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Article

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Does taxation of digital financial services adversely affect the financial inclusion agenda? Lessons from a developing country

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ABSTRACT

Despite strong evidence of the critical role of mobile money technology in deepening financial inclusion, the impact of taxing mobile money transactions on digital and financial inclusion remains an unexplored area of research. By drawing on the Unified Theory of Acceptance and Use of Technology model, this research presents a rich insight into the determinants of mobile money adoption and the moderating effect of taxation (e-levy) on mobile money adoption. The purposive data sampling technique was employed to collect data from 287 mobile money users. The structural equation modeling – partial least square method was applied to test the hypotheses of this study. The findings show that performance expectancy, effort expectancy, social influence, and facilitating conditions significantly influence behavioral intention. Consequently, behavioral intention shows a significant relationship with the actual use of mobile money. Furthermore, regarding the moderating effect of taxation, the findings show that taxation negatively and significantly influences the actual use of mobile money. Finally, the implications of the results to tax policymakers (government) and mobile money operators have been discussed.

1. Introduction

With digital technologies, economies and financial landscapes worldwide have advanced rapidly. As a result, there has been a lot of buzz and interest in financial technology, also known as FinTech. According to Gai, Qiu, and Sun (2018), FinTech refers to the use of technology to provide innovative financial services and solutions. FinTech encompasses various technological applications and innovations that aim to improve and streamline various aspects of the financial industry. FinTech companies leverage digital platforms, software, and other cutting-edge technologies to enhance financial services, increase efficiency, and offer new ways for individuals and businesses to manage their finances. FinTech is heralded for lowering the cost of financial services, expanding the reach of financial institutions to more people, and reducing face-to-face interactions, particularly for promoting economic growth during the covid 19 pandemic (World Bank, 2020). A KPMG (2022) report shows an impressive increase in global investment in FinTech, from \$105 million in 2020 to \$ 210 billion in 2021. These figures illustrate a rise in the amount of money financial institutions and technology companies invest in FinTech innovations. FinTech

innovations have significantly deepened the digital and financial inclusion agenda (Senyo & Osabutey, 2020) and have contributed immensely to economic development, especially in developed economies. FinTech provides individuals and businesses with technologically innovative ways to fulfill their financial needs (Baganzi & Lau, 2017). According to Alhassan and Adam (2021), digital inclusion refers to adopting systems and related technologies at all levels, including digital skill training. According to a World Bank (2021) report, ‘financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs, such as payments, savings, and transactions delivered responsibly and sustainably.’

Mobile money, a FinTech innovation that makes it possible to conduct financial transactions using mobile devices, empowers individuals (both banked and unbanked) to exercise better control of their finances (Demirgüç-Kunt, Klapper, Singer, Ansar, & Hess, 2018). Mobile money services have contributed to the cashless payment system (Rahman, Ismail, & Bahri, 2020). As a result, mobile money is widely viewed as a game-changing digital technology to deepen financial inclusion. According to Statista (2023a, 2023b), in 2021, the number of mobile

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users worldwide stood at 7.1 billion, estimated to reach 7.5 billion by the end of 2025. Similarly, the [World Bank \(2020\)](#) reports that mobile devices accelerate the global rise in financial inclusion. The specific requirements for mobile money services can vary depending on the country, regulatory framework, and the specific service provider. In an emerging economy like Ghana, which is often heralded among the pacesetters in technology-enabled transactions in the sub-Saharan Africa region, mobile money adoption has seen a significant increase ([Statista, 2023a, 2023b](#)), as many Ghanaians, both banked and unbanked, resort to mobile money services. Ghana's mobile money ecosystem comprises users, service providers, agents, banks, and regulators ([Donovan, 2012; Senyo & Osabutey, 2020](#)). Users refer to the people and businesses who make use of mobile money services and products. Organizations that give users mobile money services are known as service providers; most often, these are telecommunication companies ([Maurer, 2012](#)). Agents act as go-betweens for customers and service providers, making mobile money services like cash deposits, redrawals, and transfers possible. Banks act as custodians of mobile money funds for service providers. Lastly, regulators are government organizations with the power to oversee operations inside the mobile money ecosystem ([Mugambi, Njunge, & Yang, 2014](#)). In Ghana, mobile money services allow individuals to perform financial transactions using their mobile phones, even without a traditional bank account. Mobile money services leverage telecommunication networks to facilitate secure and convenient money transfers, payments, and other financial activities. This development has further enhanced the digital banking experience for bank account holders as they can deposit and transfer funds across accounts ([Alnemer, 2022](#)).

Prior studies have investigated mobile money adoption and use; however, the intention to use and the actual use of mobile money innovation have been the focus of the mobile money literature (e.g., [Narteh, Mahmoud, & Amoh, 2017; Pobe & Ansong, 2022; Senyo & Osabutey, 2020](#)) while only a few studies are found on the effect of taxation (e-levy) on mobile money adoption ([Bongomin, Yourougou, & Munene, 2019; Mpofo, 2022a, 2022b](#)). For instance, while examining FinTech adoption in the banking sector in Ghana, [Pobe and Ansong \(2022\)](#) focused on behavioral antecedents, while the effect of e-levy on adopting digital transactions was not examined. Furthermore, [Senyo and Osabutey \(2020\)](#) studied mobile money adoption, focusing on behavioral and technological antecedents, without attention to how taxation (e-levy) influences the actual use of mobile money. Similarly, [Bongomin, Yosa, and Ntayi \(2021\)](#) assessed the mediation effect of hedonic motivation on mobile money adoption and found it to positively and significantly influence adoption. However, their study did not examine the moderating effect of electronic transfer levy (e-levy) on mobile money adoption.

Taxation, as a mechanism for revenue generation, has far-reaching implications that extend beyond fiscal objectives ([Mpofo, 2022a, 2022b](#)). As governments endeavor to fund public services, infrastructure, and social programs, they often resort to taxing various economic activities, including financial transactions. In the context of mobile money adoption, however, the imposition of taxes raises intricate questions about its effects on user behavior, affordability, and the broader socio-economic landscape. Researchers such as [Bongomin et al. \(2019\)](#) have investigated the effect of taxation on digital transactions. Given that taxation of digital transactions plummets users from using digital channels for business transactions ([Bongomin et al., 2019](#)), it is vital to expand the extant literature by assessing the impact of e-levy on mobile money adoption. This research seeks to delve into the complex interplay between taxation and the adoption of mobile money services in Ghana, shedding light on the multifaceted ways in which taxation can either accelerate or hinder the progress of financial inclusion in this developing country. By examining this phenomenon, this study aims to contribute to a nuanced understanding of the implications of tax policies on the utilization of digital financial services. Therefore, this study examines taxation's role in the relationship between the intention and

actual usage of mobile money technology. Thus, the overarching question is, "Does taxation of digital financial services adversely affect the financial inclusion agenda?"

The rest of the paper is organized as follows; section two is the literature and theoretical framework. Section three presents the methodology. Section four presents the findings and analysis. Section five presents the discussion. Finally, section six concludes the paper with implications and study limitations.

2. Literature and theoretical framework

Traditionally, financial products and services are accessed through financial institutions. However, pervasive digitalization and technological advances allow non-financial institutions to provide financial services, a trend commonly referred to as FinTech ([Elia, Stefanelli, & Ferilli, 2022; Kowalewski & Pisany, 2023](#)). In addition, financial technology innovations make financial services more accessible to those who previously could not access them ([World Bank, 2022](#)). Mobile money is one innovation often hailed as crucial for financial inclusion ([Odoom & Kosiba, 2020](#)). Using mobile phones, users can access financial services in an ecosystem that includes banks, regulators, merchants, service providers, and agents ([Senyo & Osabutey, 2020](#)). Mobile money services allow users to complete transactions such as money transfers, bill payments, and loan acquisition ([Osakwe, Okeke, & Kwarteng, 2021](#)). [Katz and Berry \(2014\)](#) argue that tax exemption on mobile money transactions should be implemented to promote more adoption and usage of mobile phones for financial services. Their research concludes that tax legislation should exempt providers and users of financial services, especially those who offer digital financial services via mobile money platforms, from taxes to mitigate its effect on financial inclusion. According to [GSMA \(2022\)](#), tax exemptions from digital financial services may enhance the poor's digital and financial inclusion.

In May 2022, the government of Ghana introduced a 1.5% tax (referred to as e-levy) on the transfer amount of electronic transactions. The goal is to increase tax income by utilizing rapidly expanding digital financial services. The law governing e-levy applies to any transfer a person makes to or from a bank account. These include; mobile money payments made across mobile money wallets with the same mobile money provider, transfer from a wallet from one electronic payment provider to a recipient on another, transfers from bank accounts to mobile money wallets, and transfer from mobile wallets to bank accounts ([GRA, 2022](#)). According to the Bank of Ghana, there are 17.5 m active mobile money accounts and 40.9 m registered accounts in 2021 ([BoG, 2021](#)). More so, Ghana is the African country with the fastest-growing mobile money market. According to [Statista \(2023a, 2023b\)](#), as of January 2023, 59.7% of the Ghanaian population aged 15 years and older have a mobile money account. This percentage is a sharp rise from the previous year.

However, even though mobile money technology provides financial services to users at a reduced cost and with adequate convenience, strong claims cannot be made about the impact of e-levy on mobile money adoption in Ghana. Most studies leverage technological and behavioral models to validate or invalidate the factors influencing mobile money adoption ([Odoom & Kosiba, 2020; Pobe & Ansong, 2022; Senyo & Osabutey, 2020](#)), neglecting studies on financial factors that could influence adoption. This study brings a new insight into mobile money adoption literature by moderating the relationship between intention to use the innovation and actual use. The study draws inspiration from the Unified Theory of Acceptance and Use of Technology (UTAUT) to assess the enablers of mobile money adoption. Moreover, this study moderated the relationship between the intention to use the mobile money innovation and the actual use.

The financial inclusion agenda has been met with scholars focusing much attention on mobile money adoption ([Narteh et al., 2017; Osei-Assibey, 2015; Senyo & Osabutey, 2020](#)). As a result, the phenomenon is not relatively new in the broad mobile money literature. However,

reviewing the existing literature on mobile money reveals gaps that need research attention. For example, [Senyo and Osabutey \(2020\)](#) unearthed the antecedents of mobile money adoption; however, their focus was solely on behavioral and technological factors that influence the adoption of the innovation without analyzing the impact of taxation on the innovation. [Narteh et al. \(2017\)](#) and [Osei-Assibey \(2015\)](#) have focused on technology factors, while there is relative silence on the interplay between taxation and the adoption of mobile money.

Previous studies (e.g., [Amoah, Korle, & Asiama, 2020](#); [Glavee-Geo, Shaikh, Karjaluto, & Hinson, 2020](#) and [Odoom & Kosiba, 2020](#)) have primarily investigated determinants of mobile money adoption in Ghana without assessing the impact of taxation on adoption. For instance, [Glavee-Geo et al. \(2020\)](#) examined the drivers of consumer engagement with mobile money usage in Ghana and revealed that subjective norm, performance expectancy, effort expectancy, and consumer empowerment influence mobile money usage. Similarly, [Odoom and Kosiba \(2020\)](#) examined mobile money usage and continuous intention among Ghanaian micro-enterprises. Their findings validated the theorized relationships in the UTAUT model. [Amoah et al. \(2020\)](#) revealed that education and income level, availability of services such as phone credit recharge, and technology-savvy cohorts (youthful age cohorts) are key determinants of mobile money use in Ghana. However, prior studies (e.g., [Amoah et al., 2020](#), [Glavee-Geo et al., 2020](#) and [Odoom & Kosiba, 2020](#)) have not gone a step further to shed light on the multifaceted ways in which taxation can either accelerate or hinder the progress of mobile money adoption. Given that taxation of digital transactions plummets users from using digital channels for business transactions ([Bongomin et al., 2019](#)), it is important to clarify this gap in the literature. Thus, there is a need to understand the impact of taxation on mobile money services, a gap this study seeks to address.

3. Unified theory of acceptance and use of technology (UTAUT)

The UTAUT holds that behavioral intention and actual use of an innovation is influenced by performance expectancy, effort expectancy (EE), social influence (SI), and facilitating conditions ([Venkatesh, Morris, Davis, & Davis, 2003](#)).

3.1. Performance expectancy (PE) on behavioral intention

Performance expectancy (PE) is “the degree to which an individual believes that using a system will help to attain some gains in job performance” ([Venkatesh et al., 2003](#), p.447). Performance expectancy measures the perceived gain or profit associated with using an innovation. In the context of mobile money, PE measures the extent to which users of mobile money services will adopt the innovation due to the benefit and gains accompanying the innovation. According to [Zhou et al. \(2019\)](#), PE is an extrinsic motivating factor that motivates users to perform a behavior. Many studies conclude the significant predictive power of PE on behavioral intention ([Marinkovic, Dordevic, & Kalinic, 2020](#); [Netshirando, Munyoka, & Kadyamatimba, 2020](#); [Sitar-Taut & Mican, 2021](#); [Tarhini, Alalwan, Shammout, & Al-Badi, 2019](#)). [Odoom and Kosiba \(2020\)](#) and [Amoah et al. \(2020\)](#) have found a positive relationship between PE and behavioral intention to engage in digital transactions. It is important to examine if the perception of gains influences users' behavioral intention to use mobile money services. Given that users will adopt innovations if they perceive them to bring gains or profit, the study hypothesizes that;

H1. Performance expectancy significantly influences users' behavioral intention to adopt mobile money innovation.

3.2. Effort expectancy (EE) on behavioral intention

Effort expectancy (EE) is “the degree of ease of use associated with the use of an innovation” ([Venkatesh et al., 2003](#), p. 450). Effort

expectancy measures the perceived ease of using an innovation. It is associated with the physical and mental freedom of using an innovation. In the context of mobile money, EE measures the ease (both physical and mental) with which users can navigate the mobile money platform. Most studies (e.g., [Dewi, Mohaidin, & Murshid, 2020](#); [Kim & Lee, 2020](#); [Tarhini et al., 2019](#)) have found a significant relationship between effort expectancy and intention to adopt a technology. [Glavee-Geo et al. \(2020\)](#) and [Odoom and Kosiba \(2020\)](#) have found a significant relationship between effort expectancy and intention to adopt digital transactions. So far, in the context of mobile money services, the relationship between effort expectancy and intention to use the innovation is yet to be given serious attention. Therefore, it is important to know the direction of this relationship. Hence, this study hypothesizes;

H2. Effort expectancy significantly influences users' behavioral intention to adopt mobile money innovation.

3.3. Social influence (SI) on behavioral intention

Social influence (SI) is “the degree to which an individual perceives that important others believe he should use a new system” ([Venkatesh et al., 2003](#), p.453). For instance, friends, family, and social media opinions may influence a person's intention to adopt an innovation. Extant studies have reported a significant influence of SI on behavioral intention to adopt an innovation ([Adov, Pedaste, Leijen, & Rannikmae, 2020](#); [Esawe, 2022](#); [Sultana, 2020](#); [Zhang, Cao, Shu, & Liu, 2020](#)). By interacting with others, users' decision about whether or not to use mobile money service is occasionally influenced by these in their social networks. In the context of mobile money service, social influence refers to whether or not a person's close friends or family members impact their decision on whether to use the innovation. Accordingly, the study hypothesizes;

H3. Social influence significantly influences users' behavioral intention to adopt mobile money innovation.

3.4. Facilitating conditions (FC) on behavioral intention

Facilitating conditions (FC) is “the degree to which an individual believes that an organization or technological infrastructure exists to support the use of an innovation” ([Venkatesh et al., 2003](#), p. 453). Many studies report the significant predictive power of FC on behavioral intention to adopt an innovation ([Khechine, Raymond, & Augier, 2020](#); [Sitar-Taut & Mican, 2021](#); [Yoo & Roh, 2019](#); [Zhou et al., 2019](#)). Using mobile money service requires resources such as phone devices, a subscription to a carrier provider, and the necessary skill set to operate the mobile phone. [GSMA \(2017\)](#) report suggests an increased penetration of mobile phones globally, a prerequisite for mobile money adoption. However, the current literature presents a chequered outlook on the role of facilitating conditions in users' behavioral intention to adopt mobile money services. Facilitating conditions have been found to positively influence behavioral intention to use e-banking apps ([Pobe, 2022](#)), e-commerce ([Pobe & Opoku, 2018](#)), and mobile payment services ([Oliveira, Thomas, Baptista, & Campos, 2016](#)). In consonance with the literature, this study suggests that the availability of mobile phones, subscription to a carrier provider, and necessary skills will lead to greater intention to use mobile money services. Thus, the study hypothesizes;

H4. Facilitating conditions significantly influence users' behavioral intention to adopt mobile money innovation.

3.5. Behavioral intention (BI) on behavioral intention

Behavioral intention (BI) refers to individuals' subjective probability of engaging in an action ([Fishbein & Ajzen, 1975](#)). In the context of this study, BI measures users' intention to use mobile money innovation.

Most studies have found that BI significantly predicts the actual use of technology (Hossain, Quaresma, & Rahman, 2019; Pobee & Opoku, 2018; Wrysa, Marcinkowski, & Gajda, 2017). This study suggests that a higher behavioral intention can lead to increased use of mobile money services. Thus, the study hypothesizes;

H5. Behavioral intention significantly influences users' actual use of mobile money innovation.

3.6. E-levy (taxation)

The economic literature indicates that taxation affects the demand and supply curves in a market equilibrium by increasing prices and reducing the quantity of goods available. The World Bank (2014) notes that because most people use mobile phones, using mobile money without restrictions like taxes can advance financial inclusion and provide individuals with basic financial services. Additionally, according to GSMA (2015), removing taxes on mobile money services can increase the accessibility of financial services and lessen the tax burden on low-income consumers. Muthiora and Raithatha (2017) argue that tax exemptions on mobile money services can promote financial inclusion by facilitating more effective payment for goods and services. As a result, taxes on digital transactions like mobile money services can influence users' actual behavior toward the innovation (Ndungu, 2019). This study suggests that the taxation of mobile money services will significantly moderate the relationship between behavioral intention and the actual use of mobile money services. Thus, this study hypothesizes;

H6. E-levy significantly moderates the relationship between behavioral intention and actual use of mobile money innovation.

4. Methodology

This study employed the purposive sampling approach, with potential respondents who indicated they have experience with mobile money service. This approach is consistent with existing studies (Purohit, Arora, & Paul, 2022; Wahab, Tao, Tandon, Ashfaq, & Dhir, 2022). The criteria for selecting respondents are that, first, they must be adults (18 years and above), and second, they should have had an experience with the mobile money service. An online questionnaire comprising 26 items was used to collect the data. The respondents are current users of mobile money in Ghana. These users were intercepted in the Greater Accra Region of Ghana from November 2022 to January 2023. The questionnaire consisted of sections A and B. Section A gathered data on the respondents' demographic profile, while section B gathered data on hypothesized relationships. It is important to mention that the study used a multi-sequential approach in the study design. First, the survey reviewed three professors of information systems and three professors of accounting and finance. Their review helped to refine the questionnaire for the study. After that, the online questionnaire was piloted on 15 current mobile money users in Ghana. Next, mobile money innovation users were invited to participate in the survey through a purposive sampling approach. While preparing the online questionnaire, a condition was set to end the study for participants who indicated no experience with the innovation. This was done to ensure that only eligible respondents participated in the survey. In all, 287 responses collected were deemed acceptable and complete for the analysis. Ghana was selected for this study because it is a leader in mobile money innovation (Venture Africa, 2022).

More so, recently, Ghana has been confirmed as a full-grown market for mobile money utilization (McKinsey and Company, 2017). The questionnaire items were measured on a five-point Likert scale from 5 = strongly agree to 1 = strongly disagree. For the measurement of the UTAUT variables, the items were adopted from Venkatesh et al. (2003); however, these items were modified to understand mobile money adoption. The following items were used to measure the variables; PE = 4 items; EE = 4 items; SI = 4 items; FC = 4 items; BI = 3 items; Mobile

money service use = 3 items, and e-levy = 3 items. Please refer to Appendix A for the measurement scales.

To test the hypothetical relationship between the variables, we adopted the factor-based PLS-SEM because it is touted as well-suited for performing explorative quantitative research such as this present study.

5. Results and analysis

Table 1 (See Fig. 1.) (See Table 2.)

6. Measurement model estimation

Using the confirmatory factor analysis (maximum likelihood estimation technique), the validity and reliability of the multiple-item scale of the constructs were assessed. Over and above the Hair Jr, Hult, Ringle, and Sarstedt (2021) threshold of 0.70, all standardized factor loadings were significant. The internal consistency of each construct was found to be adequate, with Cronbach's alpha estimations ranging from 0.758 to 0.893 (Hair Jr et al., 2021). The composite reliabilities revealed an adequate internal consistency of multiple items for each construct, with composite reliability values above 0.70 (Hair Jr et al., 2021). In this study, all AVE scores were above the suggested value of 0.5 (Hair Jr et al., 2021).

Furthermore, as none of the heterotrait-monotrait ratio (HTMT) values exceeded the conservative value of 0.85 suggested by Henseler, Ringle, and Sarstedt (2015), the study confirmed the discriminant validity of the measurement model (Table 3).

7. Structural model estimation

The study shows that the hypothesized model explains approximately 44% of the variance in behavioral intention and 57% of actual use. The model's predictive accuracy is also good. The Stone-Geisser Q-squared values show the predictive accuracy of PE, EE, SI, and FC on BI

Table 1 Respondents' demographic profile.

Variable	Frequency (n)	Percentages (%)
Gender		
Female	173	60
Male	102	36
Undisclosed	12	4
Age		
18–24 yrs	43	15
25–35 yrs	139	49
36–44 yrs	84	29
45–54 yrs	9	3
55 years +	12	4
Educational attainment		
Basic/High School	38	13
Diploma/HND	62	22
Bachelor degree	135	47
Postgraduate (Master, Ph.D.)	52	18
Employment status		
Employed	186	65
Unemployed	46	16
Student	49	17
Retired	6	2
Mobile money service provider used by respondent		
MTN MoMo	198	69
Airtel Tigo	36	13
Vodafone Cash	53	18
Duration with the service provider (in years)		
Less than one year	12	4
Between 1 and 3 years	53	18
Between 4 and 5 years	42	15
More than five years	180	63

Source: Survey data.

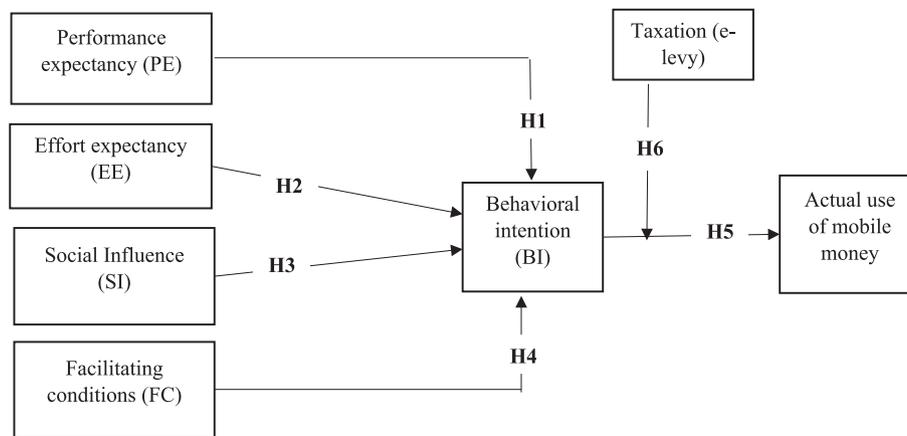


Fig. 1. Research framework. Source: Authors' construction.

Table 2 Factor loadings and reliability analysis.

Constructs	Codes	Loadings	Cronbach's alpha	CR	AVE
Performance expectancy	PE1	0.873	0.893	0.855	0.642
	PE2	0.804			
	PE3	0.733			
	PE4	0.824			
Effort expectancy	EE1	0.858	0.848	0.898	0.681
	EE2	0.866			
	EE3	0.851			
	EE4	0.814			
Social influence	SI1	0.851	0.760	0.711	0.582
	SI2	0.723			
	SI3	0.816			
	SI4	0.718			
Facilitating conditions	FC1	0.887	0.820	0.871	0.734
	FC2	0.877			
	FC3	0.806			
	FC4	0.832			
Behavioral intention	BI1	0.826	0.847	0.891	0.710
	BI2	0.780			
	BI3	0.823			
	BI4	0.823			
Mobile money use	MMU1	0.784	0.802	0.882	0.632
	MMU2	0.845			
	MMU3	0.821			
Taxation (e-levy)	TX1	0.843	0.758	0.813	0.707
	TX2	0.736			
	TX3	0.886			

Source: Survey data.

with $Q^2 = 0.399$ and the predictive accuracy of BI on Actual use with $Q^2 = 0.439$. The results show statistical support for all the hypothetical relationships portrayed in the model. As hypothesized, performance expectancy positively and significantly influences behavioral intention

Table 3 Discriminant validity (HTMT).

Constructs	Mean	SD	1	2	3	4	5	6	7
1. Performance expectancy	3.330	1.260							
2. Effort expectancy	3.460	0.470	0.457						
3. Social Influence	3.850	1.030	0.531	0.424					
4. Facilitating conditions	3.730	0.372	0.469	0.482	0.362				
5. Behavioral intention	3.520	0.991	0.387	0.548	0.642	0.632			
6. Actual Use	2.480	1.150	0.567	0.296	0.431	0.375	0.438		
7. Taxation (e-levy)	3.405	1.060	0.472	0.527	0.478	0.553	0.495	0.539	

SD = Standard Deviation. Source: Survey data.

(H1). There is also support for H2 since the relationship between effort expectancy and behavioral intention is positive and significant. The study supported the predicted significant relationship between social influence and behavioral intention (H3). There is also statistically significant support for the predicted relationship between facilitating conditions and behavioral intention (H4). In line with H5, the study finds a significant positive relationship between behavioral intention and actual use.

7.1. Moderation effect

A moderation effect is present when a third variable, known as a moderator, directly influences the relationship between the exogenous and endogenous latent variables. The primary goal of this study is to determine how the introduction of taxation (e-levy) affects the relationship between behavioral intention and mobile money adoption. As a result, the sixth hypothesis (H6) under this study was to establish if e-levy significantly moderates the relationship between behavioral intention and actual use of mobile money services. Consequently, the moderator variable of taxation (e-levy) was included in the original model that linked behavioral intention and actual use of mobile money through the SmartPLS sub-menu. The results indicate that transaction tax charges significantly and negatively moderate the relationship between behavioral intention and the actual use of mobile money.

The model fit was evaluated in addition to the estimate of the measurement model by assessing some fit indices, such as the root mean squared error of approximation (RMSEA), comparative fit index (CFI), chi-square/degree of freedom (CMIN/DF), and goodness of fit (GFI). As shown in Table 4 and as Hoyle and Panter (1995) suggested, the conditions for the overall model fit indices are met. (See Table 5.)

Table 4
The model of fit.

Goodness of fit	Recommended threshold	SEM value	Remark
Root mean squared error of approximation (RMSEA)	≤ 0.10	0.084	Good fit
Comparative fit index (CFI)	≥ 0.90	0.923	Good fit
Chi-square/degree of freedom (CMIN/DF)	≤ 3.0	2.65	Good fit
Goodness of fit (GFI)	≥ 0.90	0.987	Good fit
Normed fit index (NFI)	≥ 0.90	0.913	Good fit

Source: Survey data.

Table 5
Summary of results.

Hypothesized Path	Standardized Estimate	R ²	Q ²
H1: Performance expectancy → Behavioral intention	0.241 (<i>p</i> < 0.001)	0.439	0.399
H2: Effort expectancy → Behavioral intention	0.459 (<i>p</i> < 0.001)		
H3: Social influence → Behavioral intention	0.211 (<i>p</i> < 0.010)		
H4: Facilitating conditions → Behavioral intention	0.229 (<i>p</i> < 0.001)		
H5: Behavioral intention → Actual use	0.263 (<i>p</i> < 0.001)	0.572	0.439
H6: BI*Taxation*Actual use → Actual use	- 0.201 (<i>p</i> < 0.001)		

Source: Survey data.

8. Discussion

It is worth noting that financial digitalization is presently the solution and game changer in delivering positive growth toward the SDGs (sustainable development goals) via universal financial inclusion, especially in developing countries where this innovation is relatively emerging. This paper aims to establish the moderating (interaction) effect of electronic tax (e-levy) on the relationship between citizens' behavioral intention and actual use of mobile money services. Related work by Katz (2015) suggests that government decisions regarding implementing electronic transaction taxes are driven by public policies motivated by established goals and the cost-benefit analysis incurred to meet stated objectives. Furthermore, economic theories indicate that taxation affects market equilibrium by shifting the demand and supply curves due to raising prices with the consequential reduction in the number of products. In other words, taxes affect consumer behavior.

In Ghana, when the government passed the electronic tax (e-levy) bill to become law in May 2022, there were mixed reactions from the government and the public. Although there was massive resistance from the people, the policy was implemented. The current study, therefore, provides empirical arguments from consumers on the outcome of the e-levy implementation. In the quest to investigate the interaction effect on e-levy (H6), prior hypotheses (H1-H5) were examined to establish the core antecedents for the adoption of mobile money innovation.

Concerning hypothesis 1, findings from the survey suggest a positive and significant effect of performance expectancy on users' behavioral intention toward using mobile money innovation; thus, if users feel that using mobile money innovation improves their performance, they are more inspired to use these services. Hence, H1 is supported. This result is consistent with Venkatesh et al. (2003); Venkatesh et al. (2003); Sitar-Taut and Mican (2021); Marinkovic et al. (2020); Netshirando et al. (2020); Senyo and Osabutey (2020). This evidence demonstrates that the advantages of using mobile money services are a major factor in determining usage patterns. It follows that users are more inclined to use the technology when the benefits of using mobile money services are more significant.

Concerning hypothesis 2, the findings align with Kim and Lee (2020),

Dewi et al. (2020), and Tarhini et al. (2019), who found effort expectancy to predict behavioral intention significantly. More so, Dwivedi et al. (2017), Bongomin et al. (2019), and Verkijika and Wet (2018) confirmed that effort expectancy significantly influences users' attitudes toward adopting e-government services. As a result, H2 is supported. This suggests that users are more likely to use mobile money services if the tasks require less effort to complete.

Concerning hypothesis 3, the study revealed a significant positive impact of social influence on the behavioral intention of citizens toward adopting mobile money innovation. This evidence corroborates Esawe (2022), Zhang et al. (2020), Adov et al. (2020), and Sultana (2020). Likewise, our findings align with Lepoutre and Oguntoye (2018). Hence, H3 is supported. This suggests that the extent to which users adopt mobile money services is positively influenced by their close relations, friends, and important persons that associate with them.

Hypothesis 4 significantly predicted the influence of facilitating conditions on behavioral intention to use mobile money innovation. Hence, H4 is supported. The findings are similar to Chawla and Joshi (2020) and Glavee-Geo et al. (2020). This suggests the important role of the availability of necessary support conditions in adopting e-mobile money innovation. It also implies that facilitating conditions are essential for adopting mobile money innovation. The finding also aligns with Zhou et al. (2019), Khechine et al. (2020).

With hypothesis H5, the study established that behavioral intention significantly positively affects the actual use of mobile money innovation. This finding aligns with Hossain et al. (2019) and Wrysa et al. (2017). Furthermore, behavioral intention is a fundamental element of consumer psychology which implies that users who embrace the intention to use mobile money services tend to recommend its adoption to friends, relations, and other social network friends. In the case of Ghana, users who develop a positive and significant behavioral intention toward a technology adopt the technology. This conclusion is supported by Mensah, Chuanyong, and Zeng (2020) and Rodrigues Pinho and Soares (2011). This finding supports the prevailing belief that consumers will use mobile money services if they have favorable intentions toward the technology.

Lastly, concerning hypothesis 6, this finding shows that e-levy has a significant and negative moderation effect on the relationship between behavioral intention and actual use of mobile money innovation. This implies that imposing taxes on mobile money services reduces the intention to adopt mobile money services. This finding is similar to Okello Candiya Bongomin et al. (2019), who maintain that tax imposition on mobile money transactions can contribute to the decline in financial inclusion by discouraging more efficient payments for goods and services. This negatively affects the cashless economy policy strategy that many successive governments in developing countries seek to attain in the long run. This research supports GSMA (2015) report, which states that removing taxes on mobile money services can increase the accessibility of financial services and lessen the tax burden on low-income consumers. This research also aligns with Muthiora and Raitatha (2017), who argue that tax exemptions on mobile money services can promote financial inclusion by facilitating more effective payment for goods and services.

9. Managerial implication

Governments in developing and emerging economies, such as Ghana, should consider that the electronic landscape (marketplace) is not strong enough for users to pay exorbitant transaction taxes. It is important to note that e-levy on mobile money transactions may prevent existing and new users from engaging in e-transactions and subscribing to several mobile money financial products. This potentially limits them from gaining benefits from global fintech innovation. Similarly, governments in developing economies should consider the cost-benefit regarding revenue generation and the potential adverse impact of e-levy on the growth of the digital financial sector. Considering the growing income

inequality among citizens of developing countries and the government's insistence on taxing electronic transactions using mobile money services, there should be a framework to ensure rationalization and harmonization of taxes in the mobile telecommunication industry. Government and tax regulators can do so by adopting the best international taxation practices of other telecommunications products and services that may not hamper the growth of mobile money innovations to enhance the financial inclusion of the vulnerable in developing and emerging countries where the innovation is taking off.

10. Practical implications

Taxing mobile money services can impact the aspects of promoting financial inclusion. It affects how accessible, affordable, and sustainable these services are for populations. While taxation is a tool for generating revenue, policymakers must weigh its potential consequences on broader socio-economic objectives, especially in advancing financial inclusion. Policymakers need to evaluate how taxes affect affordability and ensure that they don't unfairly burden those who are financially vulnerable. They should also consider exempting small-value transactions from taxes to help keep mobile money transactions affordable for everyone. In order to encourage people to use mobile money services, it is important to design tax policies that promote their adoption. One approach could be implementing varying tax rates based on the size of transactions and even providing tax incentives for utilizing money for specific purposes. Tax policies should be clear and easily understood by people. Educating users about why taxes are necessary can help reduce perceptions and maintain trust in the system. Service providers and governments should allocate resources for initiatives focused on promoting literacy. These programs would educate users on the costs, benefits, and consequences of mobile money services. By ensuring transparent communication regarding taxes and their intended purposes, we can empower users to make informed decisions. Governments need to evaluate the effects of taxes on the adoption of mobile money and the broader goal of financial inclusion. This could entail conducting cost-benefit analyses to determine the effective tax rates that generate revenue while encouraging financial inclusion.

11. Theoretical implication

It is imperative to note that this study advances the fintech literature, particularly on mobile money. While there is limited research on the impact of electronic transaction taxes on mobile money services, the study discusses taxation's effect on fintech innovation. To the best of our knowledge, there is little research concerning the implication of electronic tax on mobile money transactions; hence, the study presents a fresh perspective to augment the extant literature. The study also extended the UTAUT model by incorporating a new construct (e-levy). This gives the model a new phase and increases its reliability and validity. The extension has further contributed to understanding the variance predicting the intention and actual use of mobile money innovation, given the interplay of taxation in the fintech ecosystem.

12. Conclusions

To better understand citizens' behavioral intention and actual use of mobile money innovation in responses to government e-levy imposition, this study investigates the major driving factors of citizens' willingness to use the service despite the passage and implementation of the e-levy bill. Using a survey and the original concepts of the UTAUT framework, behavioral intention and actual use of mobile money innovation are positively and significantly influenced by performance expectancy, effort expectancy, social influence, and facilitating conditions. In addition, the imposition of e-levy as a moderator in the research model showed a significant negative impact on the relationship between citizens' behavioral intention and the actual use of mobile money services.

This implies that citizens do not support the government policy of e-levy on mobile money transactions, hence must be scrapped to find an alternative way for introducing the tax.

13. Limitations and future research direction

While the research on the impact of e-levy on mobile money adoption in a developing country offers valuable insights, it is essential to acknowledge its limitations. The research findings might be limited in generalizability to other developing countries due to the unique socio-economic, cultural, and regulatory contexts of the specific country under study. Each developing nation may present distinct challenges and opportunities for mobile money adoption, making it challenging to apply the research findings to other regions directly. This research used primary data collection through surveys based on purposive sampling. The sample might not fully represent the entire population of mobile money users in the country. Moreso, the research only focused on consumers already using the mobile money service without focusing on potential consumers willing to adopt money services but not doing so due to e-levy. These limitations can affect the accuracy and generalizability of the research findings. Building on the limitations of this study, researchers can explore the following directions to enhance our understanding of this evolving phenomenon further. First, conducting longitudinal studies over extended periods could provide insights into how taxation's impact on mobile money adoption evolves over time. Researchers can better understand the dynamics and long-term effects by analyzing adoption rates, user behavior, and service providers' responses in the face of changing tax policies. Second, comparative studies across different countries and regions with varying structures and socio-economic contexts can reveal nuanced patterns of tax impact on mobile money adoption. Exploring cases where taxation has accelerated or hindered mobile money adoption can offer valuable lessons for policymakers seeking to strike the right balance.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

Appendix A. Questionnaire

A.1. Keys

(1) = Strongly disagree; (2) = Disagree; (3) = Not sure; (4) = Agree; (5) = Strongly agree.

Performance expectancy (PE)

PE1: I find mobile money services useful in my daily life.

PE2: Using mobile money services helps me accomplish things more quickly.

PE3: Using mobile money services increase my productivity.

PE4: Using mobile money services makes my transactions convenient.

Effort expectancy (EE)

EE1: I will find it easy to use mobile money services.

EE2: I believe it will be easy for me to understand and use mobile money services.

EE3: My interaction with mobile money services will be clear and understandable.

EE4: Learning to use mobile money services is easy for me.

Social influence (SI)

SI1: People who are important to me think that I should use mobile money services.

SI2: People who influence my behavior think that I should use mobile money services.

SI3: People whose opinions I value prefer that I use mobile money.

SI4: Friends make me use mobile money services.

Facilitating conditions (FC)

FC1: I have the resources necessary to use mobile money services.

FC2: I have the knowledge necessary to use mobile money services.

FC3: Mobile money technology is compatible with other technologies I use.

FC4: I can get help when we have difficulties using the mobile money service.

Behavioral intention (BI)

BI1: I intend to use mobile money services.

BI2: I will always try to use mobile money services for my transactions.

BI3: I intend to continue using mobile money services.

BI4: I plan to continue using mobile money services.

Mobile money service use (MMU)

MMU1: I use mobile money services frequently.

MMU2: I use mobile money services a lot.

MMU3: I enjoy using mobile money services.

E-levy (taxation)

TX1: Transaction charges will not affect the number of transactions I perform daily.

TX2: Transaction charges will not deter me from using mobile money services.

TX3: Transaction charges will not reduce my accessibility to financial services through mobile money services.

NB: Items for PE, EE, SI, FC, BI, and MMU were adapted from Venkatesh et al. (2003).

Items for taxation were adapted from Bongomin et al. (2019).

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