



Effect of Access to Digital Devices on Socio-Economic Empowerment of Rural Women: Evidence from Kakamega County, Kenya

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Abstract

Socio-economic empowerment of women remains a central development concern, particularly for rural women whose ability to generate income, access markets, participate in financial systems and take part in household and community decision-making continues to lag behind that of their male counterparts and their urban peers. This study sought to analyze the effect of access to digital devices on the socio-economic empowerment of rural women in Kakamega County. The study was anchored on the Capability Approach Theory and supported by the Digital Divide Theory. Descriptive survey research design was used. The target population included 250 respondents from the rural women entrepreneurs, women farmers, community leaders and ICT extension officers in Kakamega County. Simple random sampling was used for rural women and purposive sampling for key informants, and a sample size of 154 respondents was determined using the Yamane formula. Descriptive statistics, correlation and regression analysis were used to analyze the data. Access to digital devices had a positive and significant correlation with socio-economic empowerment ($r=0.517$, $p<0.001$), and the regression results showed that access to digital devices ($\beta = 0.279$, $p = 0.001$) was a positive and statistically significant determinant of the socio-economic empowerment of rural women. The study concludes that access to digital devices has a positive and statistically significant impact on socio-economic empowerment of rural women in Kakamega County, and that even little improvements in device access can have a positive measurable impact on women's economic empowerment. The study recommends that the County government, in collaboration with mobile network operators, microfinance institutions and development partners, develop and put in place specific device financing/device subsidy programmes to boost the ownership of mobile phones and other digital devices amongst the rural women.

Keywords: Access to Digital Devices, Socio-Economic Empowerment, Rural Women, Gender Digital Divide, Kakamega County, Capability Approach Theory

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1.0 Introduction

Socio-economic empowerment of women remains a central development concern, particularly for rural women whose ability to generate income, access markets, participate in financial systems and take part in household and community decision-making continues to lag behind that of their male counterparts and their urban peers. Empowerment in this sense is not simply about the availability of resources, but about whether women are able to convert the resources and opportunities open to them into real improvements in their economic standing and social influence (Sen, 1999). This distinction between having access to resources and being able to use them meaningfully is central to understanding why interventions that expand access alone do not always translate into improved welfare outcomes for women.

In Kenya, rural women play a critical role in agriculture, small-scale trade and informal enterprise, yet they continue to experience constrained socio-economic empowerment relative to men, owing to limited access to productive resources, lower educational attainment, restricted market access and prevailing socio-cultural norms that limit their economic participation (Ndung'u & Signé, 2020). In Kakamega County specifically, rural women engaged in farming, small-scale trade and informal economic activities face persistent barriers to improving their income levels, financial inclusion and decision-making power, despite ongoing national efforts to expand economic opportunities for women.

One of the factors increasingly linked to women's socio-economic empowerment is the gender digital divide, the gap between men and women in access to, use of, and benefits derived from digital technologies (Huyer, 2020). Digital technologies have grown to play an important role in enabling income generation, market access, financial inclusion and information access; where women are excluded from these technologies, their prospects for economic advancement are correspondingly constrained.

Access to digital devices means having access to and ownership of technologies including tablets, computers and smartphones, which allow people to access digital platforms and services. It has been known as an indispensable factor in digital inclusion given that it is a prerequisite to be able to take part in digital communication, to access information and to be able to engage in economic activities. Hilbert (2021) argues that digital inequality starts with a digital device inequality, which influences digital economy participation results. Hargittai (2020) also states that important factors in meaningful digital engagement include personal ownership. Lacking digital devices, people are cut off from numerous contemporary socioeconomic opportunities. This places an emphasis on access to devices as a critical issue for digital inequality and socio economic empowerment.

The accessibility of digital devices has increased immensely because of the advancement of technology, however there are still disparities between income and gender groups on a global scale. Despite the high level of digitisation in advanced countries, disparities in device ownership persist and impact differential participation in digital environments (Hilbert, 2021). Women and low income groups are less likely to be in possession of personal digital devices, restricting their digital engagement, as mentioned by Hargittai (2020). Mobile phones are vital for economic participation particularly in developing countries, explains Donner (2020). Ownership is not uniform, however, and structural issues such as affordability and income inequality have an impact on ownership. The above trends around the world are consistent of the ongoing pattern of socio economic disparities in access to digital devices.

Economics and gender inequality is a key driver to access of digital devices at the regional level, especially in Sub Saharan Africa. According to Gillwald (2021), cost of the digital devices continue to be a significant challenge in rural areas. In rural areas, women may be using shared devices, which reduces privacy and even use of devices (Wyche, 2020). However, Porter (2022) points out that there is still a gender gap in smartphone ownership because of income level and cultural norms. Additionally, Burrell (2021) explains how shared access has a negative effect on the quality and effectiveness of digital engagement. The conditions demonstrate a very uneven gender and socio economic distribution of access to digital devices in the region.

The uptake of digital devices has grown in Kenya with high mobile penetration, however there are still huge gaps particularly with women, especially in rural areas. The lack of ownership of a smartphone by women relative to men undermines their ability to access digital services (Ndung'u, 2020). In rural areas, women might have to rely on communal household appliances, thereby limiting their autonomy in using technology (Mothobi, 2021). Kariuki (2022) notes that a lack of device ownership is a constraint on access to mobile financial services and online economic opportunities. In addition, Mutua (2023) highlights the close relationship between income generating and economic participation and ownership of digital devices. The results indicate continued disparities in access to digital devices in Kenya.

Socio economic empowerment means that people are able to advance themselves economically and contribute to social and economic activities. It entails availability of resources, opportunities and power of decision making. If the people have the power to make decisions and put them into action, then the empowerment is realized, as Sen (2019) states. Similarly, Kabeer (2020) emphasizes an empowerment concept of individuals' access to resources and their agency. Mobile technology also makes the market more efficient, expands income possibilities and creates opportunities to engage in economic processes, as stated by Aker and Mbiti (2020), and Donner (2019) believe that digital platforms can be utilised for these purposes. Likewise, Ogutu et al. (2019) conducted a study in which they found that digital financial services can lead to an increase in household wealth and economic stability.

Rural women are a large population group in Kenya and are a key group in agriculture, small scale trade and informal sector which supports household livelihoods. Despite this contribution, rural women still have limited access to productive resources, financial services and economic opportunities compared to their urban counterparts and men in the same communities (Kirui et al., 2020; Ogutu et al., 2019). Mobile money has shown significant gains in Kenya, but as noted by Ndung'u and Signé (2020), rural women are less likely to own digital devices than men and urban women. Within this national picture, Kakamega County reflects many of the same patterns. The county's economy is largely agrarian, with women forming the backbone of small-scale farming and trade, yet digital inclusion among these women remains limited by device ownership.

To the context of this study, digital device access is a major factor that contributes to socioeconomic empowerment of rural women in Kakamega County. Women's access to using digital platforms is constrained because of their limited access to smartphones and other digital tools. This impacts on their access to online markets, mobile banking and information based services. More sharing of devices reduces privacy, frequency of use, and digital autonomy. Access to personal digital devices is thus critical for improving digital inclusion. This study therefore deals with the impact of access to digital devices on socio economic empowerment of women in rural areas.

1.1 Statement of the Problem

Women remain less included in the digital field than men, especially in rural areas of developing countries, although the integration of digital technologies is increasing in all parts of the world. Digital tools have opened up new avenues of communication, financial access, education, entrepreneurship and participation in economic activities, but not all population groups benefit equally. The Global System for Mobile Communications Association (GSMA, 2023) estimates that globally women are about 19% less likely than men to own a mobile phone and 16% less likely to use mobile internet services. These gaps hinder women's access to and engagement in the developing digital economies and reduce the potential gains of digital transformation.

This is particularly noticeable in Sub-Saharan Africa, where the gap in technologies owned is still significant. Patterns of exclusion persist due to unequal access to digital devices and affordability issues noted by Hilbert (2021). Likewise, Ndung'u and Signé (2020) report that while Kenya has experienced remarkable strides in digital innovation and connectivity, many women in rural areas continue to be unable to access the digital world and be active in it. The lack of devices also remains a challenge for women in rural communities as reported by studies by Onyango and Ondiek (2021) and Mwangi and Ngugi (2022). The personal ownership of digital devices is quite low for many women, so that they cannot engage with the digital platforms and services independently. As a result, many rural women do not fully reap the benefits of digital technology opportunities.

In Kakamega County, women have a significant role in both agribusiness and small-scale trade activities and other informal sectors that support the livelihoods of their households. But their use of digital technologies is not widely effective. Digital tools have been found to enhance productivity, aid access to financial services, and create market opportunities, among other benefits, in existing studies (Kirui et al., 2020; Ogutu et al., 2019). However, women still have to deal with issues of device ownership. Also, the World Bank (2021) mentions that women in rural Kenya are less likely than men to access digital financial services, thus limiting their capacity to take advantage of technology for economic growth and financial autonomy.

A number of studies have examined the role of digital devices in economic participation. Aker and Mbiti (2020) studied the link between mobile phone availability and economic outcomes in Sub-Saharan Africa, but the study is too general to capture the diversity of women's experience. Suri and Jack (2022) studied the impact of mobile money in Kenya, but the contribution for women wasn't clearly separated from other members of the household. Fanta and Makina (2020) focused primarily on financial inclusion, while the qualitative study by Wyche and Olson (2018) has limited evidence for any measurable socio-economic outcomes associated with device access.

In recent years digital inclusion has received much attention, but the literature has been largely focused on country or regional levels. Sambuli (2021) notes that the relationship between digital exclusion, gender and rurality is still under researched in Kenya. Likewise, Gitau and Wangari (2021) suggest that the lack of contextual evidence undermines the ability to create effective and targeted interventions. Most current studies are directed at the household or at national and regional level data which are too general to adequately reflect the realities in the community. Therefore, this study sought to analyze the effect of access to digital devices on the socio-economic empowerment of rural women in Kakamega County.

1.2 Research Objective

To analyze the effect of access to digital devices on the socio-economic empowerment of rural women in Kakamega County.

1.3 Research Hypothesis

H₀: Access to digital devices has no significant effect on the socio-economic empowerment of rural women in Kakamega County.

1.4 Scope of the Study

The study was carried out among the rural women working in rural communities of Kakamega, Kenya in agriculture, small scale trade and informal economic activities. The location of Kakamega County was chosen as it is a predominantly rural area where gender and digital inequalities were likely to be reflected. The research was limited to access to digital devices, measured by ownership of mobile phones, access to smartphones and availability of computers, while socio economic empowerment was measured by income generation, financial inclusion, access to markets and access to information. The target population was 250 respondents in Kakamega County comprising rural women entrepreneurs, women farmers, community leaders and ICT extension officers. The study was conducted from March 2026 till August 2026 and the data was collected, analysed and reported in the period of the study.

2.1 Theoretical Framework

The study was anchored on the Capability Approach Theory and supported by the Digital Divide Theory. The Capability Approach Theory was formulated by Amartya Sen (1999) and elaborated by Martha Nussbaum (2000s–2021). The theory is centered not only on what people have, but what they can do and be. Development is evaluated by people's capabilities, which is their lived freedom to attain desired results, according to Sen (1999). Similarly, Nussbaum (2021) stresses that capabilities are dependent on the enabling conditions, including the conditions of education, health, and social arrangements. The theory thus moves away from availability of resources and towards opportunities and functioning. It has been broadly adopted in development studies as a framework to analyse human wellbeing and empowerment. While the theory is very explanatory, it has been criticized for being too general and hard to operationalize empirically, and Robeyns (2017) emphasizes that there is no consensus on the list of capabilities in the theory, which is complex to measure in the empirical study.

The Capability Approach Theory is relevant for this study as it directly links the access to digital technology to the socio-economic empowerment of rural women. Sen (1999) points out that these resources are only useful if they increase the actual freedoms and opportunities, like access to digital devices. In addition, this is supported by Nussbaum (2021) who stated that empowerment is rooted in the capacity to transform resources into meaningful life outcomes. The theory thus validates the analysis of the influence of digital devices on empowerment outcomes. It is the best fit anchor theory as it covers access and actual transformation into socio-economic benefits.

The concept of Digital Divide Theory was first introduced by Pippa Norris (2001) and further developed by scholars like Jan van Dijk (2020). The theory elucidates differentials in access to, use of, and benefits of digital technologies between various groups. Van Dijk (2020) suggests that there are types of digital divide: motivational access, material access, skills access, and usage outcomes. The theory offers a way of understanding how the uneven access to digital resources

will lead into unequal participation in the digital economy. The relevance of Digital Divide Theory is that it offers an explanation for the relationship between access to digital devices and socio-economic outcomes, and van Dijk (2020) points out that unequal access to digital resources contributes to unequal opportunities in education, income generation, and communication. The theory directly contributes to the analysis of access to digital devices of rural women in Kakamega County.

2.2 Conceptual Framework

This conceptual framework, summarized in Figure 1, explicates the connection between the independent variable, access to digital devices, and the dependent variable, socio-economic empowerment of rural women in Kakamega County.

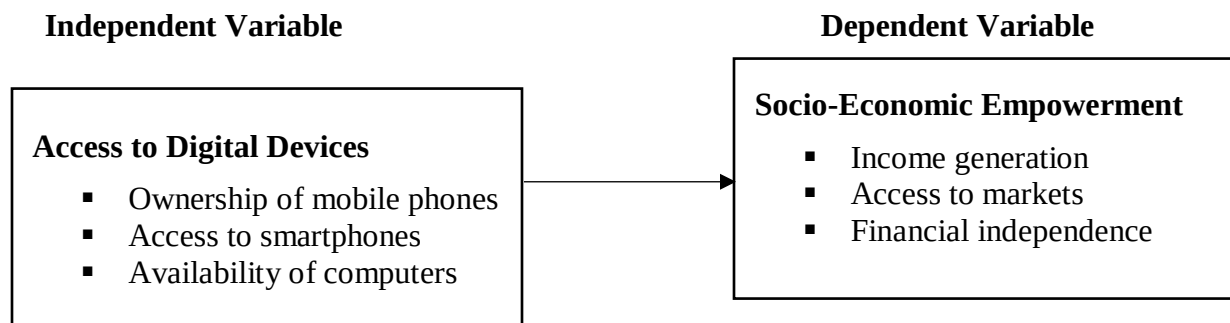


Figure 1: Conceptual Framework

2.3 Empirical Literature Review

The role of availability and ownership of digital devices in driving economic participation and empowerment has grown in recognition. A number of studies have established that the use of technologies like mobile phones and smartphones increase the capacity of individuals to have access to information, communicate, access financial services and access to markets. But the divide in device ownership persists and is impacting how different groups are able to be transformed by technology.

Aker and Mbiti (2020) studied the link between mobile phone availability and economic outcomes, based on household survey data obtained from a few countries in Sub-Saharan Africa. The researchers used econometric analysis to determine that using the mobile phone helped to increase the market efficiency, reduce information gaps and decrease the transaction costs. It was also revealed that mobile technology facilitated economic activity of households and their ability to enhance their income generating potential. The study is valuable in terms of its evidence of the benefits of digital devices in the economy but is too general to capture the diversity of women's experience. Thus, gender-specific aspects of digital access are still underresearched.

Hilbert (2021) conducted a cross-national analysis of digital inequality by analyzing the technology access of different population groups across countries using international ICT datasets. Overall, women and those living in low-income areas were found to be significantly less likely to have personal digital devices. These differences were found to have an impact on involvement in digital services and economic transactions. The study provides little insight into how the dynamics within the household affect access to technology, especially in rural areas where power of resources could be unequal.

The qualitative study by Wyche and Olson (2018) investigated the use of mobile phones among women in rural Kenya. The study involved ethnographic observation and semistructured interviews, and revealed that many women used equipment that was owned and/or controlled by other household members, especially men. These arrangements had an impact on privacy, and on the ability to make decisions independently; these also reduced any consistent engagement with digital services. The study is rich in contextual information but its qualitative approach results in findings that are not as easily generalizable as those in a quantitative study, and the study has limited evidence for any measurable socio-economic outcomes associated with device access.

Suri and Jack (2022) studied the impact of mobile money in Kenya using longitudinal household data. They showed that access to mobile phones and digital financial services led to better returns on household livelihoods, higher financial resilience and lower poverty. But the study focused on the outcome for the household and the contribution for women wasn't clearly separated from other members of the household. It raises a number of issues as to the role that women's independent use of digital devices plays in empowerment.

Fanta and Makina (2020) studied the association between mobile phone and financial inclusion in multiple Sub Saharan African countries. Their findings showed that women with personal mobile devices had higher odds of access to formal saving services, digital credit and mobile banking services. The findings of the study showed a positive relationship between device ownership and financial participation. However, financial inclusion was the primary aspect of the analysis and a comprehensive examination of all aspects of socio-economic empowerment (including decision-making, market participation, and livelihood enhancement) was not conducted.

Lokeswari et al. (2020) used a quantitative analysis to examine access to digital tools and women's economic participation in India, and found that digital devices enhance access to information, markets and entrepreneurship. The study did not sufficiently consider rural contextual constraints and issues of device control within households. The present study addresses this gap by examining access to digital devices among rural women in Kakamega County. Riley (2021) used a case study approach to examine smartphones and women's entrepreneurship in Sub-Saharan Africa, and found that smartphones increase business expansion and income. The study did not address rural infrastructure and affordability constraints. The present study addresses this gap by examining device access in relation to the empowerment of rural women in Kakamega County.

Hjort and Poulsen (2021) applied econometric analysis to study digital connectivity and labour markets in 12 African countries, and found that digital access improves employment opportunities. The study had limited gender and rural focus. The present study addresses this gap by examining digital connectivity and the empowerment of rural women in Kakamega County. The studies reviewed have found that digital devices can promote economic participation, financial inclusion and information access. But there are considerable gaps in understanding the experiences of rural women, including at sub-national levels. Most current studies are directed at the household or at national and regional level data which are too general to adequately reflect the realities in the community. Moreover, scant research has focused on the relationship between device ownership and the effects on several aspects of socio-economic empowerment all in one. The purpose of this study is to fill in the identified gaps by studying the effect of access to digital devices on socio-economic empowerment of rural women in Kakamega County, Kenya.

3.0 Research Methodology

The study adopted a descriptive survey research design. This design was considered appropriate because it enabled the researcher to systematically describe the existing state of access to digital devices among rural women in Kakamega County without manipulating any of the variables under investigation. Kothari (2004) noted that a descriptive survey design is suitable for studies concerned with describing the characteristics of a particular group or the frequency with which a phenomenon occurs, which aligned with the objective of establishing the current status of digital inclusion and its relationship with the socio-economic empowerment of rural women. The design further permitted the collection of standardized data from a relatively large and geographically dispersed population through structured questionnaires, making it a practical choice given the target population of 250 respondents distributed across rural Kakamega County.

The target population comprised 250 respondents from Kakamega County, consisting of rural women engaged in small-scale economic activities including farming, trade, and informal enterprises, together with community leaders and ICT extension officers who possessed relevant knowledge of digital inclusion issues within the study area. Rural women entrepreneurs constituted the largest segment of the target population at 180 respondents (72%) because they represented the primary unit of analysis in the study, followed by women farmers (40), community leaders (20) and ICT extension officers (10). Women farmers, community leaders, and ICT extension officers were included in smaller proportions to provide contextual and corroborative perspectives without shifting the study's primary focus from entrepreneurial women.

The study employed both simple random sampling and purposive sampling techniques. Simple random sampling was used to select rural women respondents to ensure that every eligible respondent had an equal opportunity of participating in the study, thereby minimizing sampling bias. Specifically, the lottery (balloting) method without replacement was used: a sampling frame listing all eligible rural women in the study area was compiled with the help of community leaders and ward administrators, each woman was assigned a unique number written on a slip of paper, the slips were placed in a container and thoroughly mixed, and slips were drawn one at a time without replacement until the required sample was reached. Purposive sampling was used to select community leaders and ICT extension officers because they possessed specialized knowledge and experience regarding digital inclusion and socio-economic empowerment within Kakamega County. The sample size was determined using Yamane formula (1967) as follows:

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

Where:

n = sample size

N = population size (250)

e = margin of error (0.05)

$$n = 250 / (1 + 250(0.05^2))$$

$$= 250 / (1 + 0.625)$$

$$= 154 \text{ respondents}$$

The sample of 154 respondents was distributed as 105 rural women entrepreneurs (68%), 25 women farmers (16%), 15 community leaders (10%) and 9 ICT extension officers (6%). The study

used structured questionnaires and an interview guide. Kothari (2004) pointed out that when dealing with a huge number of respondents a questionnaire is among the best tools to use, which was the case in this study. A Likert scale of 5 points was used, with a list of response items that were strongly agree, agree, undecided, disagree and strongly disagree (5=Strongly Agree, 4=Agree, 3=Undecided, 2=Disagree and 1=Strongly Disagree). Access to digital devices was measured using five statements on ownership of a mobile phone or smartphone, regular access to a digital device, and the contribution of digital devices to information access and income generating activities, while socio-economic empowerment was measured using five statements on income level, access to financial services, decision-making power, participation in economic activities and overall well-being.

The pilot study was conducted using 10 percent of the sample size, as recommended by Mugenda and Mugenda (2019), who argue that a pilot sample of between 10% and 30% is adequate for testing research instruments in social science studies. Approximately 15 respondents were used for the pilot test and were not included in the final sample to avoid bias and contamination of results. Content and face validity were assessed by the research study supervisors, who confirmed that the questions reflected the research study objectives. Reliability of the research questionnaire was carried out by the Cronbach alpha coefficient, and a coefficient of 0.7 was taken as a good cut-off in social research to measure internal consistency (Orodho, 2013). Access to digital devices (5 items) recorded a Cronbach's alpha of 0.864, while socio-economic empowerment (5 items) recorded 0.858, indicating that the items measuring each variable were internally consistent and that the instrument was reliable for the main data collection.

The researcher secured an introductory letter from the University and a research permit from the National Commission for Science, Technology and Innovation (NACOSTI), and sought permission from the Kakamega County administration and the corresponding sub county offices. With the assistance of local administrators such as chiefs and village elders, the sampled rural women entrepreneurs and women farmers were reached at their business premises, market centres, and farms, while interview schedules were used to collect data from community leaders and ICT extension officers. All respondents were assured of the confidentiality of their information and told that they were free to participate. Informed consent, voluntary participation, confidentiality, privacy and anonymity were strictly observed throughout the study.

The data was checked and edited to attain completeness, clarity, uniformity, legibility, suitability and relevance, and was then coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics (frequencies, percentages, means and standard deviations) and inferential statistics (Pearson correlation and regression analysis) were used to analyse the data. Presentation of the analysed data was through tables. The regression model that was used is presented below:

$$Y = \beta_0 + \beta X + \epsilon$$

Where:

Y = Socio-economic empowerment

β_0 = Constant

β = Regression coefficient of access to digital devices

X = Access to digital devices

ε = Error term

4.0 Findings and Discussion

The study sample size was 154 respondents, comprising rural women entrepreneurs, women farmers, community leaders and ICT extension officers in Kakamega County. Out of the 154 questionnaires and interview schedules issued, 150 were correctly filled and returned, giving a response rate of 97.4%. Sataloff and Vontela (2021) established that a response rate of 70% and above is acceptable in survey-based research, and that rates approaching or exceeding 90% substantially reduce the risk of nonresponse bias. The demographic results revealed that rural women entrepreneurs formed the largest proportion of respondents at 70.0%, followed by women farmers at 16.7%, community leaders at 10.0% and ICT extension officers at 3.3%. The majority of respondents (62.6%) were within the 26–45 age bracket, which is the economically active age group most engaged in entrepreneurial and income-generating activities. More than half of the respondents, 52.0%, were married. In terms of education, the majority of respondents (73.3%) had attained secondary education or below, while farming (40.0%) and business (39.3%) jointly accounted for the livelihood of nearly four out of every five respondents (79.3%), confirming that Kakamega County's rural economy is predominantly agrarian and trade-based.

4.1 Descriptive Analysis

This section presents the descriptive statistics on the objective of the study, which sought to analyze the effect of access to digital devices on the socio-economic empowerment of rural women in Kakamega County. Respondents were asked to rate five statements on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The results are shown in Table 1.

Table 1: Descriptive Statistics on Access to Digital Devices

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev.
I own a mobile phone or smartphone	8.0%	14.7%	41.3%	20.7%	15.3%	3.21	1.12
I have regular access to a digital device (phone, computer, tablet)	6.7%	22.0%	36.0%	24.7%	10.7%	3.11	1.08
Access to digital devices has improved my ability to access information	6.7%	23.3%	38.0%	27.3%	4.7%	3.00	0.98
Digital devices help me participate in income generating activities	6.0%	19.3%	42.7%	21.3%	10.7%	3.11	1.03
Lack of digital devices limits my economic opportunities	10.0%	25.3%	31.3%	24.7%	8.7%	2.97	1.12
Composite Mean						3.08	0.78

The findings presented in Table 1 illustrate rural women's perceptions of access to digital devices in Kakamega County. On the statement that they own a mobile phone or smartphone, 8.0% strongly disagreed, 14.7% disagreed, 41.3% were neutral, 20.7% agreed and 15.3% strongly agreed (M=3.21, SD=1.12), which is interpreted as Neutral. Only 36.0 per cent of respondents

agreed or strongly agreed that they own a mobile phone or a smartphone, and 41.3 per cent were neutral on this statement, suggesting that there is a significant portion of the sample whose device ownership is incomplete or inconsistent. On the statement that they have regular access to a digital device, 6.7% strongly disagreed, 22.0% disagreed, 36.0% were neutral, 24.7% agreed and 10.7% strongly agreed ($M=3.11$, $SD=1.08$), which is interpreted as Neutral.

On the statement that access to digital devices has improved their ability to access information, 6.7% strongly disagreed, 23.3% disagreed, 38.0% were neutral, 27.3% agreed and 4.7% strongly agreed ($M=3.00$, $SD=0.98$), which is interpreted as Neutral. On the statement that digital devices help them participate in income generating activities, 6.0% strongly disagreed, 19.3% disagreed, 42.7% were neutral, 21.3% agreed and 10.7% strongly agreed ($M=3.11$, $SD=1.03$), which is interpreted as Neutral. On the statement that lack of digital devices limits their economic opportunities, 10.0% strongly disagreed, 25.3% disagreed, 31.3% were neutral, 24.7% agreed and 8.7% strongly agreed ($M=2.97$, $SD=1.12$), which is interpreted as Neutral.

The composite mean for access to digital devices was 3.08 ($SD=0.78$), interpreted as Neutral. This implies that rural women in Kakamega County have neither adequate nor markedly inadequate access to digital devices, with ownership and use concentrated around a moderate, undecided position rather than a clear position of access or exclusion. The relatively wide spread of responses across the disagree, neutral and agree categories on device ownership also indicates that access to digital devices remains uneven among the respondents. This finding is consistent with Ferguson, Seymour and Azzarri (2023), who found that although mobile phone ownership has expanded among rural women in Kenya, a persistent gender gap in device access continues to limit women's full participation in the digital economy relative to men in the same rural settings.

The dependent variable of the study was socio-economic empowerment of rural women in Kakamega County. Respondents were asked to rate five statements on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The results are shown in Table 2.

Table 2: Descriptive Statistics on Socio-Economic Empowerment

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev.
Digital technologies have improved my income level	7.3%	24.0%	31.3%	27.3%	10.0%	3.09	1.10
I am able to access financial services through digital platforms	12.7%	18.7%	35.3%	24.7%	8.7%	2.98	1.14
Digital access has improved my decision-making power	8.7%	24.0%	37.3%	18.7%	11.3%	3.00	1.11
I participate more in economic activities due to digital technologies	6.0%	22.0%	36.7%	19.3%	16.0%	3.17	1.13
Digital inclusion has improved my overall well-being	10.7%	20.7%	36.0%	22.0%	10.7%	3.01	1.14
Composite Mean						3.05	0.89

The results in Table 2 reflect respondents' perceptions of socio-economic empowerment. On the statement that digital technologies have improved their income level, 7.3% strongly disagreed, 24.0% disagreed, 31.3% were neutral, 27.3% agreed and 10.0% strongly agreed (M=3.09, SD=1.10), which is interpreted as Neutral. On the statement that they are able to access financial services through digital platforms, 12.7% strongly disagreed, 18.7% disagreed, 35.3% were neutral, 24.7% agreed and 8.7% strongly agreed (M=2.98, SD=1.14), which is interpreted as Neutral. On the statement that digital access has improved their decision making power, 8.7% strongly disagreed, 24.0% disagreed, 37.3% were neutral, 18.7% agreed and 11.3% strongly agreed (M=3.00, SD=1.11), which is interpreted as Neutral.

On the statement that they participate more in economic activities due to digital technologies, 6.0% strongly disagreed, 22.0% disagreed, 36.7% were neutral, 19.3% agreed and 16.0% strongly agreed (M=3.17, SD=1.13), which is interpreted as Neutral. On the statement that digital inclusion has improved their overall well-being, 10.7% strongly disagreed, 20.7% disagreed, 36.0% were neutral, 22.0% agreed and 10.7% strongly agreed (M=3.01, SD=1.14), which is interpreted as Neutral.

The composite mean for socio-economic empowerment was 3.05 (SD=0.89), interpreted as Neutral. This implies that rural women in Kakamega County are undecided on whether digital technologies have translated into measurable improvements in their income, financial access, decision-making power, economic participation and overall well-being. Participation in economic activities recorded the highest mean among the five items (M=3.17), while access to financial services through digital platforms recorded the lowest (M=2.98), suggesting that respondents perceive a stronger link between digital technology and general economic participation than between digital technology and formal digital financial access. This finding is consistent with the UNECA African Women's Report (2022), which established that although digital finance holds substantial potential to advance women's economic empowerment in Africa, this potential remains only partially realized due to persistent gaps in access to formal financial products among women.

4.2 Correlation Analysis

Pearson correlation analysis was conducted to assess the strength and direction of the linear relationship between access to digital devices and the socio-economic empowerment of rural women in Kakamega County. The results of the analysis are summarized in Table 3.

Table 3: Correlation Analysis Results

		Socio-Economic Empowerment	Access to Digital Devices
Socio-Economic Empowerment	Pearson Correlation	1.000	
	Sig. (2-tailed)		
	N	150	
Access to Digital Devices	Pearson Correlation	0.517**	1.000
	Sig. (2-tailed)	0.000	
	N	150	150

** Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 3, access to digital devices had a positive and significant correlation with socio-economic empowerment ($r=0.517$, $p<0.001$). This implies that access to digital devices moves together with improved socio-economic empowerment of rural women in Kakamega County. These results are consistent with the work of Aker and Mbiti (2020), who determined that using the mobile phone helped to increase the market efficiency, reduce information gaps and decrease the transaction costs, and that mobile technology facilitated economic activity of households and their ability to enhance their income generating potential. Similarly, Fanta and Makina (2020) found that women with personal mobile devices had higher odds of access to formal saving services, digital credit and mobile banking services, showing a positive relationship between device ownership and financial participation.

4.3 Regression Analysis

In addition to the correlation analysis, the study conducted regression analysis to establish the effect of access to digital devices on the socio-economic empowerment of rural women in Kakamega County. Table 4 presents the regression coefficients.

Table 4: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.007	0.380		5.285	0.000
	Access to Digital Devices	0.279	0.083	0.247	3.380	0.001

a. Dependent Variable: Socio-Economic Empowerment

The regression results in Table 4 show that access to digital devices had a positive and statistically significant effect on socio-economic empowerment ($B=0.279$, $Beta=0.247$, $t=3.380$, $p=0.001$). This implies that a unit increase in access to digital devices leads to a 0.279 unit increase in socio-economic empowerment, holding other factors constant. The effect is statistically significant at $p = 0.001$, which is below the 0.05 threshold. The results indicate that, beyond being descriptively related to empowerment outcomes, having access to digital devices has an independent measurable effect on these outcomes. As such, the null hypothesis (H_0) was rejected.

The finding broadly aligns with Ferguson, Seymour and Azzarri (2023), which identified that mobile phone ownership among rural women in Kenya has grown, but women are not engaging as much with digital and economic life as men in the same rural context, especially as the extent of engagement is limited by a persistent gender gap in access. The results also agree with Suri and Jack (2022), who showed that access to mobile phones and digital financial services led to better returns on household livelihoods, higher financial resilience and lower poverty in Kenya.

5.0 Conclusion

The study findings indicate that access to the digital devices has a positive and statistically significant impact on socio-economic empowerment of rural women in Kakamega County. The overall positioning of the respondents on the device ownership and access construct was neutral, but the significant effect of this relationship shows that even little improvements in device access can have a positive measurable impact on women's economic empowerment. The study also finds

that access in Kakamega County is currently focused on the use of basic mobile phones and not a wider digital device environment, suggesting that access is not likely to provide a scope of engagement and empowerment to rural women that is as deep as a wider one.

6.0 Recommendations

The study affirms the relevance of the Capability Approach Theory in understanding the effect of access to digital devices on the socio-economic empowerment of rural women. Consistent with Sen (1999), digital devices are only useful if they increase the actual freedoms and opportunities of rural women, and the findings validate that access to digital devices is a resource that rural women in Kakamega County can transform into meaningful socio-economic outcomes. The findings also support the Digital Divide Theory in that unequal access to digital resources contributes to unequal opportunities in income generation and communication.

The study calls for the County government to, in collaboration with mobile network operators, microfinance institutions and development partners, develop and put in place specific device financing/device subsidy programmes to boost the ownership of mobile phones and other digital devices amongst the rural women. As it was identified that access was focused around basic mobile phones and not a greater spectrum of devices, schemes could specifically focus on increased access to smartphones, and where possible, community-level access points to computers and tablets, particularly for the women farmers and women entrepreneurs, who were the largest groups of respondents in this study, living in the rural regions.

REFERENCES

- Aker, J. C., & Mbiti, I. M. (2017). Mobile phones and economic development in Africa. *Journal of Economic Perspectives*, 24(3), 207–232.
- Donner, J. (2019). *After access: Inclusion, development, and a more mobile Internet*. MIT Press.
- Fanta, A. B., & Makina, D. (2020). The relationship between technology and financial inclusion. *African Journal of Economic Review*, 8(1), 1–20.
- Ferguson, N., Seymour, G., & Azzarri, C. (2023). *Examining the gender digital divide: A case study from rural Kenya* (GCAN Policy Note 17). International Food Policy Research Institute (IFPRI).
- Gillwald, A., Mothobi, O., & Rademan, B. (2019). The state of ICT in South Africa. *Research ICT Africa Report*, 1–45.
- Gitau, S., & Wangari, P. (2021). Digital inclusion in Kenya. *Journal of African Development Studies*, 11(2), 67–82.
- GSMA. (2023). *The mobile gender gap report 2023*. GSM Association.
- Hargittai, E. (2020). Digital inequality and education. *Sociology Compass*, 14(3), 1–10.
- Hilbert, M. (2021). Digital inequality and development. *World Development*, 140, 105–120.

- Hjort, J., & Poulsen, J. (2021). The arrival of fast Internet and employment. *American Economic Review*, 109(3), 1032–1079.
- Huyer, S. (2020). Gender equality in digital access. *Information Technologies and International Development*, 16(1), 1–16.
- Kabeer, N. (2020). Women empowerment revisited. *Feminist Economics*, 26(4), 1–25.
- Kirui, O., Okello, J., & Nyikal, R. (2020). Impact of ICT on agriculture. *Agricultural Economics*, 51(3), 1–12.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Age International.
- Lokeswari, K., Devi, R., & Priya, S. (2020). Digital empowerment among women. *Journal of Rural Development*, 39(2), 1–14.
- Mothobi, O., & Gillwald, A. (2020). Digital inequality in Africa. *Research ICT Africa Report*, 1–30.
- Mugenda, O. M., & Mugenda, A. G. (2019). *Research methods: Quantitative and qualitative approaches*. ACTS Press.
- Ndung'u, N., & Signé, L. (2020). Digital transformation in Kenya. *Brookings Institution Report*.
- Norris, P. (2001). Digital divide. *Cambridge University Press*.
- Nussbaum, M. (2021). Capabilities and human development. *Cambridge University Press*.
- Ogutu, S., Okello, J., & Otieno, D. (2019). Digital finance and welfare. *World Development*, 117, 1–14.
- Onyango, J., & Ondiek, B. (2021). Gender disparities in digital access. *Kenyan Journal of ICT*, 6(1), 22–35.
- Orodho, J. A. (2013). *Techniques of writing research proposals and reports in education and social sciences*. Kanezja HP Enterprises.
- Riley, E. (2021). Digital platforms and women entrepreneurs. *World Development*, 141, 1–12.
- Robeyns, I. (2017). Wellbeing, freedom and social justice. *Open Book Publishers*.
- Sambuli, N. (2021). Gender and digital inclusion. *African Policy Review*, 10(2), 1–10.
- Sataloff, R. T., & Vontela, S. (2021). Response rates in survey research. *Journal of Voice*, 35(5), 683–684. <https://doi.org/10.1016/j.jvoice.2020.12.043>
- Sen, A. (1999). Development as freedom. *Oxford University Press*.
- Sen, A. (2019). The idea of justice. *Harvard University Press*.
- Suri, T., & Jack, W. (2020). Mobile money and poverty reduction. *Science*, 354(6317), 1288–1292.
- Van Dijk, J. (2020). The digital divide. *Polity Press*.
- Wyche, S., & Olson, J. (2018). Gender and mobile phone use. *Information Technology for Development*, 24(2), 1–18.

- Wyche, S., & Olson, J. (2020). Socio cultural influences on ICT use. *Information Society*, 36(3), 1–12.
- Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.