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**TOPIC: DIGITAL ADOPTION AND HOUSEHOLD RESILIENCE IN  
GHANA: THE ROLE OF HOUSEHOLD HEAD GENDER AND MARITAL  
STATUS**

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## **Abstract**

This study examines the relationship between digital adoption and household resilience in Ghana, with particular attention to differences by household head gender and marital status. Using data from the FinScope Ghana 2022 Survey (FinMark Trust), the study investigates how internet awareness, internet use, digital device ownership or access, and selected digital financial usage influence household coping strategies and resilience. Ordinary Least Squares regression, interaction models, joint significance tests, and marginal effects estimation were employed. The findings reveal that digital adoption is positively and significantly associated with household resilience (coefficient = 0.050,  $p = 0.018$ ), although the explanatory contribution is modest. The relationship does not differ significantly by household head gender ( $F = 0.80$ ,  $p = 0.448$ ) nor across marital status categories ( $F = 0.90$ ,  $p = 0.466$ ). The study contributes to development literature by providing empirical evidence on the relationship between digital adoption and household resilience in Ghana, offers practical guidance for policymakers and financial service providers on designing inclusive digital interventions, informs policy for addressing gender and marital-status disparities, and extends the Sustainable Livelihoods Framework to digital adoption contexts.

**Keywords:** Household resilience; Digital adoption; Financial inclusion; Gender disparities; Marital status; Ghana

## **1. Introduction**

The rapid advancement of digital technologies has fundamentally transformed economic systems, financial markets, and social interactions across the world. Over the past two decades, digital innovations such as mobile phones, internet connectivity, mobile money platforms, and digital financial services have expanded access to information, financial resources, and economic opportunities (van Zanden, 2023). Globally, digital adoption has been recognised as a critical driver of financial inclusion, poverty reduction, and inclusive development. International development institutions increasingly view digital financial services as instruments for enhancing economic resilience, particularly among vulnerable households facing income volatility, health shocks, and climate-related disruptions. The proliferation of mobile money services in Asia, Latin America, and parts of Africa has demonstrated the potential of digital technologies to reduce transaction costs, facilitate remittance flows, promote savings mobilisation, and support consumption smoothing during periods of crisis.

Household resilience has emerged as a central concept in development discourse, particularly in the context of increasing global uncertainties such as economic recessions, pandemics, food price fluctuations, and climate change. Resilience refers to the capacity of households to absorb shocks, adapt to changing circumstances, and transform their livelihoods to maintain or improve welfare outcomes. As global economic systems become more interconnected and volatile, strengthening household resilience has become a policy priority. Digital technologies are increasingly considered critical tools for enhancing resilience because they improve access to financial services, enable rapid information dissemination, support market participation, and create alternative income-generating opportunities (Mehan, 2023).

For instance, digital platforms allow households to receive emergency remittances, access digital credit during liquidity constraints, and maintain business operations during disruptions such as the COVID-19 pandemic.

In Sub-Saharan Africa, the relationship between digital adoption and resilience is particularly significant. The region is characterised by high levels of informal employment, limited access to traditional banking services, and vulnerability to climate and economic shocks (Shibia, 2024). Despite these structural challenges, Africa has experienced one of the fastest rates of mobile money growth globally. Countries such as Kenya, Ghana, and Nigeria have witnessed remarkable expansion in mobile financial services, significantly increasing the number of financially included individuals. Digital financial inclusion has reduced geographical barriers associated with traditional banking and has enabled low-income households to participate in formal financial systems (Tay et al., 2022). Empirical evidence across the region suggests that mobile money adoption improves household welfare by enhancing savings behaviour, facilitating risk-sharing mechanisms, and supporting income diversification.

However, the benefits of digital adoption in Africa are not uniformly distributed. Socio-demographic factors such as household head gender, education, marital status, and household structure influence access to and effective use of digital technologies (Anane & Nie, 2022). Gender disparities in digital access remain a major concern, with women in many African countries facing constraints related to digital literacy, asset ownership, and decision-making power. Similarly, household composition and marital arrangements affect income pooling, risk-sharing, and financial decision-making processes (Mpofu, 2023). These structural differences suggest that the relationship between digital adoption and resilience may vary across demographic groups.

Therefore, understanding the moderating role of socio-demographic characteristics is essential for designing inclusive digital policies that strengthen resilience equitably.

Within the Ghanaian context, digital transformation has accelerated significantly over the past decade. Ghana has become one of the leading mobile money markets in West Africa, with widespread use of mobile payment platforms, digital savings products, and electronic remittance services. The expansion of telecommunications infrastructure and regulatory reforms by the Bank of Ghana have contributed to the growth of digital financial services. As a result, millions of Ghanaians now rely on mobile money for daily transactions, business payments, savings, and remittances (Guermond, 2022). The integration of digital technologies into agricultural markets, small-scale enterprises, and informal trading activities has further strengthened Ghana's digital ecosystem.

Despite these advancements, Ghanaian households continue to face significant economic vulnerabilities. Income instability, food insecurity, health shocks, unemployment, and climate-related risks remain persistent challenges, particularly among low-income and rural households. The COVID-19 pandemic further exposed structural weaknesses in household coping mechanisms, highlighting the importance of resilience-building strategies (Ahmad, 2022). Digital financial services played a notable role during the pandemic by enabling contactless transactions, facilitating emergency transfers, and supporting small business continuity. However, not all households benefited equally from these digital opportunities.

Gender-based inequalities remain pronounced within Ghana's socio-economic landscape. Male-headed and female-headed households may experience different levels of poverty, resource access, and vulnerability (Mubiru, 2023). Social norms and intra-household bargaining dynamics influence financial decision-making authority,

potentially affecting how digital tools are adopted and utilised. Similarly, marital status shapes household structure, resource pooling mechanisms, and financial responsibilities. Married households may benefit from joint income streams and internal risk-sharing arrangements, while single, widowed, or divorced household heads may face greater exposure to economic shocks. These structural variations raise important empirical questions about whether digital adoption strengthens resilience uniformly or whether its relationship with resilience differs across household head gender and marital status categories (Ezung et al., 2026).

Despite the rapid expansion of digital technologies and digital financial services in Ghana, empirical evidence on their relationship with household resilience remains limited. Existing studies in Ghana and across Sub-Saharan Africa have largely focused on specific welfare outcomes such as food security, income, poverty reduction, or enterprise performance, with less attention to household resilience as a broader multidimensional outcome. This study therefore examines the relationship between digital adoption and household resilience in Ghana and further assesses whether this relationship varies across household head gender and marital status categories.

### **1.1. Research Objectives and Questions**

General Objective: To examine the relationship between digital adoption and household resilience in Ghana.

Specific Objectives

1. To examine the relationship between digital adoption and household resilience in Ghana.

2. To assess whether the relationship between digital adoption and household resilience differs by household head gender in Ghana.
3. To determine whether the relationship between digital adoption and household resilience varies across different marital status categories in Ghana.

## **1.2. Research Questions**

Based on the foregoing objectives, this study addresses the following research questions:

1. What is the relationship between digital adoption and household resilience in Ghana?
2. Does the relationship between digital adoption and household resilience differ by household head gender in Ghana?
3. Does the relationship between digital adoption and household resilience vary across different marital status categories in Ghana?

## **2. Significance of the Study**

This study is significant for several reasons, particularly within the context of Ghana's expanding digital financial ecosystem and ongoing efforts to strengthen household resilience against economic and social shocks.

From an academic perspective, this study contributes to the growing body of literature on digital adoption and development outcomes in Sub-Saharan Africa. While existing research has examined digital financial inclusion in relation to specific welfare indicators such as income, food security, or enterprise performance, fewer studies have adopted a comprehensive household resilience framework that integrates absorptive,

adaptive, and transformative capacities. By explicitly examining the relationship between digital adoption and overall household resilience, this study broadens the analytical lens beyond isolated welfare outcomes.

The study is also significant from a policy standpoint. Ghana has prioritised digitalisation as a national development strategy with increasing investments in mobile money infrastructure, digital identification systems, and financial technology innovation. Policymakers and regulators, including the Bank of Ghana, promote digital financial inclusion as a pathway toward poverty reduction and economic stability. The findings of this study provide evidence-based insights into whether digital financial services enhance resilience and which demographic groups benefit most.

Furthermore, the study holds practical significance for financial service providers and digital platform operators. Understanding how household head gender and marital status influence the resilience outcomes associated with digital adoption can inform the design of more inclusive financial products. Finally, the study offers methodological significance by utilizing nationally representative household-level data and incorporating interaction effects between digital adoption and socio-demographic characteristics within a single econometric framework.

## **2.1.Scope of the Study**

This study is geographically limited to Ghana. Although digital adoption and household resilience are important in many African countries, this research focuses only on Ghana in order to provide context-specific evidence. The study focuses on households as the main unit of analysis and uses secondary data from the FinScope Ghana 2022 Survey. Digital adoption is measured using indicators of access to and use of digital technologies, including internet awareness, internet use, ownership of or access to

digital devices, and selected digital financial usage. Household resilience is measured using proxy variables constructed from indicators relating to financial stress, food-related coping behaviour, and households' adaptive expectations about future wellbeing. The study focuses on household head gender and marital status as key socio-demographic moderating factors.

## **2.2.Limitations of the Study**

The use of secondary data limits the study to variables already included in the FinScope Ghana 2022 Survey. The cross-sectional nature of the data means the study cannot establish causal relationships between digital adoption and household resilience. Some important variables, such as detailed measures of financial literacy, social networks, and psychological resilience, are not fully captured in the dataset. Finally, the study relies on self-reported information from respondents, which may introduce response bias.

## **3. Organization of the Study**

The remainder of this thesis is organized into four chapters. Chapter Two reviews relevant literature on digital adoption, household resilience, and the theoretical frameworks underpinning this study. Chapter Three describes the methodology, including data sources, variable measurement, and analytical techniques. Chapter Four presents the empirical findings and discussion. Chapter Five concludes with a summary of findings, policy implications, recommendations, and suggestions for future research.

## **4. Literature Review**

### **4.1. Theoretical Framework**

This study is anchored primarily in the Sustainable Livelihoods Framework (SLF), while the Technology Acceptance Model (TAM) serves as a supporting theory. The SLF provides the main explanation for how access to assets and capabilities shapes households' ability to cope with, adapt to, and recover from shocks. TAM complements this by explaining the behavioral factors that influence the adoption and use of digital technologies.

#### ***4.1.1. Sustainable Livelihoods Framework***

The Sustainable Livelihoods Framework (SLF) provides a comprehensive theoretical foundation for understanding how digital adoption can influence household resilience in developing economies such as Ghana. The framework originated from the seminal work of Chambers and Conway (1992), who conceptualized a livelihood as comprising the capabilities, assets, and activities required for a means of living. They argued that a livelihood is sustainable when it can cope with and recover from shocks and stresses, maintain or enhance its capabilities and assets, and provide opportunities for future generations. Building on this foundation, the United Kingdom's Department for International Development (DFID, 1999) formalised the framework into a structured analytical model that identifies five core forms of capital, namely human, social, financial, physical, and natural capital, which households combine to pursue livelihood strategies within a vulnerability context characterised by shocks, trends, and seasonality.

Subsequent scholars expanded the analytical depth of the framework by emphasising its dynamic and multidimensional nature. Scoones (1998) introduced a more explicit focus on livelihood strategies, arguing that households continuously combine and transform assets in response to institutional structures and vulnerability pressures. Ellis (2000) further highlighted livelihood diversification as a critical mechanism through which rural households reduce exposure to risk and enhance resilience. Over time, the SLF evolved from a static asset-based model into a dynamic resilience-oriented framework that captures absorptive, adaptive, and transformative capacities, making it particularly suitable for analysing contemporary development issues such as digital transformation and financial inclusion.

In the context of digital adoption, technologies such as mobile phones, mobile money, and internet services can be conceptualised within the SLF as components of financial and social capital that expand households' asset portfolios. Aker and Mbiti (2010) demonstrate that mobile phone adoption in Africa reduces information asymmetries, lowers transaction costs, and improves market efficiency, thereby enhancing economic opportunities for households. Similarly, Donner and Tellez (2008) argue that mobile banking and digital financial services facilitate financial inclusion by enabling low-income populations to save, transfer funds, and access credit more efficiently. By expanding financial and informational capital, digital adoption strengthens households' absorptive capacity to withstand shocks, adaptive capacity to adjust livelihood strategies, and potentially transformative capacity to shift into more resilient economic pathways.

The relevance of the Sustainable Livelihoods Framework to this study is both conceptual and analytical. Conceptually, the framework positions resilience as an outcome of asset accumulation and effective livelihood strategies within a vulnerability

context. Analytically, the SLF allows digital adoption to be interpreted as an asset-enhancing mechanism that improves access to financial capital, enhances social capital, and strengthens human capital. Importantly, the framework accommodates social differentiation and inequality, making it particularly relevant to the household head gender and marital status perspectives of this study. Access to livelihood assets is often shaped by gender norms, bargaining power, and household structures (Kabeer, 1999).

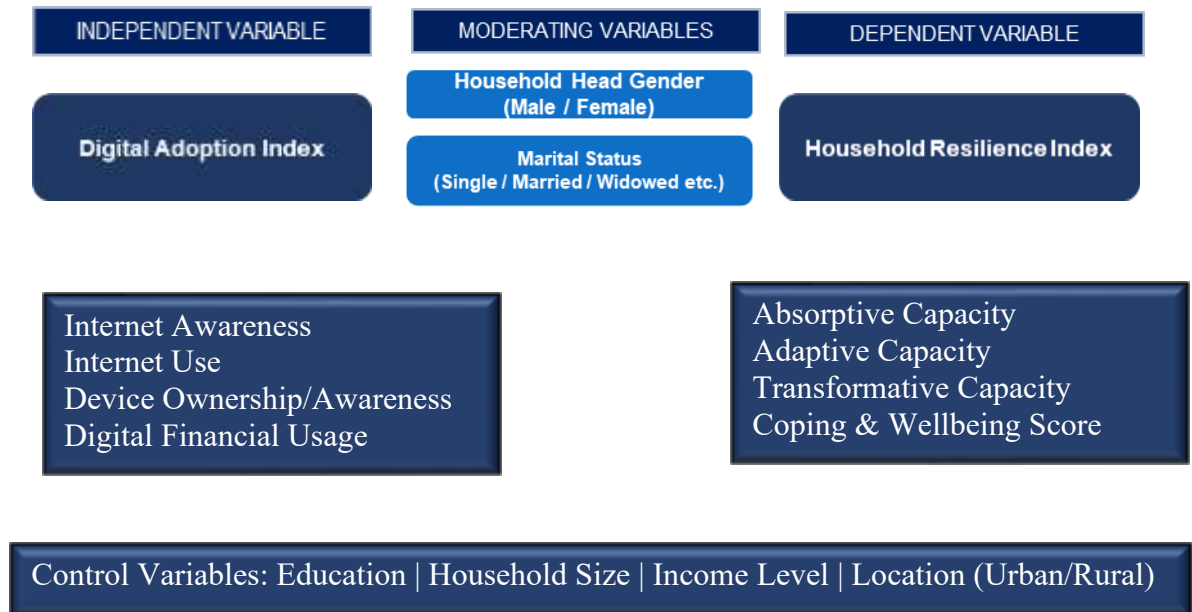
#### ***4.1.2. Technology Acceptance Model (TAM)***

The Technology Acceptance Model (TAM) provides a robust theoretical foundation for understanding the determinants of digital adoption, which constitutes the key independent variable in this study. The model was originally developed by Davis (1989) to explain and predict user acceptance of information systems. Rooted in the Theory of Reasoned Action (Fishbein & Ajzen, 1975), TAM posits that individuals' behavioural intention to use a technology is primarily determined by two cognitive perceptions: perceived usefulness and perceived ease of use. These perceptions influence attitudes toward technology, which subsequently shape behavioural intention and actual usage.

The applicability of TAM to digital financial services and ICT adoption in developing economies has been extensively documented. Research shows that perceived usefulness strongly predicts adoption of mobile banking and mobile money services (Donner & Tellez, 2008). Similarly, perceived ease of use significantly influences digital uptake, particularly among populations with limited technological exposure or low literacy levels (Aker & Mbiti, 2010). In Ghana and similar contexts, trust, security perceptions, and social influence also play critical roles in shaping technology adoption decisions (Boateng et al., 2016). Importantly, TAM also provides theoretical grounding for examining household head gender and marital status differences in digital adoption, as

gender can moderate technology acceptance due to differences in risk perception, access to resources, and socio-cultural constraints (Venkatesh & Morris, 2000).

## 4.2. Conceptual Framework



### 4.2.1. Digital Adoption

Digital adoption, particularly in the form of digital financial inclusion and broader ICT use, has become a central pillar in contemporary development discourse. Digital adoption refers to the extent to which households have access to, own, and use digital devices, internet services, and digital platforms, including communication and financial technologies (Pazarbasioglu et al., 2020). In Ghana, the rapid expansion of mobile money services since the early 2010s has fundamentally reshaped household financial behaviour, enabling millions of previously unbanked individuals to participate in formal financial transactions (Kodom, 2019).

Mobile money represents the most prominent form of digital financial inclusion in Ghana. Okyere et al. (2024) found that mobile money adoption significantly enhanced food security and coping capacity among rural households. Similarly, Ayayi et al. (2025) demonstrated that mobile money access improved resilience to health shocks. ICT use extends beyond financial transactions to include information access, market participation, and social connectivity. Mobile phones enable farmers to obtain real-time market prices, weather forecasts, and extension advice, thereby improving agricultural productivity and income diversification (Kamal & Bablu, 2023).

Despite these positive outcomes, digital adoption remains characterised by structural inequalities. Gender disparities persist in digital access and usage, often driven by differences in income, education, cultural norms, and control over financial resources. Oteng et al. (2024) observed that women traders in Ghana adopted ICT tools to sustain business operations during COVID-19 disruptions but faced constraints related to digital literacy and data affordability. Rural-urban divides further shape digital adoption patterns, with rural households facing weaker network coverage and fewer mobile money agents (Adeleke, 2024).

#### ***4.2.2. Household Resilience***

Household resilience refers to the capacity of a household to anticipate, absorb, adapt to, and recover from shocks and stresses without compromising its long-term welfare (Peter et al., 2025). Unlike traditional poverty measures that provide static snapshots of income or consumption levels, resilience emphasises dynamic processes and forward-looking capacities. Scholars commonly distinguish among three interrelated dimensions of resilience: absorptive capacity, adaptive capacity, and transformative capacity (Turchi et al., 2023). Absorptive capacity refers to the ability of households to

withstand shocks using existing resources and coping mechanisms. Adaptive capacity involves adjustments in livelihood strategies to reduce future vulnerability. Transformative capacity represents deeper structural changes, such as integration into formal financial systems or participation in digital markets (Tanner et al., 2015).

Gender dynamics further complicate resilience outcomes. Female-headed households often face structural disadvantages in access to assets, credit, and formal employment, which may weaken their absorptive and adaptive capacities (Katutu & GEST, 2023). Married households may benefit from pooled resources and shared risk management strategies, while single or widowed households may rely more heavily on external support networks (Will et al., 2023). In the Ghanaian context, digital transformation initiatives have created new opportunities for strengthening resilience mechanisms; however, the extent to which these technologies translate into improved resilience outcomes depends on household characteristics, usage intensity, and structural constraints.

### **4.3. Empirical Review**

The following empirical review summarizes recent studies on the relationship between digital adoption and household resilience, with particular emphasis on Ghanaian households.

Okyere et al. (2024) examined the role of mobile money adoption in promoting household food security and resilience in Northern Ghana. Their findings revealed that households that adopted mobile money were significantly more likely to experience improved food security, smoother consumption patterns, and stronger coping mechanisms during periods of hardship. The study further demonstrated that mobile

money enhanced resilience by facilitating faster remittance inflows, improving access to informal credit networks, and reducing transaction costs.

Abdul-Wakeel and Osabuohien (2022) investigated the threshold effects of ICT access and usage on household welfare in Ghana and Burkina Faso. The results revealed that ICT adoption significantly improves household welfare and resilience; however, the relationship is nonlinear. The authors found that households must reach a certain minimum threshold of ICT usage before experiencing substantial resilience gains.

Bour and Adu (2026) explored the transition from financial education to actual digital financial usage among Ghanaian households, emphasising the roles of technology perception and intra-household bargaining dynamics. Their findings indicated that digital financial usage significantly improves household resilience by enhancing savings behaviour, improving access to credit, and facilitating consumption smoothing during economic shocks.

Mannah-Blankson et al. (2025) examined the socio-economic impact of digital technologies among Ghanaian market women. The findings revealed that digital technologies significantly improved income stability, customer reach, and business continuity, particularly during market disruptions. However, adoption levels were uneven due to constraints including limited digital literacy, high transaction costs, and unreliable internet connectivity.

Asongu (2021) assessed how mobile phone penetration interacts with knowledge diffusion to influence inclusive human development across Sub-Saharan Africa. The findings revealed that mobile phone technology significantly enhanced inclusive human development by facilitating access to information, improving financial inclusion, and expanding economic participation.

Ayayi et al. (2025) examined the impact of mobile money adoption on household resilience to health-related shocks in Togo. The findings revealed that households using mobile money were significantly better able to cope with health shocks compared to non-users, with particularly strong effects among lower-income households.

#### **4.4. Research Gap**

Although the reviewed studies provide substantial evidence that digital adoption enhances household welfare and resilience in Ghana and Sub-Saharan Africa, important gaps remain. First, existing studies largely focus on specific dimensions of resilience without adopting a broader household resilience framework. Second, several Ghana-specific studies primarily analyse productivity and income outcomes rather than directly modelling household resilience as a comprehensive outcome variable. Third, gender is often treated as a control variable rather than as a central dimension through which resilience effects are differentiated. Moreover, most existing studies do not explicitly compare resilience outcomes across marital status categories. This study therefore addresses these gaps by empirically examining the relationship between digital adoption and household resilience in Ghana while explicitly incorporating household head gender and marital status perspectives.

#### **4.5. Conceptual Framework**

The conceptual framework of this study is built on the proposition that digital adoption is associated with household resilience, but that the strength and nature of this relationship may vary across households depending on key socio-demographic characteristics, particularly household head gender and marital status. The framework positions digital adoption as the main explanatory variable, household resilience as the dependent variable, and household head gender and marital status as moderating

variables that may shape how digital resources translate into resilience outcomes. In addition, socio-economic characteristics such as education, household size, income level, and location are treated as control variables.

## **5. Data and Methods**

### **5.1. Data**

This study uses secondary data from the FinScope Ghana 2022 Survey, a nationally representative household dataset compiled by FinMark Trust to assess financial inclusion, digital adoption, and household financial behavior in Ghana. The dataset is well suited to this study because it contains detailed information on households' access to and use of digital technologies, together with measures of financial stress, coping strategies, and relevant socio-demographic characteristics. The FinScope Ghana 2022 Survey employs a stratified sampling design to ensure broad representation across geographic and socio-economic groups, covering both urban and rural households.

### **5.2. Measures**

The analysis is built around one dependent variable, one key explanatory variable, and selected socio-demographic covariates.

The dependent variable is the Household Resilience Index (`resilient_index`). This index captures households' capacity to cope with and adapt to economic and financial stress. It is constructed from indicators reflecting coping frequency, access to support, financial stress, and forward-looking perceptions about wellbeing. In operational terms, the index combines twelve recoded items from the survey: `B9a_1New`, `B9a_2New`, `B9a_3New`, `B9bNew`, `B9c_1NumNew`, `B9c_2NumNew`, `B9c_3NumNumNew`, `B9c_5NumNew`, `B10aNew`, `B10b_1New`, `B10b_4New`, and `B10b_5New`.

The main explanatory variable is the Digital Adoption Index (`digitaladoption_index`). This index measures the extent to which households' access, own, and use digital technologies and digital services. It is constructed from fourteen survey items capturing

internet awareness, internet use, device ownership or access, and selected digital activities: A1\_9e\_1, A1\_9e\_2, A1\_9e\_3, A1\_9fl\_1, A1\_9fl\_2, A1\_9fl\_3, A1\_9fl\_1\_1, A1\_9fl\_1\_2, A1\_9fl\_1\_3, A1\_9f2Num, B8\_4, B8\_10, B8\_11, and B8\_12.

Two socio-demographic variables are central to the heterogeneity analysis. Household head gender is measured using the recoded variable A2bNumNew, which distinguishes male-headed households from female-headed households. Marital status is measured using the recoded variable A1\_3aNew, which groups households into single, living together, married, divorced, and widowed categories.

### **5.3.Index Construction**

Both composite indices are generated using the egen rowmean() procedure in Stata. This approach computes the mean of the selected indicators for each household and provides a parsimonious summary of multidimensional constructs while preserving variation across observations.

The Household Resilience Index is constructed as the row mean of the twelve recoded resilience-related indicators. These variables capture multiple dimensions of household stress management, including frequency of coping strategies, support availability, financial strain, and perceptions of coping ability and future wellbeing. The resulting index serves as a continuous proxy for household resilience.

Similarly, the Digital Adoption Index is constructed as the row mean of fourteen indicators that reflect different dimensions of digital engagement, including awareness, access, ownership, and use. The index therefore captures the household's overall position within the digital ecosystem rather than reliance on a single digital variable such as mobile money alone.

The row-mean approach is appropriate in this context because both digital adoption and household resilience are inherently multidimensional concepts that cannot be adequately represented by a single observed measure.

#### 5.4. Empirical Strategy

The empirical analysis proceeds in three stages, corresponding to the study objectives. First, to examine the overall relationship between digital adoption and household resilience, the study estimates a baseline Ordinary Least Squares (OLS) model:

$$HR_i = \beta_0 + \beta_1 DA_i + \varepsilon_i$$

Where  $HR_i$  denotes the Household Resilience Index for household  $i$ ,  $DA_i$  denotes the Digital Adoption Index,  $\beta_0$  is the intercept,  $\beta_1$  captures the association between digital adoption and household resilience, and  $\varepsilon_i$  is the error term.

Second, to assess whether this relationship differs by household head gender, the study estimates an interaction model of the form:

$$HR_i = \beta_0 + \beta_1 DA_i + \beta_2 G_i + \beta_3 (DA_i \times G_i) + \varepsilon_i$$

where  $G_i$  represents household head gender and  $(DA_i \times G_i)$  captures the interaction between digital adoption and household head gender.

Third, to determine whether the relationship varies across marital status categories, the following interaction model is estimated:

$$HR_i = \beta_0 + \beta_1 DA_i + \beta_2 MS_i + \beta_3 (DA_i \times MS_i) + \varepsilon_i$$

where  $MS_i$  denotes marital status and  $(DA_i \times MS_i)$  represents the interaction between digital adoption and marital status.

These specifications make it possible to estimate both the average relationship between digital adoption and household resilience and the extent to which that relationship differs across demographic categories.

### **5.5. Estimation Procedure**

The study employs Ordinary Least Squares (OLS) estimation because the dependent variable is a continuous composite index. For the first objective, a simple OLS regression is estimated alongside a pairwise correlation between the Digital Adoption Index and the Household Resilience Index. To evaluate whether the interaction terms are jointly significant, the study applies the `testparm` command. Marginal effects are then estimated using the `margins` command.

## 6. Results and Discussion

### 6.1. The relationship between digital adoption and household resilience in Ghana

**Table 6.1.1. : OLS Regression Results for the Relationship between Digital Adoption and Household Resilience**

Variable	Coef.	Std. Err.	t-value	p-value	95% CI	Sig.
Digital Adoption Index	0.050	0.021	2.37	0.018	[0.009, 0.092]	**
Constant	1.659	0.035	47.23	0.000	[1.590, 1.728]	***
Mean dependent var	1.742	SD	0.238			
R-squared	0.001	N	5,156			
F-test	5.636	Prob > F	0.018			
AIC	-153.766	BIC	-140.670			

*Note.* Dependent variable: Household Resilience Index. N = 5,156. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 6.2:** Pairwise Correlation between Digital Adoption and Household Resilience

Variable	(1)	(2)
(1) Resilience Index	1.000	
(2) Digital Adoption Index	0.033	1.000

*Note.* Based on 5,156 observations.

Table 4.1 presents the baseline OLS regression results. The findings show that digital adoption is positively and statistically significantly associated with household resilience in Ghana. The coefficient of the Digital Adoption Index is 0.050 with a p-value of 0.018, indicating significance at the 5% level. This means that a one-unit increase in the digital adoption index is associated with a 0.050 increase in the household resilience index. The 95% confidence interval of [0.009, 0.092] does not include zero. However, the R-squared value of 0.001 indicates that digital adoption explains approximately 0.1% of the variation in household resilience, suggesting that many other factors also shape resilience outcomes. Table 4.2 confirms a positive pairwise correlation of 0.033 between the two indices, which is consistent with the regression findings.

The findings for Objective One show that digital adoption is positively associated with household resilience in Ghana. This result suggests that households that are more digitally connected may be better positioned to cope with economic and financial stress. Digital technologies reduce information and transaction barriers. Households with access to mobile phones, internet-enabled devices, and digital platforms may be more likely to receive timely information, communicate with relatives and support networks, and access digital financial services. These opportunities may strengthen households'

ability to respond to shocks, smooth consumption, and maintain stability during difficult periods.

The result is consistent with the Sustainable Livelihoods Framework, which argues that households build resilience when they have access to assets and capabilities that improve their ability to absorb, adapt to, and recover from shocks. Digital technologies constitute part of a household's asset base through their contribution to financial, informational, and social capital. The finding also aligns with the empirical evidence of Okyere et al. (2024), Ayayi et al. (2025), and Abdul-Wakeel and Osabuohien (2022), all of whom found positive associations between digital tools and household welfare and resilience. The low R-squared value, however, indicates that policies aimed at improving household resilience through digitalisation should be integrated with broader interventions such as social protection, financial inclusion, education, employment support, and infrastructure development.

### **Whether the Relationship Differs by Household Head Gender**

The second objective assessed whether the relationship between digital adoption and household resilience differs by household head gender in Ghana. Tables 4.3, 4.4, and 4.5 present the interaction regression, joint significance test, and marginal effects results respectively.

**Table 4.3:** Interaction Regression Results for Digital Adoption and Household Head Gender

Variable	Coef.	Std. Err.	t-value	p-value	95% CI	Sig.
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<b>Digital Adoption Index</b>	0.068	0.027	2.50	0.012	[0.015, 0.121]	**
<b>Head_Woman (main effect)</b>	0.081	0.080	1.01	0.312	[-0.076, 0.238]	
<b>Interaction: DA x Head_Woman</b>	-0.059	0.048	-1.23	0.220	[-0.153, 0.035]	
<b>Constant</b>	1.634	0.045	36.19	0.000	[1.546, 1.723]	***
<b>R-squared</b>	0.003	N	5,156			
<b>F-test</b>	2.693	Prob > F	0.019			

*Note.* Dependent variable: Household Resilience Index. Reference category: male-headed households. N = 5,156. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 4.4:** Joint Significance Test of Gender Interaction Terms

<b>Test</b>	<b>F-statistic</b>	<b>p-value</b>
<b>F(2, 5150)</b>	0.80	0.4480

*Note.* H0: interaction coefficients are jointly equal to zero.

**Table 4.5:** Marginal Effects of Digital Adoption by Household Head Gender

<b>Category</b>	<b>dy/dx</b>	<b>Std. Err.</b>	<b>t</b>	<b>P&gt; t </b>	<b>95% CI</b>
<b>Male-headed households</b>	0.068	0.027	2.500	0.012	[0.015, 0.121]

<b>Female-headed households</b>	0.009	0.040	0.220	0.823	[-0.069, 0.087]
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*Note.* Average marginal effects. N = 5,156. Dependent variable: Household Resilience Index.

Table 4.3 shows that the Digital Adoption Index is positively and significantly associated with household resilience for the reference (male-headed) category (coef. = 0.068,  $p = 0.012$ ). The interaction term between digital adoption and female-headed households is negative but statistically insignificant (coef. = -0.059,  $p = 0.220$ ). Table 4.4 reports a joint F-statistic of 0.80 ( $p = 0.448$ ), indicating that the interaction terms are jointly insignificant. Table 4.5 confirms that the marginal effect of digital adoption on resilience is significant for male-headed households ( $dy/dx = 0.068$ ,  $p = 0.012$ ) but insignificant for female-headed households ( $dy/dx = 0.009$ ,  $p = 0.823$ ). Overall, the evidence does not support the conclusion that gender significantly moderates the digital adoption-resilience relationship.

### ***Discussion of Findings***

The findings for Objective Two indicate that household head gender does not significantly alter the relationship between digital adoption and household resilience in Ghana. This result is notable because gender inequalities are widely documented in the literature on digital access, financial inclusion, and resilience. One possible explanation is that once digital access is obtained, the resilience-related benefits of digital technologies may operate in broadly similar ways across households, regardless of the gender of the household head. In other words, the main inequality may lie in access itself rather than in the resilience payoff after adoption has occurred. Another explanation is that the Digital Adoption Index captures general digital engagement

rather than more gender-sensitive dimensions such as control over digital resources or autonomy in digital financial decision-making.

### Whether the Relationship Varies across Marital Status Categories

The third objective determined whether the relationship between digital adoption and household resilience varies across different marital status categories in Ghana. Tables 4.6, 4.7, and 4.8 present the results.

**Table 4.6:** Interaction Regression Results for Digital Adoption and Marital Status

Variable	Coef.	Std. Err.	t-value	p-value	95% CI	Sig.
<b>Digital Adoption Index (base: Single)</b>	0.076	0.031	2.47	0.014	[0.015, 0.136]	**
<b>Living together (main effect)</b>	-0.076	0.183	-0.42	0.677	[-0.435, 0.283]	
<b>Married (main effect)</b>	0.008	0.079	0.10	0.922	[-0.147, 0.163]	
<b>Divorced (main effect)</b>	-0.027	0.176	-0.16	0.876	[-0.373, 0.318]	
<b>Widowed (main effect)</b>	0.342	0.201	1.71	0.088	[-0.051, 0.736]	*
<b>Interaction: DA x Living together</b>	0.052	0.110	0.47	0.637	[-0.163, 0.266]	
<b>Interaction: DA x Married</b>	-0.024	0.048	-0.50	0.619	[-0.118, 0.070]	

<b>Interaction: DA x Divorced</b>	0.005	0.104	0.05	0.964	[-0.198, 0.208]	
<b>Interaction: DA x Widowed</b>	-0.202	0.115	-1.76	0.079	[-0.428, 0.024]	*
<b>Constant</b>	1.632	0.050	32.91	0.000	[1.535, 1.729]	***
<b>R-squared</b>	0.006	N	5,156			
<b>F-test</b>	3.332	Prob > F	0.000			

*Note.* Dependent variable: Household Resilience Index. Reference category: single-headed households. N = 5,156. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 4.7:** Joint Significance Test of Marital Status Interaction Terms

<b>Test</b>	<b>F-statistic</b>	<b>p-value</b>
<b>F(4, 5146)</b>	0.90	0.4658

*Note.* H0: all marital status interaction coefficients are jointly equal to zero.

**Table 4.8:** Marginal Effects of Digital Adoption by Marital Status

<b>Marital Status</b>	<b>dy/dx</b>	<b>Std. Err.</b>	<b>t</b>	<b>P&gt; t </b>	<b>95% CI</b>
<b>Single</b>	0.076	0.031	2.470	0.014	[0.015, 0.136]
<b>Living together</b>	0.127	0.105	1.210	0.226	[-0.079, 0.333]
<b>Married</b>	0.052	0.037	1.400	0.160	[-0.020, 0.124]
<b>Divorced</b>	0.080	0.099	0.810	0.417	[-0.114, 0.274]
<b>Widowed</b>	-0.126	0.111	-1.140	0.254	[-0.344, 0.091]

*Note.* Average marginal effects. N = 5,156.

Table 4.6 shows that the Digital Adoption Index is positively and significantly associated with household resilience for single-headed households (coef. = 0.076,  $p = 0.014$ ). The main effects and interaction terms for living together, married, and divorced households are statistically insignificant. The interaction term for widowed household heads is negative and marginally significant at the 10% level ( $-0.202$ ,  $p = 0.079$ ). Table 4.7 confirms that the interaction terms are jointly insignificant ( $F = 0.90$ ,  $p = 0.466$ ). Table 4.8 shows that the marginal effect of digital adoption is statistically significant only for single-headed households. These results indicate that marital status does not significantly moderate the digital adoption-resilience relationship.

### **Discussion of Findings for Objective Three**

The findings for Objective Three indicate that marital status does not significantly alter the relationship between digital adoption and household resilience in Ghana. This result may be explained by the fact that marital status alone is an imperfect proxy for household support structures and vulnerability. Households within the same marital category can differ widely in terms of income, caregiving burdens, household composition, and access to support networks. It is also possible that digital adoption provides broadly similar resilience-related advantages across marital groups. Once households are digitally connected, they may use digital tools in similar ways, including receiving support, accessing information, or conducting transactions.

## 7. Summary of Findings

This study examined the relationship between digital adoption and household resilience in Ghana, with particular attention to whether this relationship differs by household head gender and marital status. Using data from the FinScope Ghana 2022 Survey, the study constructed a Digital Adoption Index and a Household Resilience Index and estimated OLS regression models, interaction models, joint significance tests, and marginal effects. The summary of key findings is presented below.

### Objective One:

Digital adoption is positively and significantly associated with household resilience in Ghana (coefficient = 0.050,  $p = 0.018$ ,  $r = 0.033$ ). Higher levels of digital engagement are associated with better coping capacity and more favourable resilience outcomes, although the relationship explains only a small share of total variation in resilience ( $R^2 = 0.001$ ).

### Objective Two.

Household head gender does not significantly moderate the relationship between digital adoption and household resilience. The marginal effect is significant for male-headed households ( $dy/dx = 0.068$ ,  $p = 0.012$ ) but not for female-headed households ( $dy/dx = 0.009$ ,  $p = 0.823$ ). The joint significance test is insignificant ( $F = 0.80$ ,  $p = 0.448$ ).

### Objective Three.

Marital status does not significantly moderate the relationship between digital adoption and household resilience. Digital adoption is significantly associated with resilience among single-headed households ( $dy/dx = 0.076$ ,  $p = 0.014$ ), but the joint significance

test confirms that marital status does not significantly alter the overall relationship ( $F = 0.90, p = 0.466$ ).

## **8. Conclusions**

This study concludes that digital adoption is positively associated with household resilience in Ghana. Households with higher levels of digital engagement tend to exhibit slightly better resilience outcomes, suggesting that access to and use of digital technologies supports coping, adaptation, and financial stability. This finding reinforces the view that digital technologies are increasingly important household resources in contemporary development contexts, particularly in environments characterized by economic uncertainty, financial exclusion, and vulnerability to shocks.

At the same time, the explanatory contribution of digital adoption to household resilience is modest. The low explanatory power of the baseline model indicates that household resilience is shaped by a much wider range of social, economic, and institutional factors beyond digital adoption alone. Digital technologies therefore appear to function as supportive rather than sufficient conditions for resilience.

With respect to household head gender, the study concludes that there is no statistically significant difference in the relationship between digital adoption and household resilience across male-headed and female-headed households. Similarly, the study concludes that marital status does not significantly moderate this relationship. The implication is that the positive contribution of digital adoption to resilience may be broadly similar once digital access and usage are present, irrespective of gender or marital status.

## 9. Recommendations

Based on the findings and conclusions of this study, the following recommendations are offered.

- **Expand digital infrastructure in underserved areas.**

Given that digital adoption is positively associated with household resilience, policymakers should prioritise investment in digital infrastructure, particularly in rural and peri-urban areas. Expanding mobile network coverage, increasing the density of mobile money agents, and reducing data costs will help to close the rural-urban digital divide.

- **Address the gender gap in digital access.**

The findings suggest that the key inequality lies in access rather than in the resilience payoff. Policymakers and development organisations should therefore invest in targeted digital literacy programmes, subsidised device schemes, and gender-sensitive mobile money outreach strategies to increase digital access among female-headed households.

- **Integrate digital tools within broader resilience-building strategies.**

The modest explanatory power of the Digital Adoption Index implies that digital adoption alone is insufficient for building household resilience. Policy interventions should integrate digital tools with complementary social protection programmes, financial literacy training, health insurance schemes, and employment support measures.

- **Design inclusive products for vulnerable household types.**

Financial service providers should develop tailored products and support services for households headed by widowed and single individuals, who may face unique challenges in leveraging digital tools for economic security.

## **10. Limitations and Suggestions for Future Research**

This study is subject to several limitations. First, the cross-sectional data means that the study cannot establish causal relationships. Future research should employ panel data or quasi-experimental designs to trace changes in resilience over time as digital adoption deepens. Second, the study is constrained by the variables available in the FinScope Ghana 2022 Survey. Future studies should collect primary data that include richer measures of financial literacy, psychological resilience, social capital quality, and climate exposure. Third, the Digital Adoption Index captures general digital engagement but may not fully reflect gender-sensitive dimensions such as control over digital resources. Future research should develop more nuanced measures that account for intra-household power dynamics. Fourth, future comparative studies across multiple Sub-Saharan African countries would provide broader insights into whether the findings generalise to other contexts.

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