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Article

Breaking boundaries: unveiling hurdles in embracing internet banking services in Sub-Saharan Africa

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Breaking boundaries: unveiling hurdles in embracing internet banking services in Sub-Saharan Africa

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ABSTRACT

Despite the gravitation toward Internet banking research in the information systems and information technology literature, scholars and practitioners, particularly in emerging and developing countries, have not fully explored the barriers affecting customers' intention to engage in e-banking transactions, particularly from a sub-Saharan perspective. There is still a considerable gap in the research on how online risk and socio-economic factors influence customers' intention to engage in Internet banking activities. To fill this gap, we took an online and socio-economic perspective on Internet banking adoption in an aspiring to-be IT-enabled economy. Our study adopted a quantitative research approach. Intercept surveys were conducted among 672 bank customers in Ghana. Seven hypotheses were developed, and partial-least square structural equation modelling was used to test the relationship between the variables. Our findings revealed that fear of financial loss, fear of reputation damage, avoidance motivation, price of digital devices, perceived knowledge gap, infrastructure gap, and perceived financial charge are significant barriers to e-banking adoption. The novelty of our research lies in the research framework, which is a unique conceptual model presenting online and socio-economic factors preventing e-banking adoption. Theoretical and practical implications are discussed.

IMPACT STATEMENT

In Sub-Saharan Africa, the burgeoning field of internet banking promises to revolutionize financial services, offering unprecedented convenience and accessibility. However, despite its potential, the widespread adoption of Internet banking services in the region face significant hurdles. This research endeavors to illuminate and dissect these obstacles, shedding light on the multifaceted challenges inhibiting the embrace of internet banking among consumers in Sub-Saharan Africa. By delving into the intricacies of perceived online risk, and socio-economic factors, this study aims to provide a comprehensive understanding of why Internet banking adoption rates remain low in the region. Through rigorous analysis and empirical evidence, we aim to offer insights that can inform policymakers, financial institutions, and stakeholders, facilitating the development of targeted strategies to overcome these barriers. Ultimately, our research seeks to not only identify obstacles but also to propose actionable solutions that can propel developing and emerging economies towards a future where internet banking services are embraced as integral components of the financial landscape. Hence, by breaking boundaries and unraveling the complexities surrounding internet banking adoption, we strive to contribute to the advancement of financial inclusion and economic development in the region and beyond.

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1. Introduction

Internet banking has developed significantly since the inception of the Internet in the 1990s and the dotcom bubble, which busted in early 2000 (Jiménez & Díaz, 2019). Since then, continuous technological

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advancement has disrupted the financial ecosystem. Many organizations, including banking institutions, have leveraged technology to increase consumer reach. Internet banking is a strategy to support green banking while reducing bank operating expenses associated with traditional face-to-face banking (Zhixia et al., 2018). Ghana ranks among the first five West African Countries in terms of the number of Internet bank users (Fincog, 2022). In Ghana, financial institutions, especially banks, invest in information technology and human resources with innovative digital skills to bridge the digital divide between the banked and the unbanked (Kwarteng et al., 2019; Stoica et al., 2015). Irrespective of these strides by Ghanaian banks to improve Internet banking, the gap between Internet banking adopters and non-adopters has widened (Ofori et al., 2017; Statista, 2022). According to Bank of Ghana (BoG) (2022), the number of registered Internet bank users in Ghana is limited to 5.6 million, while the number of non-Internet bank consumers has reached 18.7 million. In a nutshell, the introduction of Internet banking as a banking product to deepen the financial inclusion agenda in Ghana is far-fetched.

Many studies have emphasized the benefits associated with adopting Internet banking (Jermisittiparsert et al., 2023; Laukkanen & Kiviniemi, 2010; Naeem et al., 2022; Zhang et al., 2022), presuming that banking products merit adoption based on their efficacy. However, some online risks and socio-economic factors may adversely affect the adoption of the banking product, especially in the global south (Arif et al., 2020). For instance, Rathnayake (2023) reported on how the benefits and convenience of Internet banking have led financial institutions to adopt various digital banking innovations. However, the unanswered question is whether consumers' demand for Internet banking is at a robust level commensurate with banks' implementation efforts. Furthermore, Kwarteng et al. (2019) found that despite the significant advances in modern technology within the Ghanaian banking system, a predominant concern among consumers revolves around the heightened incidence of fraud perpetrated through these technological channels. This prompts inquiry into the potential barriers hindering consumers from utilizing Internet banking services.

The research objectives are twofold. First, we aim to assess the perceptions of bank consumers regarding barriers to Internet banking adoption in Ghana. Second, we intend to identify and examine the key factors hindering the successful adoption of Internet banking services. Consequently, the developed research questions are:

RQ1: How do consumers perceive the barriers that prevent them from successfully adopting Internet banking?

RQ2: What factors hinder the adoption of Internet banking services?

The study contributes to the theoretical understanding of Internet banking and factors that serve as barriers to successfully implementing it by developing a conceptual model. It offers fresh perceptions into the underlying inhibiting factors that affect consumers' adoption of Internet banking. Overall, the study is expected to advance theoretical knowledge, offer valuable insights to bank stakeholders, add to the body of empirical evidence, and provide a framework for methodological research on barriers to Internet banking and its effect on adoption in the particular context of Ghana.

The remainder of the paper is structured as follows. First, the literature review, research model and hypotheses development are presented in section two. The research methodology is then presented in section three. Next, the data analysis and results are shown in section four. Finally, the discussion of findings, theoretical and practical implications, limitations and future research directions are presented in the final section.

2. Literature review

According to Sathye (1999), e-banking occurs when bank customers access their bank accounts to undertake online banking transactions via the Internet. These transactions may include online deposits, balance enquiries, and transfers across multiple accounts. This kind of diversified banking is a competitive necessity for banks (Stoica et al., 2015). As automated teller machines were introduced in the USA in the 1950s and 1960s, financial payment channels have evolved significantly (Bátiz-Lazo et al., 2014). In the 1980s, telephone banking began, followed by Internet banking in the 1990s, and then mobile

banking ten years later (Jiménez & Díaz, 2019). Bank customers have both advantages and disadvantages in using various digital payment methods (DPMs) as cash gradually becomes obsolete.

According to Offei and Nuamah-Gyambrah (2016), e-banking has offered Ghanaian customers easy access to bank accounts, a development that has reduced under-the-counter practices by bank officers. The adoption of cashless policies or cashlite economies, as Okoro and Kigho (2013) refer to them, has been effective due to the sector's technological improvement, which has not only decreased the flow of actual cash but also created revenue through bank charges for the banks. Ghanaian banks' profitability has increased due to the availability of alternative digital channels in the country's banking systems (Offei & Nuamah-Gyambrah, 2016). The full realization of e-banking benefits is not attained in every case, as barriers to adoption often impede web technology from reaching its maximum potential (Rotchanakitumnuai & Speece, 2003).

In the context of Ghana, the studies by Mbrokoh (2016), Nimako et al. (2013), and Perkins and Annan (2013) collectively shed light on the factors influencing the adoption of Internet banking. Mbrokoh (2016) surveyed customers of two banks to understand perceptions of Internet banking usability and credibility, while Nimako et al. (2013) used a self-administered structured questionnaire to assess customer satisfaction with Internet banking service quality in two banks. Perkins and Annan (2013) employed a descriptive cross-sectional mixed-methodology approach, gathering data from both bank staff and customers of three banks to understand the factors influencing Internet banking adoption. While the insights from these studies remain valuable, it is worth noting that their relevance may have diminished over time due to changes in technology, banking practices, and consumer behaviour since their publication. Mbrokoh's study emphasized the significance of perceived ease of use and credibility in shaping consumers' intentions towards Internet banking adoption. It underscores the importance of addressing security, privacy, and trust concerns to enhance the credibility of Internet banking platforms. Nimako et al. found customer dissatisfaction regarding service quality aspects such as responsiveness, guidance for problem resolution, and transaction speed, suggesting improvements in these areas to enhance satisfaction and adoption rates. Perkins & Annan's study revealed that perceived ease of use, trust, security, and government support significantly influence customers' intention to use Internet banking.

A number of studies have examined the impact of financial loss on investment (Chen, 2021; Larbi, 2016; Ofori, 2020; Roszkowska, 2020). According to Ofori (2020), financial threat and investment loss are positively correlated. If the customer perceives a high level of financial loss associated with e-banking, technology adoption can be a major barrier. It is, therefore, essential to examine whether the risk of financial loss negatively influences bank customers' e-banking intention.

Reputation risk can be a barrier that damages both organizational and individual reputations. Scholars have examined the impact of financial malfeasance and system hacks on firms and individuals' reputations (Behera et al., 2022; Nujen et al., 2021). Good ethical practices enhance an organisation's reputation (Behera et al., 2022). The uptake of e-banking may be limited if adopters perceive transaction risks that could potentially damage their reputation. Moreover, comprehending the intrinsic motivational factors of users is crucial for enhancing their intention to continue using Internet banking services (Rahi et al., 2023).

A major barrier to technology adoption is the fear of security and privacy. There is little published work on avoidance motivation stemming from these concerns. The avoidance motive explains how users behave in terms of security in order to avoid harmful IT risks (Liang & Xue, 2009). This study examines how consumers might avoid e-transactions if they believe they are harmful in the context of e-banking. The price of digital services is another barrier to the adoption of e-banking services as a factor that may influence the decision to adopt the service. Additionally, a knowledge gap exists due to societal disparities, hindering the adoption of e-banking services among two distinct socio-economic groups: those with higher and lower socio-economic statuses.

To bolster the adoption of e-banking services, the primary barrier lies in facilitating conditions, encompassing the level of technical and organizational support accessible to adopters. A significant impediment to e-banking adoption is the financial charges linked to online transactions, such as transfers across multiple accounts. In this study, our objective is to delineate how customers perceive barriers to adopting banking services.

2.1. Prior research on e-banking

Although e-banking has received significant attention from scholars, its adoption in sub-Saharan African countries is relatively scarce (Ohiani, 2020). A synthesis of the extant e-banking literature helped us uncover three areas (gaps) in the e-banking literature that need research attention. These selected studies are summarised in Table 1.

First, extant Internet banking studies (e.g. Arora & Sandhu, 2018; Lee & Kim, 2020; Rahi & Ghani, 2019; Sánchez-Torres et al., 2018; Thaker et al., 2021) have extensively investigated factors that influence e-banking adoption, while there is relative silence on the factors that may inhibit the adoption of the innovation. This development is partially enabled by the excessive reliance of e-banking studies on research theories that emphasize adoption-driven factors. As a result, the antecedents that influence or

Table 1. Summary of selected e-banking studies.

References	Model used	Context	Constructs
Thaker et al. (2021)	UTAUT 2	The contextual focus of the research was Malaysia, based on 319 respondents. The structural equation modelling (SEM) method was used for data analysis.	Performance expectancy Effort expectancy Social influence Facilitating conditions Price value Hedonic motivation
Safari et al. (2020)	TAM	The contextual focus of the research was the Democratic Republic of Congo, based on 215 respondents. The structural equation modelling (SEM) method was used for data analysis.	Perceived usefulness Perceived ease of use Perceived web security Internet trust
Sharma and Govindaluri (2014)	Extended TAM	The research was conducted in India based on 314 respondents. The structural equation modelling (SEM) method was used for data analysis.	Perceived usefulness Perceived ease of use Social influence Awareness Quality of Internet connection Computer self-efficacy
Rahi and Ghani (2019)	DeLone and McLean IS success model and self-determination theory (SDT)	The research was conducted in Pakistan based on 750 respondents. The structural equation modelling (SEM) method was used for data analysis.	Information quality Service quality Satisfaction Introjected regulation External regulation Intrinsic regulation Identified regulation
Rawashdeh (2015)	Extended TAM	The research was conducted in Jordan based on 298 respondents. The structural equation modelling (SEM) and SPSS method were used for data analysis.	Perceived usefulness Perceived ease of use Perceived web privacy (PWP) Attitude Intention
Arora and Sandhu (2018)	UTAUT and SERQUAL	The research was conducted in India and involved 524 respondents. The multiple regression analysis (MRA) method was used for data analysis.	Effort expectancy Performance expectancy Information quality Service quality Self-interest Experience
Sánchez-Torres et al. (2018)	UTAUT with modification	The research was conducted in Colombia and involved 600 respondents. The structural equation modelling (SEM) method was used for data analysis.	Performance expectancy Effort expectancy Government support Trust
Yaseen and El Qirem (2018)	UTAUT 2 with modification	The research was conducted in Jordan and involved 348 respondents. The data analysis method used was multiple regression.	Performance expectancy Effort expectancy Social influence Hedonic motivation Service quality
Wang et al. (2017)	UTAUT with modification	The research was conducted in China based on 181 respondents. The data analysis method used was multiple regression.	Perceived ease of use Performance expectancy Effort expectancy Personalisation Compatibility Convenience
Lee and Kim (2020)	Benefit-risk and network externality framework	The research was conducted in South Korea and involved 672 respondents. The data analysis method used was multiple regression.	Economic efficiency Functional risk Security risk Critical mass Number of services Trust

prevent the adoption of e-banking, such as perceived financial charges, infrastructural gap, price of digital services, and fear of financial loss, are understudied. Similarly, previous studies (e.g. Arora & Sandhu, 2018; Safari et al., 2020; Sánchez-Torres et al., 2018) have primarily concentrated on adoption drivers, while there has been little discussion about inhibitors. For instance, Arora and Sandhu (2018) focused on adoption drivers such as performance expectancy, effort expectancy, information quality, and service quality to investigate Internet banking in India. Likewise, Sánchez-Torres et al. (2018) used performance expectancy, effort expectancy, government support, and trust as Internet banking adopters in Colombia. Although knowing the adoption drivers is important, it is also crucial to understand the impact of inhibitors/barriers because they can lead to non-adoption, discontinued use, and, eventually, the extinction of the innovation (Senyo & Osabutey, 2020). For this reason, a study examining the barriers to e-banking adoption is needed to formulate policies to address these adoption bottlenecks.

Second, previous Internet banking studies (e.g. Rawashdeh, 2015; Safari et al., 2020; Thaker et al., 2021; Wang et al., 2017; Yaseen & El Qirem, 2018) have largely investigated technology factors such as perceived ease of use, perceived usefulness, perceived website security, quality of Internet connection, and perceived web privacy, while knowledge on factors such as perceived financial charges, infrastructural gap, price of digital services, and fear of financial loss remain limited. For instance, in investigating Internet banking adoption, Safari et al. (2020) focused on factors such as the perceived usefulness of the technology, perceived ease of use, and Internet trust. Similarly, Thaker et al. (2021) focused on factors such as performance expectancy, effort expectancy, and facilitating conditions. Likewise, Rawashdeh (2015) also examined Internet bank adoption by focusing on factors such as perceived web privacy and perceived ease of use. As a result, technological factors that influence Internet banking adoption are well established. Nonetheless, prior studies like Thaker et al. (2021), Rawashdeh (2015), and Safari et al. (2020) have not gone further to investigate barriers to Internet banking adoption. Given that there are inhibitors to Internet banking adoption, there is a need to understand the factors that serve as barriers to its adoption, a gap this study seeks to address.

Third, many Internet banking studies (e.g. Rawashdeh, 2015; Safari et al., 2020; Sharma & Govindaluri, 2014; Thaker et al., 2021) have largely adopted technology adoption theories such as the technology acceptance model (TAM), unified theory of acceptance and use of technology (UTAUT), and DeLone and McLean IS success model. It is important to mention that the technology adoption models do not adequately address the dynamics of financial and socio-economic characteristics that inhibit e-banking adoption. Therefore, it is important to explore the financial and socio-economic barriers to Internet banking adoption, which are not sufficiently accounted for by the technology acceptance theories.

While the outlined three areas shed light on the existing gaps in e-banking literature relevant to this study, it is imperative to recognize and highlight additional emerging literature that holds promise in furthering our comprehension of Internet banking, especially within other developing economies. The literature on Internet banking in developing economies highlights critical factors influencing adoption and utilization. Kumar et al. (2023) emphasize the significance of user perception, particularly in India, where the perceived benefits and ease of mobile banking usage drive adoption. Uche (2023) contributes insights from Nigeria, where security concerns pose substantial barriers to Internet banking. The study underscores the need for improved infrastructure and trust-building efforts to alleviate consumer apprehensions.

In an Algerian context, Bellahcene and Latreche (2023) found that perceived usefulness and ease of use significantly impact attitudes and usage of e-banking services. They advocate for enhancing accessibility and support resources to encourage broader acceptance. Bernard Azolibe et al. (2023) shed further light on Nigeria's challenges, identifying infrastructure limitations as a key hindrance to Internet banking adoption. The study underscores the necessity for network providers to improve reliability and speed. Gautam and Sah (2023) research in Nepal emphasizes the importance of website efficiency and user satisfaction in driving customer loyalty for Internet banking. They highlight the need for continuous improvement in service quality and user experience to foster greater adoption.

Comparatively, while these studies recognize the importance of user perception and security concerns, there are regional nuances. For instance, Indian users prioritize convenience and ease of use, Nigerian users express heightened concerns about security, Algerian users emphasize utility and accessibility, and Nepalese users value website efficiency and satisfaction. Despite these variations, improving infrastructure and trust remain central to fostering Internet banking adoption across these diverse contexts.

2.2. Conceptual framework and hypotheses development

Technological advancements have empowered consumers to seamlessly access a wide array of products and services within the banking industry (Malar et al., 2019). With the development of ICT, banks now have a direct relationship with their customers, rather than having to interact with a bank branch in person (Martovoy & Santos, 2012). In order to achieve value co-creation, some authors, such as Andreu et al. (2010), specify the consequences of direct interactions between a company and its customers. Other researchers, such as Payne et al. (2008), argue that organizations must adopt a customer relationship approach to support value creation. In order to co-create with customers, companies must be able to connect with them and have a market orientation. As a result, leveraging customers' subconscious behaviour becomes imperative for optimizing the company-client relationship. This approach fosters customer engagement and facilitates the fulfilment of their individual needs. Moreover, the advent of new technologies, products, and services encourages new customer demands (Hosseini et al., 2020). As information becomes more accessible and products and services become more diversified through the Internet, consumers have higher expectations. Consequently, innovations originating in one part of the world can swiftly become accessible and desired globally (Mainardes et al., 2017). Consumers can also access electronic services through their smartphones. As a result, banks are constantly bringing new services to market based on customer demands, reflecting a continuous exchange of ideas and co-creation of value (Akter et al., 2020).

We developed a conceptual framework based on seven factors that we argue may negatively affect the intention to engage in e-banking transactions. These factors include fear of financial loss, perceived fear of reputation damage (identity theft), uncertainty about the outcome of the service (avoidance motivation), the perceived price of digital services, perceived knowledge gap among prospective/users, infrastructure gap, and perceived amount of finance charges. The research framework is illustrated in Figure 1.

2.2.1. Fear of financial loss

Fear of financial loss occurs when people experience money losses due to faulty services by firms (Chen, 2021). Generally, people decline technology, which poses a threat of losing money. In Internet banking, consumers are likely to reject the innovation if they perceive some financial losses due to third parties accessing their personal information and using it against them, thereby losing money (Larbi, 2016). Although Internet banking is associated with benefits such as convenience and easy access to bank accounts, the fear of financial loss dimension is yet to be fully explored in research. Hence, examining whether the fear of financial loss impedes bank consumers' intention to adopt an innovation is crucial. In the extant literature, fear of financial loss has been suggested to influence financial investment (Chen, 2021; Larbi, 2016; Ofori, 2020; Roszkowska, 2020). Following this, we consider the fear of financial loss as a barrier to Internet banking adoption. So far, in the context of Internet banking, the relationship between fear of financial loss and behavioural intention to adopt Internet banking has not been determined. As a result, we hypothesized that;

H1: The perceived fear of financial loss during online transactions would negatively affect the intent to engage in e-banking transactions.

2.2.2. Fear of reputation damage

Reputational damage is the loss that impacts a person's or business's excellent standing, leading to adverse perceptions among others. (Boakye et al., 2023). In cases where people perceive the adoption of an innovation may damage their reputation, they are likely to reject its adoption. In Internet banking, consumers are likely to reject the innovation if they perceive reputational damage associated with it. Using e-banking services requires consumers to provide sensitive information that is susceptible to hackers and crackers, who in turn can use it against consumers, which may tarnish their reputation. In prior studies, reputational damage has negatively influenced innovation adoption (Behera et al., 2022; Chang & Chen, 2020; Nujen et al., 2021). Following this path, this study opines that fear of reputation damage will prevent consumers from forming the intention to adopt e-banking and, therefore, we hypothesize that;

H2: The perceived fear of reputation damage would negatively affect the intent to engage in e-banking transactions.

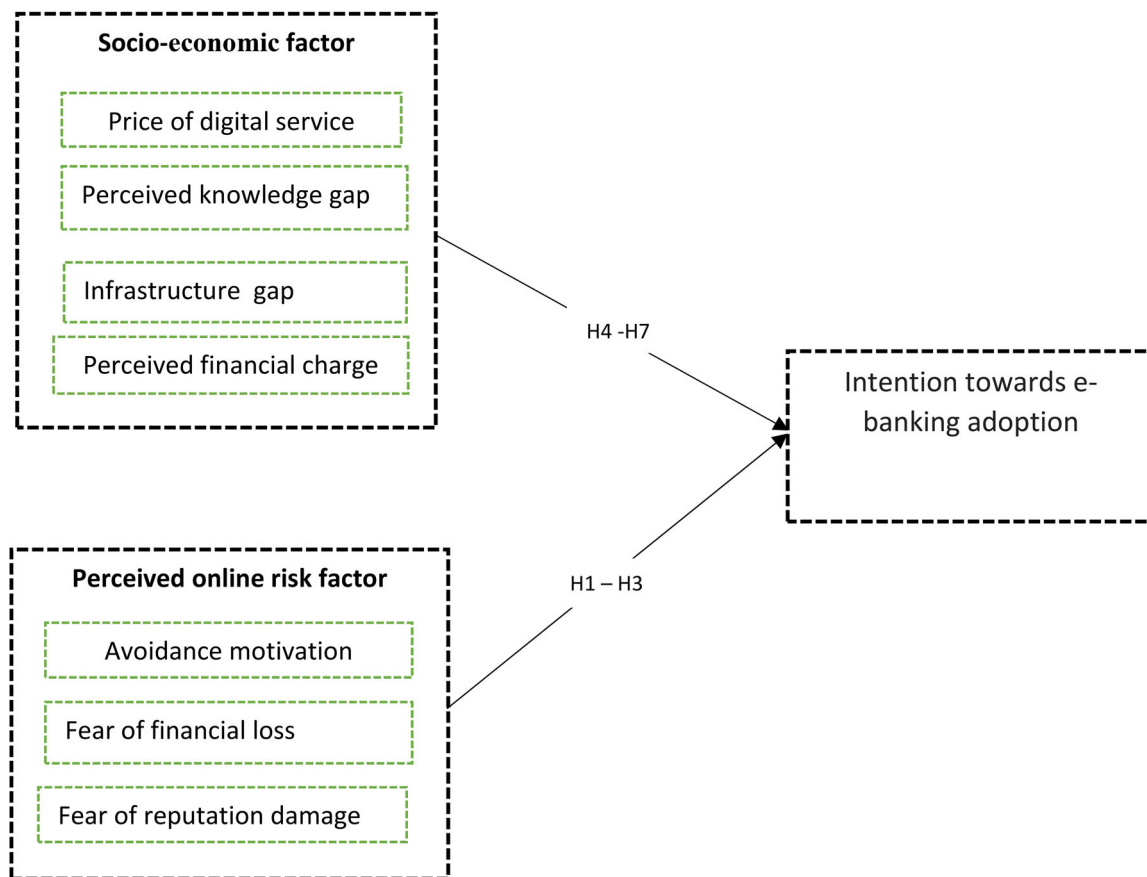


Figure 1. Research framework.
Source: Authors' construct.

2.2.3. Avoidance motivation

Avoidance motivation stems from security and privacy concerns relating to technology adoption. Avoidance motivation explains users' security behaviour in order to avoid harmful IT risks (Liang & Xue, 2009). In addition, extant research has shown that privacy concerns and coping appraisal significantly influence users' adoption of technology (Ammari et al., 2014; H. Chen & Li, 2017; Witschey et al., 2015). In the e-banking context, we argue that users of the innovation may avoid it if their perception of the e-transaction is harmful. Therefore, we hypothesise that:

H3: The uncertainty about the service outcome (avoidance motivation) would negatively affect the intent to engage in e-banking transactions.

2.2.4. Price of digital services

Digital products and services are becoming increasingly important for financial institutions, including banks. Today's platform economy generates profits for firms that leverage digital solutions (Agarwal et al., 2022). However, addressing the costs associated with utilizing digital products and services remains challenging. Scholars have argued that the price of digital products and services should be based on their value rather than their production costs (Bapat & Khandelwal, 2023; Baumgart, 2020). While the consumer value of traditional goods and services is often tangible, assessing the value of digital products poses a greater challenge. Consumers typically need to experience digital products first hand before determining the price they are willing to pay (Kalyanaram et al., 2022). This ex-post price determination may affect adoption, especially when the price is relatively higher than consumers expect. Although Internet banking involves using applications created by banks, when the cost of its creation is heavily burdened on consumers, it prevents them from using it. Hence, examining whether the high price of digital services hinders bank consumers' intention to adopt e-banking innovation is crucial. So

far, in the context of Internet banking, the relationship between the price of digital services and intention towards adoption has not been determined. As a result, it is important to uncover the direction of the relationship. Therefore, this study hypothesizes that;

H4: High price of digital devices would negatively affect the intent to engage in e-banking transactions.

2.2.5. Perceived knowledge gap

According to Wei and Zhang (2008), the higher a person's economic and social status, the more privy they are to information the media provides and vice-versa. As a result of this societal variance, the knowledge gap between the two groups (higher and lower socio-economic status) has widened. Page and Uncles (2004) highlighted two dimensions of Internet knowledge; they described it as declarative and procedural knowledge. Users' understanding of the Internet is critical to technology adoption. When users are familiar with and understand how to perform specific Internet banking tasks, the possibility of engaging in e-banking applications will also be high and vice-versa. Consequently, users' knowledge of Internet terms like cookies, search, and browse would positively influence technology adoption. To this end, we hypothesise that:

H5: Perceived knowledge gap among prospective/users would negatively affect the intent to engage in e-banking transactions.

2.2.6. Infrastructure gap

Infrastructure in this context can be juxtaposed with the facilitating conditions variable in the UTAUT model proposed by Venkatesh et al. (2003). Facilitating conditions measure the extent of available technical and organisational support to adopters of technology or systems. Shankar and Meyer (2009) suggested that technology infrastructure is an essential driver of the socio-economic development of every nation. We argue that investing in infrastructure and e-banking support systems will significantly drive e-banking adoption, without which a lower adoption could occur. Furthermore, sustainable technology development (e-payment, e-revenue mobilisation, and cardless transactions) could be achieved in developing countries when technology infrastructure gaps are bridged. Consequently, we hypothesised that:

H6: Non-availability of infrastructure would negatively correlate with engaging in e-banking transactions.

2.2.7. Perceived financial charge

The concept of the perceived financial gap in e-banking in our study refers to the economic disparity between the technology adopters in developed and developing economies. Research has shown that IT-enabled services' quality, quantity, and accessibility lag in emerging economies (Boateng et al., 2008; Jibril et al., 2020c). As a result, the finance charges associated with online transactions, such as transfers across multiple accounts, could deter e-banking adoption. In addition, Yu (2012) highlighted that prospective users of online banking applications are wary of potential costs that may be imposed due to bank service charges. Research has shown that new technology comes with an associated cost, and banks shift these charges to their customers (Sathye, 1999; Yiu et al., 2007), discouraging customers from adopting IT-enabled services. Therefore, we hypothesise that:

H7: Perceived financial charges would negatively affect the intent to engage in e-banking transactions.

3. Methodology

3.1. Sampling and data collection instrument

A survey method was used to achieve the objectives of the study. For a more comprehensive understanding of the banking landscape in Ghana, a non-randomised sampling technique was adopted to gather the research data. The choice of purposive and referral sampling techniques was driven by the need to target specific banks meeting predetermined criteria while also leveraging existing connections to expand the participant pool (Valerio et al., 2016). After the selection of the banks, respondents were

approached at the bank premises. Only respondents who used Internet banking and mobile banking app services were qualified. Furthermore, the snowball sampling method was employed to facilitate participant recruitment, wherein initial respondents referred additional participants, thereby enriching the sample diversity (Rahi, 2017). Participants of the survey were drawn from selected eleven medium-to-large-sized commercial banks in Ghana, i.e. Zenith Bank Ghana, Fidelity Bank Ghana Ltd., Ecobank Ghana Ltd., Ghana Commercial bank (GCB) Ltd, Agricultural Development Bank (ADB), United Bank of Africa – Ghana, Prudential Bank Ltd., National Investment Bank (NIB) Ltd., CAL Bank Ghana, Access Bank Ltd., and Absa Bank Ghana Limited (*formerly, Barclays Bank Ghana Ltd.*).

To summarize the component of the checklist, the authors composed and used the following items as relevant criteria for the 11 banks selected for the study:

- *A registered and recognized financial institution as a legal entity (bank) by the Bank of Ghana,*
- *Bank size or bank type (to qualify as medium-to-large size bank),*
- *Market share (customer base),*
- *Visibility of the bank branches across at least the 10 major administrative regions of Ghana (before the creation of new regions in 2019),*
- *Integrated with e-banking system (Internet banking and mobile banking).*
- *E-Banking Services offered: 1. Internet Banking, 2. SMS Banking, 3. ATM Banking Service, 4. VISA/MasterCard Debit Cards, 5. MasterCard Point of Sale Terminal Service, 6. E-zwich Cards & Points of Sale, 7. Slip-Free Banking, 8., Money Transfer (MT), 9. Statement by Email, 10. Electronic Notification System (eNS) and 11. E-Teller, (cited from Asemanyiwaa, 2012).*

Data collection occurred during the COVID-19 pandemic, prompting the incorporation of soft copy methods to adhere to social distancing protocols recommended by the WHO. Having considered the challenges of the pandemic at the time, the researchers were meticulous in their approach to intercepting study participants, utilizing both hard and soft copies of the research questionnaire (close-ended questions) to gather data. While this adjustment was crucial for ensuring participant safety, it also posed logistical challenges, such as limited access to bank premises and potential reluctance among participants to engage in face-to-face interactions. A purposive sampling technique was used to select the banks that meet a minimum threshold, such as having an Internet banking facility. This technique facilitated the targeted recruitment of participants from banks already integrated with e-banking systems, ensuring relevance to the study's objectives (Elkatawneh, 2016; Myers & Avison, 2002). Field workers (research assistants) were recruited to assist in data collection from these selected banks, ensuring a diverse and representative sample. Additionally, explicit efforts were made to obtain informed consent from participants and maintain confidentiality throughout the data collection process. As a result, most of the study's participants were approached at the banks' various premises. Before data collection commenced, the authors proactively engaged with bank management to communicate the study's objectives and obtain permission for data collection activities within their premises. We informed them of the anticipated outcomes to aid in making informed decisions regarding their financial services (fintech adoption). Upon obtaining permission, we targeted customers visiting the banking hall for transactions. Interestingly, some bank officials assisted us in data collection by distributing copies of the questionnaire (both hard and soft copies) to their clients.

Given the involvement of human subjects, ethical compliance was of utmost importance. It should be noted that this study constituted part of the first author's doctoral dissertation. Before commencing data collection, formal approval was obtained from the independent research committee of the Faculty of Management and Economics, Tomas Bata University in Zlin, Czech Republic (ID:UTB/6208V038/FAME/01/2020). The consent ethical letter was signed by the vice dean of PhD study of the faculty (Ing. Lubor Homolka, PhD). Participants were required to sign an ethical consent form prior to their involvement in the study, ensuring their understanding and voluntary participation. For reference, the ethical approval and consent form is available upon request.

Before the main data collection, the researchers conducted a pilot study involving 30 respondents to ensure that the measurement scales were free from ambiguity and clearly understood by any ordinary

bank customer. It also helped validate the chosen construct's reliability using Cronbach's alpha. *NB: The authors of this paper would like to reiterate that the data was taken from the PhD thesis of the first author.*

3.2. Data analytical tool

To advance the analysis of multiple regression, the study employed a PLS-SEM (partial least squares structural equation modelling) method using ADANCO software version 2.2.1. This method was selected due to its suitability for analyzing complex relationships within the dataset, particularly when dealing with latent variables and structural models. SPSS software was used to conduct a descriptive analysis of participant profiles. PLS-SEM was chosen over co-variance-based structural equation modelling (CB-SEM) because of its robustness in handling non-normally distributed data. CB-SEM typically assumes normality in the data distribution, which may not always hold true in empirical research scenarios. In contrast, PLS-SEM imposes fewer distributional assumptions, making it more suitable for exploratory research or when data normality is not assured (Hair et al., 2014; Suhr, 2006).

Table 2 presents preliminary data on the socio-demographic profile of the bank customers who participated in the studies. In view of this, it is imperative to note that the profiling of the study's participants offers some clarity concerning the willingness and the intention to take up e-banking as an alternative service to traditional banking. Nonetheless, since the research is confined to the challenges faced by customers, it will be noteworthy to know the varying gadgets/devices that they use to engage in the aforementioned service. Note, see Table 2 for respondents' details.

3.3. Measurement scale

The research questionnaire consists of two sections. Section one explores the socio-demographic profile of the participants, such as gender, age group, and education, while section two contains measurements of the hypothesised model (challenges faced by e-banking adopters). The perception of e-banking challenges was measured on a five-point Likert scale ranging from completely disagree to completely agree. The research constructs were adopted from related literature, while the measurement items were adapted to suit the current study. Regarding the perceived identity theft factors: Security and privacy concerns were from (Nwaiwu et al., 2020; Zanoon & Gharaibeh, 2013); Fear of financial loss and fear of reputational damage were taken from Walsh et al. (2016); Avoidance motivation was from Hille et al. (2015); Intention towards e-banking transaction was from Venkatesh et al. (2003). The socio-economic factors: Infrastructure, Price of digital devices, Digital divide (knowledge gap), and Perceived financial charges were all sourced from Jibril et al. (2020b).

3.4. Common method bias (CMB)

In a quest to prove the presence of CMB, the study took inspiration from the methodology literature (see Bagozzi & Yi, 1988); the questionnaire was cautiously constructed with assurance indicated in the upper part of the questionnaire that participant information would remain confidential. Participants were informed that their information would remain confidential, and that they could opt out of the research at any time. To reinforce the claim, a full multicollinearity test was implemented. Specifically, VIF (variance inflation factor) was used to give additional evidence of common method variance. Estimates from this post hoc evaluation indicated that CMB was not an issue since the calculated VIFs were less than the cut-off value of ten (10) (see Alin, 2010; Kock & Hadaya, 2018; Podsakoff et al., 2003; Salmerón et al., 2020). Hence, there is no concern about CMB. See VIFs in Table 4.

4. Data analysis and results

4.1. Construct measurement and validation

The paper followed the recommendation of methodological literature (Hair et al., 2020; Khan et al., 2019; Sarstedt et al., 2022). First, the authors assessed the construct reliability and validity complement

Table 2. Summary of respondents' profile.

Variable category		Frequency	Percent (%)
Mode of administration	Offline (hard copy)	433	64.43
	Online (soft copy)	239	35.56
Gender	Male	423	67.7
	Female	241	31.4
	Prefer not to say	6	0.9
Age	18–25yrs	162	24.1
	26–30yrs	165	24.6
	31–35yrs	273	40.6
	36–40yrs	63	9.4
	41yrs and Above	9	1.3
Educational level	Basic & SHS level	60	8.9
	Undergraduate	339	50.4
	Postgraduate	252	37.0
	Others	21	3.1
Citizenship status	Ghanaian	663	98.7
	A foreign resident in Ghana	9	1.3
Respondent's geographical location	Northern/North East/Savanna Region	36	5.4
	Upper East Region	18	2.7
	Upper West Region	3	.4
	Bono/Bono East/Ahafo Region	111	16.5
	Ashanti Region	144	21.4
	Eastern Region	15	2.2
	Greater Accra Region	201	29.9
	Western/ Western North Region	42	6.3
	Volta/Oti Region	18	2.7
	Central Region	84	12.5
	Formal sector	387	57.6
	Informal sector	84	12.5
	Student	114	17.0
	Others	87	12.9
Respondent's income level	Less than 500 GHS	63	9.4
	Between 500 to 1,000 GHS	228	33.9
	Between 1,100 to 2,000 GHS	201	29.9
	Between 2,100 to 3,000 GHS	78	11.6
	Between 3,100 to 4,000 GHS	45	6.7
	Above 4,000 GHS	57	8.5
Online visitation (to buy/enquire a product/service before)	Yes	534	79.5
	No	138	20.5
Use of online banking service	Yes	534	79.5
	No	138	20.5
The medium of Internet access	Own Laptop	90	13.4
	Home/Personal PC	9	1.3
	School/Office PC	9	1.3
	Smartphone/Mobile Phone	558	83.0
	Cybercafé PC	6	0.9
The frequency of Internet use	Daily	552	82.1
	Weekly	36	5.4
	Once or twice a month	33	4.9
	Once or twice in 3 months	39	5.8
	Few times in a year	9	1.3
	Never	3	0.4
Ever use the Internet to buy a product/service before	Yes	532	79.2
	No	140	20.8
Ever use the Internet to transfer/deposit before	Yes	459	68.3
	No	213	31.7
Frequent bank transacted with	Ecobank Ghana Ltd.	123	18.4
	Agricultural Development Bank (ADB)	24	3.6
	Zenith Bank Ghana	21	3.1
	Ghana Commercial Bank (GCB) Ltd.	177	26.3
	Fidelity Bank Ghana Ltd	57	8.5
	Barclays Bank Ghana Ltd.	39	5.8
	Access Bank Ltd.	27	4.0
	Bank of Africa Ghana Ltd.	15	2.2
	CAL Bank Ghana	36	5.4
	Prudential Bank Ltd.	27	4.0
	National Investment Bank Limited (NIB)	84	12.5
	Other	42	6.3
Years transacted with current bank	Less than 1 year	96	14.3
	1–3 yrs	177	26.3
	4–10 years	282	42.0
	11–15 years	81	12.1
	more than 15 years	36	5.4

(continued)

Table 2. Continued.

Variable category		Frequency	Percent (%)
Debit/Credit card used	Master Card	81	12.1
	Visa Card	255	37.9
	ATM Card	198	29.5
	e-Zwich Card	51	7.6
	Other	87	12.9
Total (n)		672	100.0

Source: Author's field data from Ghana (January to September 2020).

Table 3. Construct reliability and convergent validity.

Construct	Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_C)	Cronbach's alpha(α)	Average variance extracted
Fear of finance loss	0.9697	0.9263	0.8973	0.7589
Fear of reputation damage	0.9702	0.9411	0.9329	0.8002
Avoidance motivation	0.8841	0.8758	0.7815	0.7815
Price of digital device	0.8302	0.8982	0.8299	0.7463
Perc-Knowledge gap	0.9631	0.9723	0.9573	0.9212
INTENT to E-Banking	0.9303	0.9389	0.9192	0.7549
Infrastructure gap	0.8920	0.9222	0.8877	0.7478
Perc. financial charge	0.9027	0.8989	0.8390	0.7483

Source: Authors' computation from ADANCO 2.2.1.

with the loadings of the measurement variables in the hypothesised model. This initial assessment aims to satisfy the quality criteria for both indicators' reliabilities and convergent validity of the measurement variables. Regarding the minimum requirement of 0.70 (see Bagozzi & Yi, 1988; Hair et al., 2020), measurements satisfied this criterion at a t-value < 1.96. Again, the composite reliability estimates of the measurements using Dijkstra-Henseler's rho and Cronbach alpha values are adequate enough comparing the threshold value of 0.7 given by Hair et al. (2020) and that of Kock and Hadaya (2018) (see Table 3). Regarding the items loading, only the first item (AVDMOT1) of the avoidance motivation construct was dropped for not meeting a minimum cut-off of 0.50 (Hair et al., 2020). Nonetheless, the average variance extracted per construct was sufficiently above the recommended value of 0.5 (see Bagozzi & Yi, 1988; Kock & Hadaya, 2018). Table 4 shows the item loadings and the variance inflation factor.

Next, discriminant/divergent validity was consequently examined based on the Heterotrait–Monotrait (HTMT) ratio of correlations approach (see Henseler et al., 2015). By this estimation, we show that variables are sufficiently distinct from each other by following the recommendation provided by Henseler et al. (2015). This approach showed that none of the comparable correlation coefficients surpassed the maximum value of 0.85; hence, the study concludes that evidence of discriminant validity is established among constructs (see Table 5).

4.2. Hypothesis testing – PLS-SEM

After completing the reliability and validity test, the paper proceeded to structural analysis (path model). In other words, to evaluate the relationship between the barriers and the intent to engage in e-banking transactions. Following the guidelines of Hair et al. (2020), the statistical processing of data showed a direct structural model. It is important to state that seven hypotheses were developed and tested. Both T-values and P-values were considered to determine significant levels of the relationships. The empirical findings supported all the proposed hypotheses except for H2 (see a summary in Table 6).

Furthermore, in the quest to assess the R^2 (coefficient of determination) from the proposed model, the result revealed R^2 value of 35.2% (0.352), indicating a sufficient predictive power of the model (Kasuya, 2019). In other words, the R^2 values indicate the percentage of variations in the outcome variable that was explained by the predictive variables. R^2 values of > 0.5 are strong and better predictors of the model in question (Cameron & Windmeijer, 1997; Gelman et al., 2019).

5. Discussion, implications and conclusions

Based on the TAM, UTAUT, and UTAUT 2 models, previous studies did not adequately account for the inhibitors or challenges of technology adoption since these theories mainly account for adoption factors.

Table 4. Item loading and Variance inflation factor (VIF).

Construct	ITEMS	Loadings	VIF
Fear of financial loss	FOFL1: I am afraid that somebody could steal my money while I am transferring my personal data online	0.8057	1.8171
	FOFL2: I am scared that a criminal could use my credit card account number to do online shopping in my name	0.8952	3.3081
	FOFL3: I am frightened that somebody could do online shopping at my expense	0.8753	3.5141
	FOFL4: I am worried about an unauthorised person making online purchases using my personal data	0.9050	2.7201
Fear of reputational damage	FORD1: I am frightened of somebody using my personal data on the Internet in order to run me down	0.9394	2.4585
	FORD2: I am very worried that the unauthorised use of my personal data online could damage my reputation	0.9116	4.0676
	FORD3: I am worried about my reputation being damaged due to the illegal use of my personal data online	0.8867	5.3863
	FORD4: The thought that a stranger could damage my reputation by using my personal data online scares me.	0.8374	4.2139
Avoidance motivation	AVDMOT2: I am scared that when I have to give my bank account number to shop online that it could be misused	0.7732	1.6987
	AVDMOT3: I am scared that my bank account could be hacked by an unknown person	0.9824	1.6987
Price of digital device	PDD1: I would easily buy a digital device if I am offered a price discount	0.8845	2.2304
	PDD2: I am generally concerned about the price of digital devices	0.8599	1.8994
	PDD3: The lower prices I get a digital device, the more attracted I will engage/transact in online banking	0.8469	1.7694
Perceived knowledge gap	PKG/DG1: I will use Internet banking when I have adequate knowledge about its usefulness	0.9466	4.9884
	PKG/DG2: I will engage in Internet banking transactions when I have adequate knowledge about its convenience.	0.9713	8.0307
	PKG/DG3: I will use internet banking if I have much adequate knowledge about how to use it	0.9613	6.0018
Intent to e-banking	INTENT1: I would use Internet banking for purchasing a product/service	0.8755	3.1462
	INTENT2: I would always consider using Internet banking for my e-shopping	0.8045	2.9459
	INTENT3: Given the chance, I would try to buy items online via Internet banking	0.8976	4.1103
	INTENT4: In the future, I will most likely be using the Internet banking for payments.	0.9050	4.5280
	INTENT5: Using Internet banking for transfer/deposit is something I would do	0.8578	3.1732
Infrastructure	INFRAST1: In my opinion, I think lack of government support infrastructure in Information Communication Technology (ICT) sector negatively affects easy internet accessibility	0.8742	2.6860
	INFRAST2: I think the inability of the government to create more awareness of the benefits of ICT (INTERNET) usage for all citizens negatively affects online-related transactions.	0.8926	3.1426
	INFRAST3: I think lack/inadequate internet access to all areas in the country as well as FREE WIFI in schools and recreation centres affect my willingness to engage in online-related transactions	0.8461	2.2810
	INFRAST4: I think the Internet and other devices such as computers and smartphones prices should be moderate to be afforded by giving subsidies to dealers/operators in the Telcom industry	0.8453	2.0949
Perceived financial charge	PFC1: I won't use an online transaction when the charging fee is high	0.8927	1.8454
	PFC2: Engaging in Internet banking may attract some deduction from my bank account	0.9068	2.4857
	PFC3: Using Internet banking would affect the amount of my deposit/savings with unusual fee	0.7911	1.9663

Source: Authors' computation from ADANCO 2.2.1.

Our findings align with prior research indicating that the purpose of use and satisfaction positively influence customer adoption of Internet Banking (Saadilah et al., 2021). Therefore, by proposing a conceptual model for this study, we contribute to the literature and present a useful framework for understanding several key aspects. Firstly, addressing the knowledge and infrastructure gaps of Internet banking may lead to increased adoption of e-banking services among customers. Secondly, perceived price values emerge as significant influences on customers' intentions to use e-banking, fostering adoption among stakeholders and customers alike. Thirdly, factors such as financial charges, security, privacy concerns, and financial malfeasance strongly impact the satisfaction levels of customers in utilizing e-banking.

Table 5. Discriminant validity using HTMT(Heterotrait–Monotrait ratio).

Construct	1	2	3	4	5	6	7	8
1. Fear of finance loss								
2. Fear of reputation damage	0.7787							
3. Avoidance motivation	0.5308	0.5265						
4. Price of digital device	0.1534	0.1664	0.2021					
5. Perc-Knowledge gap	0.2253	0.2859	0.4139	0.4070				
6. Intent to E-Banking	0.1242	0.0577	0.0254	0.4892	0.4060			
7. Infrastructure gap	0.2153	0.2431	0.4137	0.3565	0.4715	0.4039		
8. Perc. financial charge	0.3067	0.2124	0.3666	0.3153	0.3957	0.2871	0.5631	

Source: Authors' computation from ADANCO 2.2.1.

Table 6. PLS-SEM-Hypothetical path.

Effect	Beta (β)	M	SD	T-value	P-value	Decision
H1: Fear of finance loss -> INTENT to E-Banking	-0.1756	-0.1908	0.0432	-4.0599	0.0000	Supported
H2: Fear of reputation damage -> INTENT to E-Banking	-0.0726	-0.0710	0.0622	-1.1678	0.2430	Not supported
H3: Avoidance motivation -> INTENT to E-Banking	-0.0965	-0.0815	0.0480	-2.0104	0.0444	Supported
H4: Price of digital device -> INTENT to E-Banking	0.2973	0.2994	0.0451	6.5917	0.0000	Supported
H5: Perc-Knowledge gap -> INTENT to E-Banking	0.2476	0.2387	0.0407	6.0890	0.0000	Supported
H6: Infrastructure gap -> INTENT to E-Banking	0.2162	0.2121	0.0446	4.8511	0.0000	Supported
H7: Perc. financial charge -> INTENT to E-Banking	0.0843	0.0823	0.0419	2.0107	0.0444	Supported
Coefficient of determination (R^2)						
Intent to E-banking = 0.352						

Source: Authors' computation from ADANCO 2.2.1.

Lastly, the development of a comprehensive theoretical model, integrated with other emerging technologies aimed at enhancing e-banking customer satisfaction, should be pursued and implemented. This holistic approach stands to improve the overall efficacy and user experience of e-banking services.

Many studies primarily focus on the factors influencing the utilization of mobile financial services, recognizing that such technological advancements are relatively new, particularly for elderly consumers who often require education or training on these technologies (Albashrawi & Motiwalla, 2017). Various barriers hinder the acceptance, adoption, and usage of mobile commerce among the elderly, with security and trust emerging as prominent concerns within this demographic (Lian & Yen, 2014). Financial institutions face the challenge of instilling trust to engage this audience, notwithstanding prevailing perceptions of distrust within the sector (Benamati & Serva, 2007). Moreover, user interaction with the Internet primarily relies on trust, although often nonchalantly (Howah & Chugh, 2019).

The analysed data provided significant insight into the socio-economic factors and perceived identity risk factors that inhibit the adoption of e-banking services. Considering the emergence of the COVID-19 pandemic, it is evident that many financial institutions have inculcated the habit of online transactions into their clients to make greater use of technology (e-banking facilities). However, it is known in the less digitalised economies, for that matter, Ghana, where the current study is hinged on, that e-banking not only reduces queues (or client waiting time) but helps to fulfil one of the basic protocols of the World Health Organisation, i.e. avoiding face-to-face contact. This research is novel because of its unique conceptual model, which presents online and socio-economic factors that impede the adoption of e-banking today. Tailoring the measurement items to align with the specifics of the current study involved the adaptation of research constructs drawn from relevant literature. Regarding the perceived identity theft factors, security and privacy concerns were drawn from studies by Nwaiwu et al. (2020) and Zanoon and Gharaibeh (2013). Fear of financial loss and fear of reputational damage were sourced from research conducted by Walsh et al. (2016). Avoidance motivation was derived from the work of Hille et al. (2015), while intention towards e-banking transactions was adapted from Venkatesh et al. (2003). All three factors relating to the socio-economic situation were informed by the research of Jibril et al. (2020b).

H1: The perceived fear of financial loss during online transactions would negatively affect the intent to engage in e-banking transactions.

The first hypothesis of this study is that the perceived fear of financial loss during an online transaction would negatively affect the intent to engage in the e-banking service. This is because the perceived

fear of financial loss connotes the potential loss of money from online transactions. In this study, the construct is one of the perceived online risk factor dimensions. With this in mind, sceptical customers or users who are not sure about the successful outcome of the transaction may think they may lose money in the process. Based on the regression and significant value of our findings, *H1* was confirmed and suggested that customers' inability to maximise the use of e-banking service has triggered the security and trust components of the service. This study corroborated the work of Nwaiwu et al. (2020), which was also in Nigeria's service-based organisations.

H2: The perceived fear of reputation damage (or identity theft) during online transactions would negatively affect the intent to engage in e-banking transactions.

The study further investigates a dimension of perceived online risk factor (known as perceived reputation damage) regarding hypothesis two. This construct espouses the identity theft that may occur when a bank customer engages in e-banking services. Security and privacy concerns have become a driving force for prospective and existing customers' decision-making to embark on e-banking transactions. Though our results show a negative relationship between perceived reputation damage and the intent to adopt e-banking services, the effect was not statistically significant. The findings were contrary to the earlier work of Jibril et al. (2020a), which studied customers of two banks in the same study context.

H3: The uncertainty about the service outcome (avoidance motivation) would negatively affect the intent to engage in e-banking transactions.

The study's third hypothesis was supported, which has to do with the negative relationship between avoidance motivation and the intent to engage in e-banking transactions (*H3*). Avoidance motivation describes the perception (or the state) at which a person anticipates a harmful effect of using new technology. In this light, the findings suggest that once the bank customers envisage a possible negative outcome of the service, they are not motivated to accept or adopt this e-banking, hence avoiding it entirely. Therefore, the study's participants know that since the e-banking service repurposes regular banking services, they believed that the outcome of the service could be compromised. This finding is in line with Rhoa and Yub (2011) research and subsequently confirms the work of the proponent of technology threat avoidance theory (see Liang & Xue, 2009).

H4: The perceived price of digital devices would negatively affect the intent to engage in e-banking transactions.

The fourth hypothesis considers the relationship between the price of digital services and the intent to adopt e-banking. It is worth noting that the current study discovered a significant correlation between the price of digital services and the intention to use e-banking services in Ghana. That is to say, *H4* was supported and suggested that bank customers in less digitalised economies are concerned about their income level relative to the price of digital services, including the cost of digital devices (such as smartphones, tablets, and so forth.). This result emphasises that the higher the cost of facilitating conditions to adopt e-banking service, the lower the willingness they (customers) exhibit towards e-banking service. This evidence corroborated with earlier research from Boateng et al. (2016), which assessed the determinants of Internet banking in a developing country.

H5: Perceived knowledge gap among prospective/users would negatively affect the intent to engage in e-banking transactions.

The fifth hypothesis of the study was to ascertain the effect of the perceived knowledge gap on the intent to engage in e-banking services. The hypothesis statement was supported; thus, the perceived knowledge gap among bank customers would negatively affect the intention to adopt e-banking services. As mentioned earlier in the literature section, the perceived knowledge gap in this study context describes the customer's sufficient experience or information to hook up on the new technology (Chhatwani & Mishra, 2021). The finding suggests that ICT knowledge, such as knowing how to navigate websites and use bank apps, among others, tends to encourage prospective and existing bank customers to leverage these technologies and make banking transactions stress-free. This finding aligns with that of Al-Jabri and Sohail (2012).

H6: Non-availability of infrastructure would negatively correlate with engaging in e-banking transactions.

The sixth hypothesis explains the negative correlation between infrastructure deficit and the intent to engage in e-banking services. Indeed, the results show that the infrastructure gap negatively affects customers' intention to adopt e-banking services. In this research, the infrastructure support system involves the availability of Wi-Fi connections, stable Internet connection, affordable broadband, and constant electricity supply, among others, to the general citizens (or customers). Therefore, the findings suggest that a deficit of these facilitation conditions within an emerging economy would inhibit the desire to adopt e-banking. This evidence supports the ongoing discourse and further strengthens the literature on similar research themes (see Eren, 2021; Rafdinal & Senalasari, 2021).

H7: Perceived financial charges would negatively affect the intent to engage in e-banking transactions.

The last hypothesis examines whether perceived financial charges negatively affect the customer's intent to adopt an e-banking service. The hypothesis statement (H7) was partially supported. This evidence suggests that bank customers are not happy with the additional costs charged by banks due to the new technology (e-banking service). However, it is interesting to note that for banks to recover their operating cost of integrating e-banking system, such costs are transferred to the customer. Having this cost burden in mind, the customer would prepare to ignore the e-banking service and switch to the old physical banking service to avoid possible financial charges. The current research confirms the outcome of a study by Namahoot and Laohavichien (2018).

The findings of our study resonate with and complement existing research conducted in both Ghanaian and developing economy contexts, shedding further light on the factors influencing Internet banking adoption. Firstly, in alignment with prior Ghanaian studies, our research underscores the pivotal role of perceived usefulness and ease of use in driving customer adoption of Internet banking. This echoes the findings of Mbokoh (2016), Nimako et al. (2013), and Perkins and Annan (2013), highlighting the enduring importance of these factors within the Ghanaian banking landscape. Secondly, our study's emphasis on perceived price value mirrors the dissatisfaction expressed by Ghanaian customers regarding transaction fees and charges, as identified by Nimako et al. (2013). This finding also resonates with research conducted in India by Kumar et al. (2023), indicating a shared concern across diverse developing economies regarding the financial aspects of Internet banking. Additionally, our study acknowledges the importance of infrastructure availability in driving customer adoption of Internet banking, aligning with research conducted in Nepal by Gautam and Sah (2023). Lastly, our research underscores the universal challenges of security, privacy concerns, and financial malfeasance, aligning with prior studies in both Ghana and other developing economies. This reaffirms the critical role of trust and security in fostering customer satisfaction and adoption, as emphasized by Perkins and Annan (2013) and Uche (2023) in the Ghanaian and Nigerian contexts, respectively. By acknowledging the shared challenges and nuances across diverse geographical contexts, our research underscores the importance of a holistic approach to address the multifaceted factors influencing Internet banking adoption in sub-Saharan African countries and other developing economies.

5.1. Theoretical implications

E-banking, in general, has received considerable attention from scholars and other industry players alike. It is studied as a strategic management tool that banks perform in service quality regarding the effectiveness and efficiency of the new technology in the financial industry (Botchway et al., 2019; 2020; Kennedy, 2012; Vinodhini & Chandrasekaran, 2012). Hence, this study opens a pathway for scholarly work on the barriers of FinTech regarding the strategic implementation of digital technologies adoption (or engagement) in a service-based organisation, particularly in the banking industry in developing economies. Furthermore, the study adds to the technology adoption literature and provides a theoretical basis for scholars to unearth hidden dimensions of customers' constraints that impede the successful engagement of online banking transactions in a developing economy. Again, the avoidance motivation theory is barely applied in the context of e-banking literature; hence, this research extends the theory's application to enhance its validity and reliability.

5.2. Practical implications

Practically, the study serves as a guideline for bankers and other players in the financial industry. Understanding customers' behaviour in technology adoption helps firms make profitable decisions in the long term. In other words, financial practitioners could rely upon this current study to deploy strategic management and marketing tools to curb the avoidance of e-banking service engagement from the customer side. The study further admonishes banking institutions to intensify user education on the adoption and continual use of e-banking services so far as e-banking has come to stay. This user education is necessitated due to the growing usage of technology across the business environment, and it would help mitigate the perception of constraints associated with the new technology (e-banking). It will be imperative for bankers to take an immediate approach to remedy the persistent avoidance or slow adoption of technology, particularly in the emerging economies this study hinges on.

5.3. Conclusion, research limitations and future direction

Our study quantitatively analysed 672 responses (bank customers) to establish the barriers to e-banking services in an emerging economy (Ghana). Notably, fear of financial loss, fear of reputation damage, and avoidance motivation are classified as perceived online risk factors. In contrast, the price of digital devices, perceived knowledge gap, infrastructure gap, and perceived financial charge are categorised as socio-economic factors. The study hypothesised and concluded that except for fear of reputation damage, all other constructs were significant barriers to adopting e-banking services in Ghana. The study recommends that for developing economies such as Ghana, a sub-Saharan African country, to achieve a cashless economy, prudent measures should be instituted by the banks and regulators alike to instil confidence in the citizenry regarding e-banking services.

Like others, this research is not without limitations. First, the analysis considered only bank customers' views while overlooking the bank practitioners' views. Second, the study factored in online risks and socio-economic factors (variables) without considering cultural and psychological factors that could inhibit the adoption of e-banking transactions in Ghana. Next, the study's sample size may be small compared to the number of customers of various commercial banks in Ghana, which could affect the generalisability of the results. Hence, the researchers invite future scholars to consider a mixed-methods approach to investigate the current theme in a similar jurisdiction (or context). Also, it would be interesting if other important variables were factored into a new study. Notwithstanding, the authors recommend that future studies increase the sample size to strengthen the reliability and validity of the proposed research model. In addition, a comparative study from emerging economies could be interesting to ascertain similarities and discrepancies from the current model.

Author contributions statement

Abdul Bashiru Jibril: The conception and design, or analysis and interpretation of the data; the drafting of the paper, revising it critically for intellectual content; and the final approval of the version to be published. **Frederick Pobe:** The conception and design, or analysis and interpretation of the data; the drafting of the paper, revising it critically for intellectual content; and the final approval of the version to be published. **Saikat Gochhait:** Revising it critically for intellectual content; and the final approval of the version to be published. **Ritesh Chugh:** Revising it critically multiple times for intellectual content and flow; and the final approval of the version to be published. All authors agree to be accountable for all aspects of the work.

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Data availability statement

Data is available upon reasonable request.

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