are more likely to make independent decisions regarding smartphone ownership and usage.

3.4 Sample Size Determination

Using Cochran's formula for sample size determination:

$n = \frac{pqZ^2}{e^2}$

Where,

1. N = Sample size
2. Z = Z-Value at 95% confidence level = 1.96
3. p = Estimated proportion of the population with the attribute = 0.5
4. q = 1− p = 0.5
5. e = Margin of error = 0.05

$n = \frac{0.5X0.5X(1.96)^2}{0.05^2}$

n = 384.

The estimated number of households in Aganga parish is approximately over 800, then

The sample size was therefore approximated to 384 respondents. This sample size was considered adequate for statistical analysis and manageable within the available time and resources.

3.5 Sampling Techniques

The study used a multi-stage sampling approach, combining simple random sampling and systematic sampling techniques.

3.5.1 Stage one: Representative sample per village

The required sample size will be distributed among the selected villages of Aganga Parish using proportional allocation based on the estimated number of households in each village. This will ensure that villages with larger populations contribute a larger number of respondents to the study, thereby improving representativeness of the sample.

Formula: $n_i = \frac{Ni}{N} \times n$

Where:

ni = sample allocated to village i

Ni = number of households in village i

N = total households in all selected villages (800)

n = total sample size (384)

3.5.2 Stage two: selection of households

Within each village, households were selected using systematic sampling. Every K^{th} household was chosen after determining a sampling interval based on the estimated number of households.

$K = \frac{N}{n}$

Where:

K = Sampling interval

N = Total number of households in Aganga Parish

n = Required sample size

Given approximately 800 households and a sample size of 384:

K=800/384 = 2.08

The sampling interval will therefore be approximated to **2**, meaning every second household will be selected after randomly choosing the starting households

3.5.3 Stage Three: Selection of Respondents

One eligible adult respondent will be selected from each sampled household. In households without a smartphone owner, the household head or another eligible adult respondent will be interviewed.

3.6 Data Collection Methods and Tools

3.6.1 Data Collection Method

The study will primarily use the survey method to collect primary data from respondents. The survey method is appropriate because it allows collection of standardized information from a relatively large number of respondents within a short period.

3.6.2 Data Collection Tool

A structured questionnaire was used in conjunction with an offline kobo toolbox as the main data collection tool. The questionnaire contained closed-ended questions to capture information about the variables shown below.

3.7 Measurement of Variables

Table 3.1: Measurement of variables

Variable name.	**Data type.**	**Measurement unit.**
Dependent variable.		
Smartphone ownership	Binary	Yes =1, No =0
Independent variable.		
Income level (ugx)	Categorical	Less than 100,000=1 100,001-300,000=2, 300,001-600000=3, Above 600,000 = 4
Education level	Categorical	No formal education =1 Primary =2, secondary = 3 post-Secondary = 4
Employment status	Categorical	Formal employment = 1, self-employed = 2, student = 3
Power access	Categorical	Solar = 1, neighbor's house = 2, charging Centre = 3
Network coverage	Categorical	Very network=1, weak=2, moderate=3, strong network=4
Peer influence	Binary	Friends own smartphone = 1, friends do not own smartphone = 0
Household demographic characteristics.		
Age	Continuous	Age as per the last birthday
Gender	Binary	male=1, female= 0

3.8 Data Analysis Techniques

Data collected were coded and entered into statistical software such as excel and forwarded to Stata for analysis.

The analysis included:

3.8.1 Descriptive Statistics

Frequencies and percentages to summarize demographic characteristics and smartphone ownership patterns. Tables and charts were also used to present findings clearly.

3.8.2 Inferential Statistics

Chi-square tests to examine associations between categorical variables and smartphone ownership.

Logistic regression analysis to determine the effect of independent variables on smartphone ownership while controlling for age and gender. The regression model will be specified as,

$$\text{In}\left(\frac{P(Y=1)}{1-P(Y=1)}\right)= \beta_0+\beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \beta_5X_5+ \beta_6X_6$$

Where: Y = Dependent variable (smartphone ownership; 1 = owns smartphone, 0 = does not own)

$P(Y = 1)$ = Probability of owning a smartphone

β_0 = Constant term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = Coefficients of independent variables

X_1 = Education level

X_2 = Employment status

X_3 = Income level

X_4 = Power access

X_5 = Network coverage

X_6 = Peer influence

The level of significance will be set at 5% (0.05). Null hypotheses will be rejected if the p-value is less than 0.05.

3.9 Ethical Considerations

The study adhered to ethical research standards, including:

Informed Consent: Respondents were informed about the purpose of the study and they voluntarily participated.

Confidentiality: Personal information was not disclosed. The collected data was used strictly for academic purposes.

Anonymity: Names of respondents were not recorded on the questionnaire.

Voluntary Participation: Respondents right to withdraw from the study at any time without penalty was upheld.

Respect and Non-Harm**:** The study avoided causing psychological, social, or economic harm to participants.

3.10 Limitations of the Study

The study faced several limitations such as;

Self-Reported Data: Information provided by respondents are subject to recall bias or misreporting.

Time Constraints: The cross-sectional design captures data at one point in time and may not reflect changes over time.

Resource Constraints: Financial and logistical limitations may restrict the depth of data collection.

Despite these limitations, the study provided reliable and useful insights into the determinants of smartphone ownership in Aganga Parish.

CHAPTER FOUR: ANALYSIS, PRESENTATION AND INTERPRETATION OF RESULTS

4.0 Introduction.

This chapter presents the empirical findings regarding the socioeconomic and infrastructural determinants of smartphone ownership among rural households in Aganga Parish, Apac District, Uganda. The analysis relies on primary data collected from a representative sample of 384 households. The data analysis progresses systematically from univariate descriptive profiles to bivariate associations utilizing Pearson's Chi-Square (chi^2) tests of independence, and concludes with a structural multivariate logistic regression model to isolate true determinants controlled for other factors.

4.1. Questionnaire response rate

384 questionnaires were administered, all 384 questionnaires were successfully completed; however, a few responses had missing income values. Data were collected through face-to-face interviews using Kobo Toolbox. The data excel sheet was downloaded, cleaned and validated using Microsoft excel. Univariate, bivariate, and multivariate analyses were performed to clearly understand the influence of income levels, power access, network coverage, employment status, education level, peer influence on smartphone ownership in Aganga parish.

4.2. Distribution of respondents

The study targeted one smartphone owner in a selected household of Abade, Aganga, Igoti, Alwala, Runguja and Waitumba villages of Aganga parish. For cases where no member owned a smartphone, household heads were interviewed.

4.3. Background characteristics of respondents

This is the description of respondents' attributes which were necessary for this study, which include gender, age, employment status, monthly income, household size, education level, network strength, smartphone ownership and village of residence.

Table 4.2 Distribution of respondents by background characteristics

Variables	Category	Frequency	Percentage (%)
Distribution of respondents by Village	Abade	63	16.4
	Aganga	70	18.2
	Alwala	48	12.5
	Igoti	65	16.9
	Runguja	84	21.9
	Waitumba	54	14.1
	Total	**384**	**100**
Gender of respondents	Male	203	52.9
	Female	181	47.1
Age of respondents	16-30 years	181	47.1
	31-45 years	157	40.9
	Above 46 years	46	12.0
	Total	**384**	**100**
Education status of respondents	No formal education	25	6.1
	Primary	166	43.2
	Secondary	145	37.8
	Post-secondary	48	12.5
	Total	**384**	**100**
Employment status of respondents	Employed (formal)	49	12.8
	Self employed	275	71.6
	Student	60	15.7
	Total	**384**	**100**
Monthly income level of respondents (ugx)	Less than 100,000	121	33.1
	100,001-300,000	141	37.0
	300,001-600,000	89	23.4
	Above 600,000	33	8.6
	Total	**384**	**100**
Power access (charging mode) of respondents	Solar power	302	78.7
	Charging center	15	3.9
	Neighbors' house	67	17.5
	Total	**384**	**100**
Network strength reported by respondents	Very weak	40	10.4
	Weak	103	26.8
	Moderate	148	38.5
	Strong	93	24.2
	Total	**384**	**100**

4.3.1 Interpretation

Gender of Respondents

Out of the 384 respondents surveyed, 203 (52.9%) were male while 181 (47.1%) were female. This indicates a relatively balanced gender distribution, although males constituted a slightly larger proportion of the sample.

Age Distribution of Respondents: The findings show that 181 respondents (47.1%) were aged between 16 and 30 years, while 157 respondents (40.9%) were between 31 and 45 years. Respondents aged above 46 years accounted for 46 individuals (12.0%). These results indicate that the study population was predominantly youthful, with nearly 88% of respondents being below 46 years.

Education level of Respondents: Regarding educational attainment, 166 respondents (43.2%) attained primary education, making it the largest educational category. This was followed by secondary education with 145 respondents (37.8%), post-secondary education with 48 respondents (12.5%), and no formal education with 25 respondents (6.1%). The findings reveal that the majority of respondents possessed at least basic formal education.

Employment Status of Respondents: The results indicate that 275 respondents (71.6%) are self-employed, making self-employment the dominant source of livelihood in Aganga parish. Students accounted for 60 respondents (15.7%), while formally employed individuals constituted 49 respondents (12.8%). These findings suggest that most respondents depend on informal economic activities for income generation.

Monthly Income Level of Respondents**:** The largest proportion of respondents, 141 (37.0%), earned between UGX 100,001 and UGX 300,000 per month, followed by 121 respondents (33.1%) earning less than UGX 100,000. Respondents earning between UGX 300,001 and UGX 600,000 accounted for 89 individuals (23.4%), while only 25 respondents (6.5%) earned above UGX 600,000 per month. These findings indicate that the majority of respondents belonged to low-income households.

Power Access (Charging Mode): The majority of respondents, 302 (78.7%), relied on solar power for charging their devices. 67 respondents (17.5%) charged their devices at neighbors' homes, while 15 respondents (3.9%) used charging centers. These findings suggest that solar energy is the primary source of electricity in the area, reflecting limited access to the national electricity grid.

Network Strength: The results show that 148 respondents (38.5%) reported moderate network strength, making it the most common category. This was followed by weak network strength reported by 103 respondents (26.8%), strong network strength reported by 93 respondents (24.2%), and very weak network strength reported by 40 respondents (10.4%). Overall, approximately 62.7% of respondents experienced moderate to strong network coverage. This suggests that mobile network infrastructure is reasonably available in Aganga parish.

4.3.2 Smartphone Penetration Rate

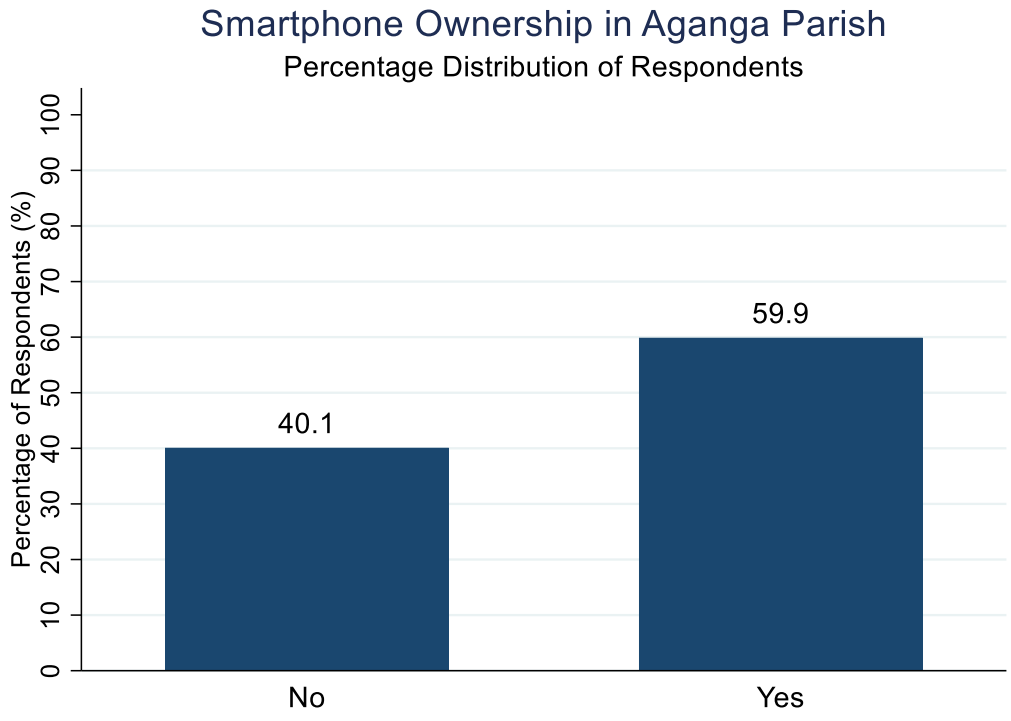


Figure 4.2 **Distribution of Respondents by Smartphone Ownership.**

The figure shows that a total of 230 respondents (59.9%) reported owning a smartphone, while 154 respondents (40.1%) did not own a smartphone. These findings indicate that smartphone ownership is relatively prevalent in Aganga Parish, with the majority of respondents having access to smartphone technology. However, the substantial proportion of non-owners suggests the existence of socioeconomic barriers that may limit smartphone adoption among some members of the community.

4.3.3 Descriptive Statistics of Continuous Variables

Table 4.3:Descriptive statistics of continuous variables

Variables	Observation	Mean	Standard deviation	Min	Max
Age of respondents	384	32.7	11.2058	16	78
Household size	384	6.0	2.8533	1	16

A total of 384 respondents were included in the study. The mean age was 32.7 years (SD = 11.21), with ages ranging from 16 to 78 years, indicating that smartphone ownership was assessed across a wide age range in Aganga Parish. The variation in age suggests that ownership patterns may differ between younger and older respondents.

The average household size was 6 members (SD = 2.85), ranging from 1 to 16 members. This indicates that most respondents lived in relatively large households, which may influence smartphone ownership through differences in household financial resources and communication needs.

4.3.4 Drivers of smartphone ownership among households in Aganga Parish

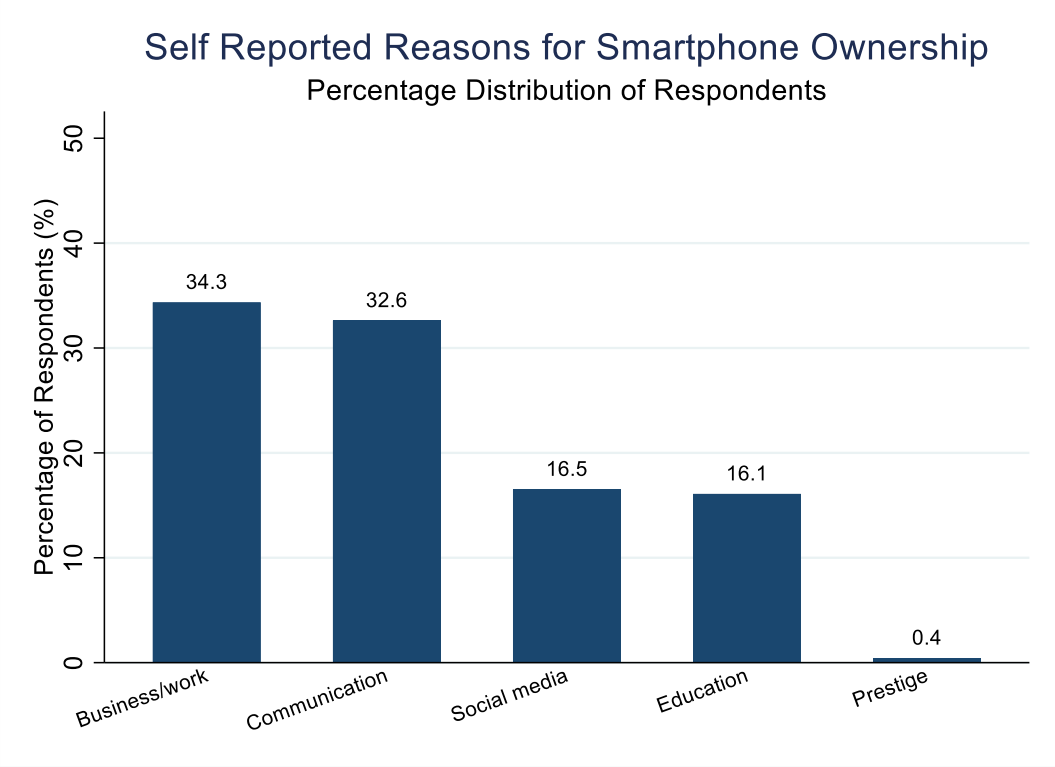


Figure 4.3 Drivers of smartphone ownership among households in Aganga parish.

The findings reveal that the leading reason for smartphone ownership is business or work-related use, accounting for 34.3% of respondents. This is closely followed by communication purposes, which represent 32.6% of the households. Use of smartphones for social media engagement accounts for 16.5%, while educational purposes constitute 16.1% of respondents. A negligible proportion of 0.4% reported prestige as their primary reason for owning a smartphone.

4.3.5 Barriers to smartphone ownership among households in Aganga Parish

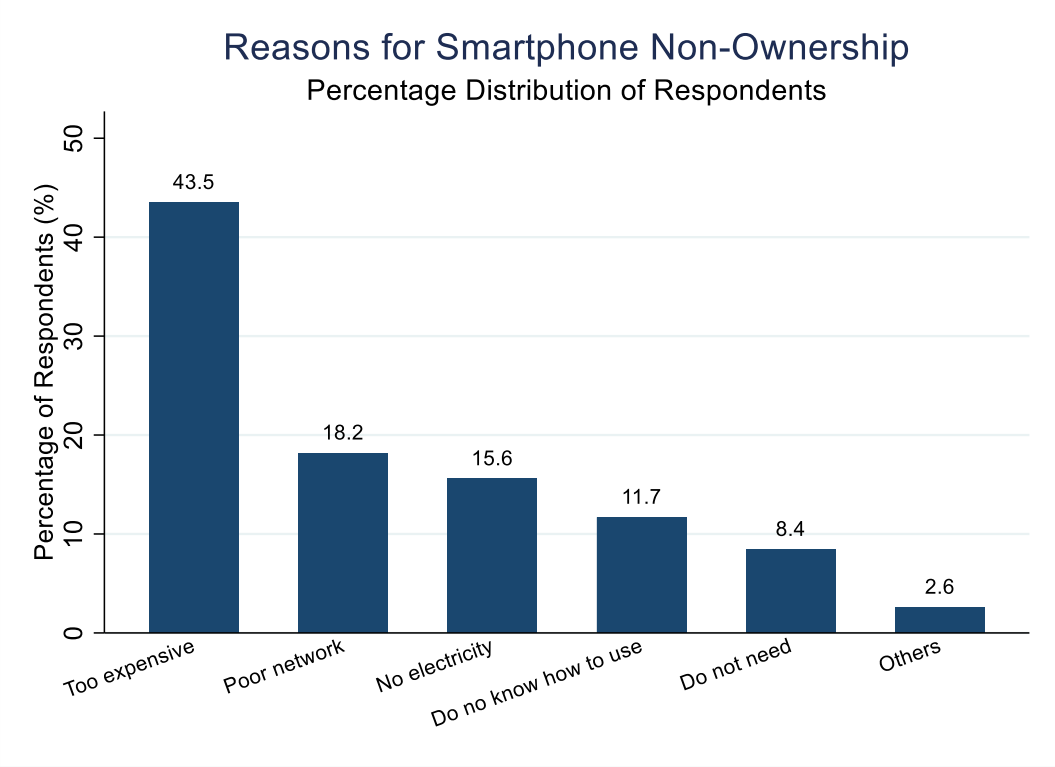


Figure 4.4 Barriers to smartphones ownership in Aganga

The distribution of self-reported reasons for non-ownership of smartphones among households in Aganga Parish indicates that the predominant reason is high cost of smartphones, reported by 43.5% of respondents. This is followed by poor network coverage, which accounts for 18.2% of the households. A further 15.6% of respondents reported lack of electricity as a reason for non-ownership, while 11.7% indicated lack of knowledge on how to use smartphones. Additionally, 8.4% of respondents reported that they do not need a smartphone, whereas a marginal proportion of 2.6% cited other unspecified reasons for non-ownership.

4.4 Bivariate Association Analysis (chi2)

To examine the initial relationships between smartphone ownership and the selected explanatory variables, cross-tabulations were performed between smartphone ownership and education level, employment status, income level, power access, network coverage, peer influence, age, and gender. Pearson's Chi-square (χ^2) test of independence was used to determine whether there were

statistically significant associations between each variable and smartphone ownership among households in Aganga Parish. The results are presented in Table 4.4.

Table 4.4: Distribution of Respondents by socio economic characteristics and by smartphone ownership

Explanatory Variable	Owns smartphone (%)		Frequency	χ^2	P-value
	Yes	No			
Education Level				59.2279	0.001
No formal education	44.0	56.0	25		
Primary	41.0	59.0	166		
Secondary	73.8	26.2	145		
Post-secondary	81.3	18.8	48		
Employment status					
Employed (formal)	67.3	32.7	49	8.0210	0.046
Self employed	55.6	44.4	275		
Student	73.3	26.7	60		
Income level (Ugx)					
Less than 100,000	34.9	65.1	126		
100,001-300,000	61.0	39.0	141	75.3890	0.001
300,001-600,000	85.4	14.6	89		
Above 600,000	92.0	8.0	25		
Power access					
Solar power	66.9	33.1	302	30.8222	0.001
Charging center	26.7	73.3	15		
Neighbors' house	35.8	64.2	67		
Network coverage					
Very weak	25.0	75.0	40		
weak	38.8	61.2	103	59.2346	0.001
moderate	58.8	41.2	148		
strong	89.2	10.8	93		
Peer influence					
Friends own smartphone	67.4	32.6	270		
Friends do not own smartphone	42.1	57.9	114		
Control variables					
Age					
16-30 years	60.5	39.5	174	8.0099	0.046
31-45 years	51.3	48.7	157		
Above 46 years	42.9	57.1	53		
Gender					
Male	57.5	42.5	203	0.8467	0.357
Female	44.0	56.0	181		

4.4.1 Interpretation of Bivariate Associations

Education level is strongly associated with smartphone ownership ($\chi^2 = 59.2279$, $p < 0.001$). Ownership increases with higher levels of education, rising from 44% among respondents with no formal education (11 out of 25) to 41% in primary education (68 out of 166), 74% in secondary education (107 out of 145), and 92% among those with post-secondary education (44 out of 48). This suggests that education enhances both the ability and likelihood of owning a smartphone, likely through improved income opportunities and digital literacy.

Employment status is also significantly associated with smartphone ownership ($\chi^2 = 8.0210$, $p = 0.046$), although the relationship is relatively weaker compared to other variables. Smartphone ownership is highest among students (73%) and formal employees (67%), while self-employed individuals exhibit a lower proportion (56%). The unemployed category is too small to allow strong inference but indicates full ownership in this dataset.

Income level shows a very strong and highly significant relationship with smartphone ownership ($\chi^2 = 75.3890$, $p < 0.001$). Ownership increases consistently with income, from 35% among respondents earning less than 100,000 UGX (44 out of 126) to 61% in the 100,001–300,000 UGX bracket, 85% in the 300,001–600,000 UGX group, and universal ownership (100%) among those earning above 600,000 UGX. This confirms that affordability is a critical determinant of smartphone access.

Access to power sources is also significantly associated with smartphone ownership ($\chi^2 = 30.8222$, $p < 0.001$). Respondents relying on solar power show the highest ownership levels (67%), while those depending on charging centers or neighbors have much lower ownership rates (36%). This indicates that ease of charging and energy accessibility strongly influence smartphone adoption.

Network coverage is another significant factor ($\chi^2 = 59.2346$, $p < 0.001$), with ownership increasing steadily as network quality improves. Only 25% of respondents in areas with very weak coverage own smartphones, compared to 49% in weak areas, 59% in moderate areas, and 89% in areas with strong network coverage. This demonstrates that infrastructure quality directly affects smartphone uptake.

Finally, peer influence is significantly associated with smartphone ownership ($\chi^2 = 22.8656$, $p < 0.001$). Respondents whose friends own smartphones have a higher ownership rate (67%) compared to those whose friends do not (42%), highlighting the role of social networks in technology diffusion.

4.4.2 Control Variables

The chi-square test is also used to examine the association between the control variables (age and gender) and smartphone ownership. Age is found to have a statistically significant relationship with smartphone ownership ($\chi^2 = 8.0099$, $p = 0.046$). Smartphone ownership is highest among respondents aged 31–45 years, where out of 157 respondents 60.5% owned a smartphone, followed closely by those aged 16–30 years, with out of 181 respondents 63.0% owning a smartphone. Ownership declined among older age groups, with of 53 respondents, 51.3of those aged above 46 years owns a smartphone. Findings suggest that younger and middle-aged individuals are more likely to own smartphones than older respondents, possibly due to greater technological familiarity and a higher demand for digital services.

Gender, on the other hand, is not significantly associated with smartphone ownership ($\chi^2 = 0.8467$, $p = 0.357$). Among male respondents, 126 out of 203 (62.1%) owned a smartphone, compared to 104 out of 181 (57.5%) among female respondents. Although smartphone ownership is slightly higher among males, the difference is not statistically significant. This indicates that smartphone ownership does not vary substantially by gender among the households of Aganga parish. The bivariate analysis indicates that education level, employment status, income level, power access, network coverage, peer influence, and age are significantly associated with smartphone ownership ($p < 0.05$). In contrast, gender is not significantly associated with smartphone ownership ($p > 0.05$). These findings suggest that socioeconomic characteristics, infrastructural factors, social influence, and age play an important role in determining smartphone ownership, whereas gender does not appear to be a key determinant in parish.

4.5 Distribution of Respondents by socio economic characteristics and by smartphone ownership

Table 4.5: Distribution of Respondents by socio economic characteristics and by smartphone ownership

Variable	Category	Odds Ratio	p-value	Std. Error	95% C. I
Age group	16-30 *(RC)*	1.00	–	–	–
	31–45	0.82	0.536	0.32	0.44, 1.53
	Above 46	0.88	0.806	0.52	0.32, 2.44
Education level	No formal education *(RC)*	1.00	–	–	–
	Primary	0.33	0.118	0.71	0.14, 5.20
	Secondary	2.43	0.022	0.39	1.14, 5.18
	Post-secondary	8.44	0.008	0.81	1.72, 41.29
Employment status	Student *(RC)*	1.00	–	–	–
	Formal employment	2.07	0.015	0.30	1.15, 3.72
	Self employed	4.35	0.010	0.57	1.42, 13.29
Income level	Less than 100,000 *(RC)*	1.00	–	–	–
	100,001–300,000	6.23	0.030	0.84	1.19, 32.50
	300,001-600,000	4.21	0.019	0.61	1.27, 13.93
	Above 600,000	3.22	0.004	0.41	1.45, 7.18
Power access	Charging center *(RC)*	1.00	–	–	–
	Neighbor's house	2.45	0.021	0.39	1.14, 5.28
	Solar power	7.60	0.026	0.91	1.28, 45.25
Network coverage	Very weak *(RC)*	1.00	–	–	–
	Weak	1.13	0.847	0.63	0.33, 3.89
	Moderate	1.20	0.067	0.10	0.99, 1.46
	Strong	5.38	0.021	0.73	1.29, 22.50
Peer influence	No *(RC)*	1.00	–	–	–
	Yes	7.28	0.011	0.78	1.57, 33.70

4.5.1 Interpretation.

A binary logistic regression model was estimated to identify the determinants of smartphone ownership among households in Aganga Parish. The model was statistically significant overall **(**Wald $\chi^2 = 83.75$, $p < 0.001$), indicating that the explanatory variables jointly influenced the likelihood of smartphone ownership. The model further explained approximately 45.75% of the variation in smartphone ownership, as indicated by the Pseudo R^2 value of 0.4575, suggesting a good model fit. The reference categories were respondents aged 16–30 years, those with no formal education**,** students, households earning less than UGX 100,000, households relying on charging

centers for electricity, respondents living in areas with very weak network coverage, and those reporting no peer influence**.**

The results indicate that age was not a significant determinant of smartphone ownership. Compared with respondents aged 16–30 years (reference category), those aged 31–45 years had 18% lower odds of owning a smartphone (OR = 0.82, $p = 0.526$), while respondents aged above 46 years had 12% lower odds (OR = 0.88, $p = 0.811$). Both associations were statistically insignificant, implying that age did not independently influence smartphone ownership.

Education level significantly influenced smartphone ownership. Relative to respondents with no formal education (reference category), those with primary education had lower odds of owning a smartphone (OR = 0.33, $p = 0.125$), although the association was not statistically significant. However, respondents with secondary education were 2.43 times more likely ($p = 0.022$) and those with post-secondary education were 8.44 times more likely ($p = 0.008$) to own smartphones than respondents with no formal education, demonstrating that higher educational attainment significantly increases the likelihood of smartphone ownership.

Employment status was also a significant determinant. Compared with students (reference category), respondents in formal employment were 2.07 times more likely to own smartphones (OR = 2.07, $p = 0.015$), while self-employed respondents were 4.35 times more likely to own smartphones (OR = 4.35, $p = 0.010$). This suggests that engagement in income-generating activities increases the probability of smartphone ownership.

Income level had a significant positive effect on smartphone ownership. Compared with households earning less than UGX 100,000 (reference category), those earning UGX 100,001–300,000**,** UGX 300,001–600,000, and above UGX 600,000 were 6.23**,** 4.21, and 3.22 times more likely to own smartphones, respectively ($p < 0.05$ for all categories). This indicates that higher household income enhances the ability to acquire smartphones.

Power access was another significant determinant. Compared with households relying on charging centers (reference category), households charging phones at neighbor's house were 2.45 times more likely to own smartphones (OR = 2.45, $p = 0.021$), while households using solar power were

7.60 times more likely to own smartphones (OR = 7.60, $p = 0.026$). These findings highlight the importance of reliable electricity in facilitating smartphone ownership.

Regarding network coverage, households living in areas with weak (OR = 1.13, $p = 0.847$) and moderate (OR = 1.20, $p = 0.067$) network coverage did not differ significantly from those living in areas with very weak network coverage (reference category). However, respondents living in areas with strong network coverage were 5.38 times more likely to own smartphones (OR = 5.38, $p = 0.021$), indicating that reliable network connectivity significantly promotes smartphone ownership.

Finally, peer influence was a significant predictor of smartphone ownership. Respondents who reported peer influence were 7.28 times more likely to own smartphones than those reporting no peer influence (OR = 7.28, $p = 0.011$), suggesting that social interactions and peer behavior substantially influence smartphone adoption.

Overall, the multivariate analysis shows that education level, employment status, income level, power access, strong network coverage, and peer influence are the key independent determinants of smartphone ownership among households in Aganga Parish, whereas age was not a significant predictor after controlling for other variables in the model.

4.6 Chapter Conclusion

In conclusion, the findings indicate that smartphone ownership in Aganga Parish is significantly associated with education level, income level, power access, network coverage, peer influence and age at the bivariate level. However, the multivariate analysis revealed that education level, employment status, income level, power access, strong network coverage, and peer influence are the key independent determinants of smartphone ownership among households in Aganga Parish. These findings highlight the importance of socioeconomic status, infrastructure availability and social influence in shaping smartphone adoption among rural households.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION.

5.1 Introduction

This chapter presents a synthesis of the major findings, conclusions, and recommendations of the study. The discussion links the empirical findings to existing theoretical and empirical literature on smartphone adoption and digital inclusion. The study investigated the socioeconomic, infrastructural, and social determinants of smartphone ownership among households in Aganga Parish, Apac District. The analysis was conducted using descriptive statistics, Pearson Chi-square tests, and binary logistic regression.

The logistic regression model was statistically significant (Wald $\chi^2 = 83.75$, $p < 0.001$) and explained approximately 45.75% of the variation in smartphone ownership (Pseudo $R^2 = 0.4575$), indicating that the explanatory variables provided substantial predictive power regarding smartphone ownership among households in Aganga Parish.

5.2 Discussion of Findings

5.2.1 Socioeconomic Determinants of Smartphone Ownership

Income Level: Income emerged as one of the strongest determinants of smartphone ownership. The bivariate analysis revealed a highly significant association between income level and smartphone ownership ($\chi^2 = 75.389$, $p < 0.001$), while the multivariate analysis confirmed that households in higher income categories were significantly more likely to own smartphones than households earning less than UGX 100,000 per month. For instance, households earning UGX 100,001–300,000 were 6.23 times more likely to own smartphones than those in the lowest income category, and this relationship remained statistically significant at the 5% level ($p = 0.030$). The findings suggest that affordability remains a critical prerequisite for smartphone ownership because higher-income households are better positioned to meet acquisition and maintenance costs associated with smartphone use. This finding is consistent with Chabossou et al., (2008) and Sekabira, (2017), who reported that household income significantly influences access to mobile technologies in developing countries. The results further support digital divide theories, which emphasize economic resources as a fundamental determinant of technology adoption.

Education Level: Education was also found to be a significant determinant of smartphone ownership. The chi-square analysis indicated a strong relationship between education level and smartphone ownership ($\chi^2 = 59.228$, $p < 0.001$). Similarly, the logistic regression results showed that respondents with secondary education and post-secondary education were significantly more likely to own smartphones than those without formal education. Specifically, respondents with post-secondary education were 8.44 times more likely to own smartphones, and the relationship was statistically significant at the 5% level ($p = 0.008$). This finding suggests that education enhances digital literacy, technological awareness, and the ability to recognize the benefits associated with smartphone use. The finding aligns with Landmann et al., (2021), who found that education improves individuals' capacity to adopt and effectively utilize digital technologies. It also supports the Technology Acceptance Model (TAM), which argues that knowledge and perceived usefulness influence technology adoption decisions.

Employment Status: Employment status significantly influenced smartphone ownership at both the bivariate ($\chi^2 = 8.021$, $p = 0.046$) and multivariate levels. Compared with students, respondents engaged in formal employment and self-employment were significantly more likely to own smartphones. Self-employed respondents were 4.35 times more likely to own smartphones than students, and this relationship remained significant at the 5% level ($p = 0.010$). This finding suggests that participation in income-generating activities not only increases purchasing power but also creates a practical need for smartphones in business transactions, communication, and access to market information. The findings are consistent with Nsabimana & Funjika, (2019), who observed that employment enhances technology adoption by increasing financial capacity and the demand for digital services.

5.2.2 Infrastructural Determinants of Smartphone Ownership

Power Access: Access to electricity emerged as an important determinant of smartphone ownership. The bivariate analysis showed a significant association between power access and smartphone ownership ($\chi^2 = 30.822$, $p < 0.001$), while the logistic regression model indicated that households using solar power were significantly more likely to own smartphones than households relying on charging centres. Households using solar power were 7.60 times more likely to own smartphones, and this relationship remained statistically significant at the 5% level ($p = 0.026$). This finding demonstrates that access to reliable energy infrastructure increases the practicality

and sustainability of smartphone use. The findings support Jaglin, (2019) who argues that reliable electricity is a prerequisite for meaningful participation in the digital economy and a critical driver of digital inclusion in rural communities.

Network Coverage: Network coverage was found to be one of the most influential infrastructural determinants of smartphone ownership. The bivariate analysis revealed a highly significant association between network quality and smartphone ownership ($\chi^2 = 59.235$, $p < 0.001$). The multivariate analysis further showed that respondents living in areas with strong network coverage were 5.38 times more likely to own smartphones than those living in areas with very weak network coverage, and this relationship was statistically significant at the 5% level ($p = 0.021$). These findings suggest that households are more likely to invest in smartphones when network infrastructure allows them to fully utilize internet-based services and digital applications. The results are consistent with Shah et al., (2017) and Raghunandan et al. (2025), who found that network quality significantly influences the perceived usefulness and adoption of smartphones.

5.2.3 Social and Demographic Determinants of Smartphone Ownership

Peer Influence: Peer influence emerged as one of the strongest predictors of smartphone ownership. The logistic regression results indicated that respondents whose friends owned smartphones were 7.28 times more likely to own smartphones than those whose peers did not own smartphones, and the relationship remained statistically significant at the 5% level ($p = 0.011$). The findings suggest that smartphone adoption is not solely driven by economic and infrastructural factors but is also influenced by social interactions and community learning processes. Individuals often learn about the benefits of technology through observing and interacting with peers who have already adopted it. This finding strongly supports Rogers' Diffusion of Innovation Theory and is consistent with Ma et al., (2018), who reported that peer networks significantly influence technology adoption decisions within rural communities.

Age and Gender: Although age was significantly associated with smartphone ownership at the bivariate level ($\chi^2 = 8.010$, $p = 0.046$), it lost significance in the multivariate analysis. This suggests that age does not independently influence smartphone ownership after accounting for differences in education, income, employment status, and infrastructure access. Similarly, gender was not significantly associated with smartphone ownership ($\chi^2 = 0.847$, $p = 0.357$). This finding suggests

that smartphone ownership in Aganga Parish is increasingly influenced by socioeconomic opportunities and infrastructure availability rather than gender differences. The findings are consistent with Chen et al. (2023), who found that demographic differences in technology adoption diminish once socioeconomic characteristics are controlled for.

5.3 Conclusion

The study concludes that smartphone ownership in Aganga Parish is primarily influenced by socioeconomic, infrastructural, and social factors. The most important determinants identified were income level, education level, employment status, power access, network coverage, and peer influence. The findings demonstrate that smartphone ownership is strongly associated with affordability, digital literacy, infrastructure availability, and social diffusion processes. While age and gender initially appeared important at the bivariate level, they did not independently influence smartphone ownership after controlling for other explanatory variables. Overall, the evidence suggests that the digital divide in Aganga Parish is largely structural and socioeconomic rather than demographic. Consequently, efforts aimed at improving digital inclusion should prioritize addressing income constraints, infrastructure deficits, and digital literacy gaps within rural communities.

5.4 Recommendations

Based on the findings, the study recommends that:

1. Government and development partners should strengthen household income-generating initiatives through agricultural commercialization, entrepreneurship development, and vocational skills training to improve smartphone affordability.
2. The Government of Uganda should expand rural electrification programs and promote affordable solar energy technologies to improve access to reliable charging facilities.
3. Telecommunication companies should strengthen network infrastructure in rural areas to improve service quality and enhance the utility of smartphones.
4. Local governments and development agencies should implement digital literacy programs targeting individuals with low educational attainment to improve awareness and effective utilization of digital technologies.

5. Community leaders and development partners should leverage peer networks and local technology champions to accelerate smartphone adoption through community-based digital awareness campaigns.

5.5 Areas for Further Research

1. Future studies should:
2. Investigate the impact of smartphone ownership on household welfare, income generation, and poverty reduction.
3. Examine longitudinal trends in smartphone adoption among rural households.
4. Explore the role of internet affordability and digital skills in influencing smartphone usage.
5. Conduct comparative studies across different rural districts of Uganda to establish broader patterns of digital inclusion.
6. Employ qualitative approaches to explore barriers and motivations underlying smartphone adoption decisions.

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Appendices

Appendix I: Questionnaire

DETERMINANTS OF SMARTPHONE OWNERSHIP AMONG HOUSEHOLDS OF AGANGA PARISH

SECTION 1: INTRODUCTION

1.1 Introduction

Good morning/afternoon. My name is **Oguta Robinson**, a Bachelor of Science in Quantitative Economics student at Makerere University. I am conducting this study in partial fulfillment of the requirements for my degree. The purpose of this research is to examine the factors influencing smartphone ownership among households in Aganga Parish. Your participation is voluntary. You may decline to answer any question or withdraw at any time. All information provided will be treated with strict confidentiality and used strictly for academic purposes. No personal identifiers will be recorded.

The interview will take approximately 10–15 minutes. There are no direct risks or financial benefits associated with participating.

1.2 Consent

Do you agree to participate in this interview?
1 = Yes
0 = No (End interview)

SECTION 2: IDENTIFICATION & INTERVIEW DETAILS

2.1 Date of Interview: _____

2.2 Village Name: _____

2.3 Interview Start Time: _____

2.4 GPS Location: _____

SECTION 3: SMARTPHONE OWNERSHIP
3.1 Do you personally own a smartphone?
1 = Yes

2 = No

3.2 Is this smartphone your main phone for daily use?

1 = Yes

2 = No

3 = N/A

SECTION 4: DEMOGRAPHIC CHARACTERISTICS

4.1 Age of respondent as of last birthday (years): _____

4.2 Gender

1 = Male

2 = Female

4.3 Highest level of education completed

1 = No formal education

2 = Primary

3 = Secondary

4 = Post-secondary

SECTION 5: SOCIO-ECONOMIC CHARACTERISTICS

5.1 Current employment status:

1 = Formal Employed

2 = Self-employed

3 = Unemployed

4 = Student

5.2 Average monthly household income (UGX)

1 = Below 100,000

2 = 100,001 – 300,000

3 = 300,001 – 600,000

4 = 600,001 – 1,000,000

5 = Above 1,000,000

5.3 Household size (number of members): _____

SECTION 6: INFRASTRUCTURE & ACCESS

6.1 Does your household have access to electricity?

1 = Yes

2 = No

6.1.1 If NO, how do you mainly charge phones?

1 = Solar

2 = Charging center

3 = Neighbor's house

5 = Other (specify) _____

6.2 How would you rate mobile network coverage in your area?

1 = Very weak
2 = Weak
3 = Moderate
4 = Strong
5 = Very Strong

SECTION 7: SOCIAL INFLUENCE

7.1 Do most of your close friends or household members own smartphones?

1 = Yes
2 = No
3 = Not sure

SECTION 9: CHECKPOINT QUESTIONS

9.1a If you DO NOT own a smartphone, what is the main reason?

1 = Too expensive
2 = Do not need one
3 = Do not know how to use
4 = Poor network coverage
5 = No electricity
6 = Security concerns (theft)
7 = Other (specify) _____

9.1b If you OWN a smartphone, what is the main reason?

1 = Communication
2 = Business/work
3 = Social media
4 = Education
7 = Other (specify) _____

SECTION 10: CONCLUSION

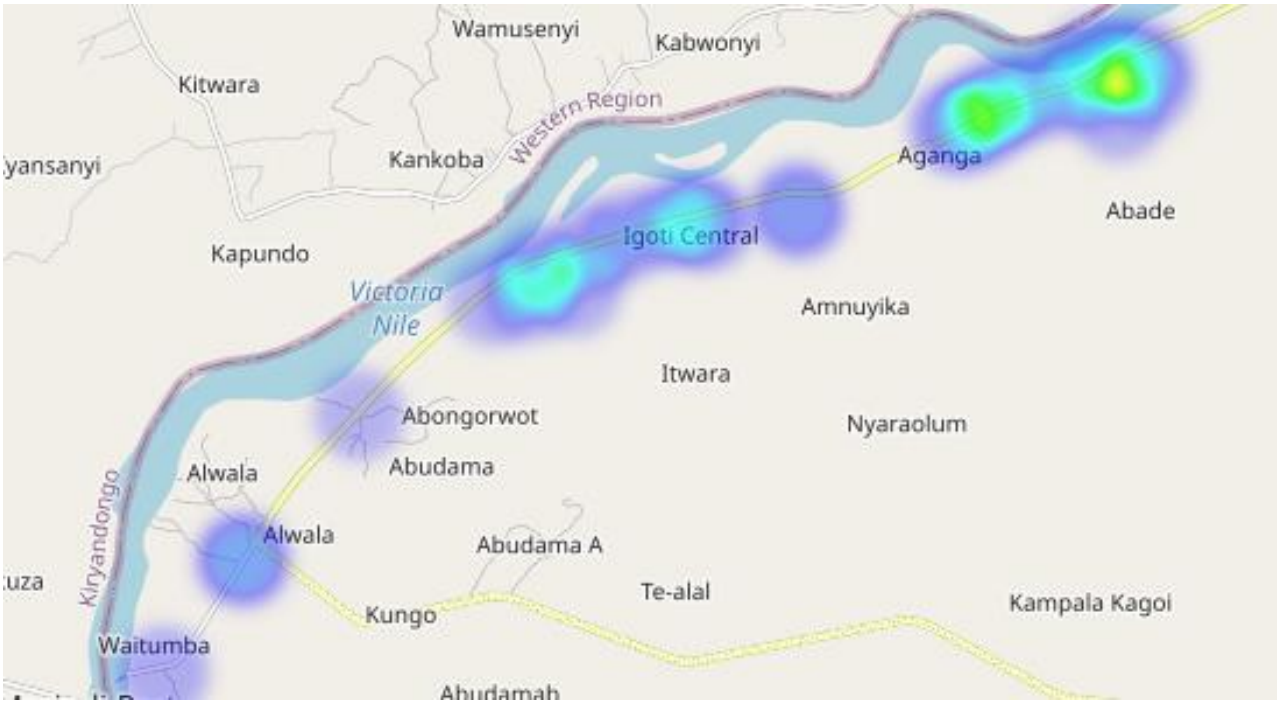
10.1 Thank you very much for taking the time to participate in this interview. Your responses are highly valuable and will contribute to academic research. We appreciate your cooperation and wish you a good day.

10.2 Interview End Time: _____

Appendix II: Sampling Frame

Village	Total Households	Sample Allocated
Abade	130	63
Aganga	145	70
Alwala	100	48
Igoti	135	65
Runguja	175	84
Waitumba	115	54
Total	800	384

Appendix III: Map of Aganga Parish



Appendix IV: Kobo Toolbox Questionnaire

https://ee.kobotoolbox.org/x/YRmY6IY9