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Examining E-banking Use in Yemen:

A Quantitative Study from the Perspective of the Unified Theory of Acceptance and Use of Technology 2

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This thesis uses a quantitative method to explore the factors that influence the use of electronic banking (e-banking) in Yemen, considering the role of socio-economic conditions and technological accessibility. By using an adapted Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model, the study examines how performance expectancy, effort expectancy, social influence, facilitating conditions, habit, and trust impact e-banking use among Yemeni people. The research reveals that while performance expectancy, effort expectancy and facilitating conditions significantly influence e-banking use, the role of habit seemed insignificant. The additional construct trust showed mixed results, which suggests that its influence is moderated by infrastructural and socio-economic factors. The study also highlights a digital divide, where differences in e-banking use are influenced by differences in internet access, technological availability, and digital skills. This research contributes to understanding the complex dynamics of e-banking in the Yemeni context and offers insights into strategic approaches to improve digital financial inclusion in Yemen. The findings emphasize

the necessity for improving technological infrastructure and tailoring e-banking services for varying levels of digital skills and access.

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1 Introduction

1.1 Background

Over the past decades, the global landscape has witnessed rapid digital transformation, facilitated by the broad adoption of internet and mobile technology. This progress has included the emergence of electronic banking, which has played a central role in the transformation of the worldwide financial industry (Claessens, Glaessner & Klingebiel, 2001).

Electronic banking, also known as e-banking, includes a variety of banking services and transactions conducted through electronic devices, such as computers or mobile devices, allowing customers to access banking services remotely through the Internet. The emergence of e-banking in the form we recognize today initially appeared in the fall of 1995, and experienced widespread adoption by numerous banks within the first three years (Orr, 1998). Although early e-banking services were relatively basic, focusing mainly on facilitating access to account-related information, these early attempts led to the research and development of more services. This includes capabilities for instantaneous transactions, processing loan applications, and opening new accounts to name a few (Sharma, 2016).

As a result of this development, a new approach to managing customer finances emerged. This approach relies on the ability to conduct banking transactions without the need to be physically present in bank branches (Vyas, 2012). Furthermore, the adoption of e-banking services has also benefited banks by allowing them to reduce operational costs. This led to reduced requirements for the infrastructure and workforce that traditional banking methods require to provide customer service (Cheng, Lam & Yeung, 2006).

Research on technology adoption and use reveals a wide range of influencing factors. When the analysis is narrowed down to the individual's psychological dimensions, factors such as perception, motivation, and affective states emerge as central factors influencing technology adoption (Stroh, Mention & Duff, 2022). Additionally, Lu et al. (2005) conducted research on graduate students at a regional university in Texas to identify factors influencing their decision to adopt wireless Internet services through mobile devices. They found that social influences, personal willingness to experiment, usefulness, and ease of use are strong drivers of technology adoption.

Corrales and Westhoff (2006) argue that political regimes also have an influence on technology adoption, where authoritarian regimes may restrict the use of certain technologies whose content they cannot control while promoting technologies that are within their control. Further research by Abu-Shanab (2011) demonstrated that level of education also influences the adoption and use of certain technologies. The research examined banking customers in Jordan and revealed that those with an advanced level of education were more willing to adopt and use e-banking services than others.

In some cases, age may be considered a factor influencing technology use, however Shen (2019) supports the notion that the consequences of aging such as hearing loss, vision

impairment, or neurological symptoms are in fact the direct factors influencing technology adoption and use. He added that elderly people who do not suffer from physiological aging do not differ in their tendency to adopt technology from other people.

1.2 E-banking in The Middle East

The United Nations Economic and Social Commission for Western Asia's (ESCWA) report on the maturity index of electronic and mobile government services (2023), which gathered data from 17 Arab countries, indicates a significant improvement in electronic services overall. The United Arab Emirates and Saudi Arabia are among the leading countries in this field. Furthermore, the report shows a relationship between the Gross Domestic Product (GDP) per capita and the proliferation of e-services. With Saudi Arabia and the UAE ranking the highest GDP per capita alongside widest spread of e-services, there is sufficient evidence to support the relationship between the two. Despite the differences in GDP per capita among Arab countries, as indicated in the report, the most widely used service is the payment of electricity bills through the Internet which is a form of e-banking. This illustrates the increasing use of e-banking services in the region. According to Al-Aghbari et al. (2015), Yemen is a developing country that faces many challenges, including fragile infrastructure. Al-Bashiri (2021) discusses that the ongoing conflicts in the region has compromised the communications infrastructure through regular acts of sabotage and destruction. This disruption poses a barrier to the expansion of Internet services within the country.

In early 2022, Yemen experienced remarkable advancements in its telecommunications sector. Yemen Mobile launched the fourth generation of broadband cellular network technology (4G) internet services as the first provider of service within the country (Yemen Mobile, 2022). Initially, the service faced several issues and was only available with limited capacity. This was later expanded and developed as technology advanced (Al-Yousifi, 2023). In the study conducted by Alhakimi and Esmail (2020) on the factors influencing the adoption of Internet banking services in Yemen, the authors pointed to the desire of customers to expand access to the network, especially in rural areas. Moreover, they concluded that banks and Internet providers should cooperate to make Internet services accessible to all segments of society.

According to Al-Muhrami et al. (2021), 18 banks are operating in Yemen. Although specific dates for the initiation of e-banking services in Yemen are not provided, he pointed out that these services went through a noticeable improvement in the early 2000s. Currently, all 18 banks offer some form of e-banking service, whether it's through websites or smartphone applications. The quality and type of these services vary from one bank to another. Some banks only provide basic services, such as account information and current balance, while others offer more advanced services. Some banks, such as Al-Qutaibi Bank and Al-Busairi Bank, have established a smooth user experience. They have made it possible to open a bank account remotely without the need to visit bank branches, which has made it possible for a larger number of customers to open bank accounts from anywhere. Although the process of activating the account may take a long time and, in some cases, requires visiting the branch or conducting an interview via Zoom or Google Meet to verify one's identity, it is still an effective and desirable way in the Yemeni market.

In the political arena, Yemen's government aims for large-scale digitization. As part of this plan, the Ministry of Finance has created a strategy for deploying an integrated financial management system across government entities. Consequently, it issued the Official

Announcement No.6 July 2023, requiring that all central and local government bodies disburse employee salaries only via banking channels, and implementation was expected within a maximum period of one month from the date of issuance of the announcement (Ministry of Finance of the Republic of Yemen, 2023).

1.3 Delimitations

Due to an ongoing war in Yemen certain delimitations need to be made to preserve the consistency of the responses. The war has been going on for more than ten years and the country has suffered from political and administrative division across all state institutions ever since the Houthi movement took control of the capital, Sanaa, in 2014 (BBC, 2014). Consequently, Aden was declared the temporary capital, and the government administration was relocated there. It has been internationally recognized as the legitimate representative of the Yemeni people (DW, 2015). The conflict continues to push Yemen closer to two separate states, with neither recognizing the legitimacy of the other. Because the Houthi movement sought to separate state institutions, government decisions from Aden, including the Official Announcement No. 6 issued by the Ministry of Finance, are not recognized in areas under Houthi control (Aljazeera, 2019).

Furthermore, as discussed by Aghajanian and Mele (2023), the conflict between the regions has led to a significant economic gap concerning the valuation of the Yemeni rial. Additionally, the Houthis recently issued a new 100-riyal coin, which Saeed Al-Batati (2024) argues will further increase the prevailing economic divide in Yemen. Since political regimes influence technology adoption and use (Corrales & Westhoff, 2006), studying the factors influencing e-banking use in areas under Houthi control may yield results inconsistent with those from areas controlled by the Aden government. Therefore, this study will focus on provinces primarily under the control of the Aden government, including Abyan, Aden, Al-Jawf, Al-Mahra, Dhale, Hadhramaut, Lahij, Marib, Shabwah, Socotra, and Taizz. It is important to note that in the proceeding chapters, when referring to Yemen, this study specifically discusses the parts of Yemen under the Aden government. Figure 1.1 depicts the areas under Houthi control in red, which are the provinces excluded from this study: Al-Bayda', Al-Hudaydah, Al-Mahwit, Amran, Dhamar, Hajjah, Ibb, Raymah, Sa'dah, and Sana'a, the previous capital of Yemen.

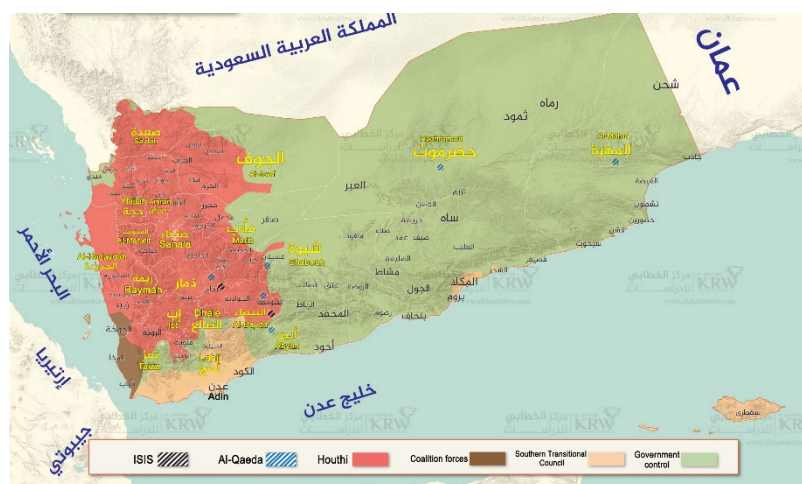


Figure 1.1: Map of the territorial division in Yemen (adapted from Khattabi Centre for Studies, n.d.).

1.4 Research Question

The central objective of this research is to investigate which key factors influence the adoption and use of e-banking services in Yemen and how demographic and socioeconomic conditions impact the use of e-banking services. This research will explore:

1. What are the key factors influencing the use and continued adoption of e-banking in Yemen?
2. How do demographic and socioeconomic conditions affect the use of e-banking in Yemen?

1.5 Purpose

This study aims to identify the impact of several factors on the use of e-banking in Yemen. These factors include performance expectations, effort expectations, social influence, facilitating conditions, trust, and habit, all moderated by demographic attributes such as age, gender, and experience. Additionally, the study considers the impact of digital divide factors such as education and income levels, geographical conditions, and the lack of physical access to technology and the internet, which all contribute to the digital divide. We intend to measure the impact of education and income level as potential moderators.

1.6 Significance of the Study

Studying the factors behind the adoption and use of e-banking in Yemen is crucial due to the country's socioeconomic conditions and its fluctuating political situation. Compared to its counterparts, the amount of research devoted to this field is very limited. Furthermore, there is a lack of academic work examining the adoption and use factors following the implementation of the official announcement by the Ministry of Finance mentioned earlier.

2 Literature Review

2.1 Theoretical Framework

2.1.1 *Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)*

Over the years, the landscape of e-banking has evolved significantly, with a range of theoretical models being utilized to understand the factors influencing technology use. Among these models is the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), introduced by Venkatesh, Thong, and Xu (2012), which stands out as a framework designed to examine technology acceptance and use in the context of a consumer. The UTAUT2 was developed by integrating three new constructs into the original UTAUT, which extended its applicability beyond organizational settings to better suit a consumer context. This extension of the UTAUT2 is especially relevant for studying e-banking adoption and use, where individual consumer decisions play a crucial role.

2.1.1.1 *Earlier models*

Over time a wide range of models have been created as a result of an effort to determine the factors influencing the acceptance and use of technology. However, Davis (1989) argued that prior research had “been constrained by the shortage of high-quality measures for key determinants of user acceptance,” which led him to develop the Technology Acceptance Model (TAM) attempting to seek better measures for predicting and explaining the use of technology. Davis's (1989) investigation focused on two theoretical constructs, perceived usefulness, and perceived ease of use, as the main predictors of technology adoption in organizational settings.

With time more models would appear such as the TAM2 and the Motivational Model, each adding new variables and contexts to better understand the factors influencing technology acceptance. These efforts are what led to the creation of the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003), which incorporated the findings from eight models and theories including TAM. As a result, the UTAUT identified four key constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions, which were found to have a significant impact on technology acceptance and usage, alongside moderators such as age, gender, and experience.

2.1.1.2 *Core Constructs of UTAUT2 and Their Application to E-banking*

UTAUT2 was introduced to improve the original UTAUT model by integrating three new constructs, namely Hedonic Motivation, Price Value, and Habit, alongside the existing ones: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. These additional constructs were meant to examine how the original UTAUT models focus on explaining employee technology acceptance and use could be extended to the context of consumer technologies (Venkatesh et al., 2012). Each of these core constructs offers different perspectives in which to examine the factors influencing the adoption of e-banking in Yemen.

Performance expectancy: Is described as the degree to which using a certain technology is perceived to help and provide benefits in performing certain activities (Venkatesh et al., 2012). In the context of Yemen, where the banking sector is facing many challenges, e-banking offers an opportunity to improve financial services accessibility and efficiency. Therefore, the perceived benefits of e-banking in enhancing financial transactions can significantly impact its adoption among Yemeni users.

Effort expectancy: Is defined as the degree of difficulty that is associated with the use of technology, which refers to the ease of use (Venkatesh et al., 2012). In a country like Yemen, where the technological infrastructure may not be as developed or evenly developed across the country, the ease of use of e-banking platforms may be crucial. Simplifying the e-banking interfaces can lower barriers to adoption, especially in a less tech-savvy population.

Social Influence: Measures the degree to which the user perceives those important others in the user's close network such as family and friends are of the opinion that they should use a certain technology (Venkatesh et al., 2012). Consequently, the construct is about the social pressures or norms influencing technology use. As described by Greer (2021), family plays a crucial role in Arab culture. Therefore, the influence of family and friends on individuals' decision to adopt and use new technologies like e-banking services must be considered. These social dynamics cannot be underestimated in the process of raising the wider acceptance of e-banking services.

Facilitating Conditions: Refers to the extent to which an individual perceives that the use of a technology is supported by technical and organizational infrastructure (Venkatesh et al., 2012). When it comes to the use of e-banking services, the availability of the necessary technological infrastructure plays a crucial role. This becomes even more noticeable in regions with limited access to traditional banking facilities.

Hedonic Motivation: "Is defined as the fun or pleasure derived from using a technology" (Venkatesh et al., 2012). The enjoyment that the user experiences from using electronic services may be an important consideration when it comes to other types of services. However, in the case of Yemeni users and their primary objectives in using e-banking services, their experienced enjoyment is considered less relevant.

Price Value: Measures the user's cognitive trade-off between their perceived benefits of using a certain technology and the monetary cost associated with using it (Venkatesh et al., 2012). This is particularly relevant in personal consumption scenarios. Although, it might not be as relevant for e-banking services in Yemen since firstly there is no cost associated with its use and secondly it is considered to be more of a tool that simplifies and helps users to carry out their banking activities more efficiently.

Habit: Is defined as the extent to which the use of a certain technology becomes an automatic behavior, highlighting the effect of learning. Venkatesh et al. (2012) highlight the similarities between the construct habit and experience and point out that "experience reflects an opportunity to use a target technology and is typically operationalized as the passage of time from the initial use of a technology by an individual." However, they separate the two by referring to experience as a necessary but not sufficient condition for the formation of habits, and that depending on the user's experience with a certain technology, different levels of habit can be

developed. The habitual use of technology or more specifically e-banking services can influence its continued use considerably, especially for routine financial transactions.

2.1.1.3 Moderating Effects

In addition to the core constructs, Venkatesh et al. (2012) identified age, gender, and experience as key moderators that affect the relationship between the core constructs and both behavioral intention and technology use. They suggested that the seven core constructs affect the user's behavioral intention, which in turn influences their use behavior. In this context, the behavioral intention is an intermediary variable between the exogenous variables - the core constructs - and the endogenous variable use behavior, which indirectly influences the use behavior. However, they argued that use behavior could be directly affected by the constructs Facilitating Conditions and Habit. Venkatesh et al. (2012) argued that "Older consumers tend to face more difficulty in processing new or complex information, thus affecting their learning of new technologies" and that "compared to younger consumers, older consumers tend to place greater importance on the availability of adequate support."

They also argued that since women tend to be more interdependent, co-operative and consider more details compared to men, "in a consumer context, women are likely to pay more attention to the prices of products and services and will be more cost conscious than men." Additionally, they found that "women are typically more involved in purchasing and, thus, more responsible and careful with money than men are" (2012). Since e-banking in Yemen is free and there is not any price value associated with the use of the services it is not quite relevant to include the Price Value construct in our UTAUT2 model, however examining the differences between genders remains highly relevant, as the gap between women and men is substantial, and women face challenges in securing their rights in a male dominated society (Manea, 2010).

Venkatesh et al. (2012) showed that not only gender but also age moderates the effect of price value on the behavioral intention and discussed further that "greater experience can lead to greater familiarity with the technology and better knowledge structures to facilitate user learning, thus reducing user dependence on external support" and that "experience will work in tandem with age and gender to moderate the effect of habit on behavior." This suggests that the moderating effects of age, gender and experience offer a more multifaceted view of how different factors influence the adoption and use of technology, more specifically e-banking services, across diverse consumer groups.

2.1.1.4 Behavioral intention and Use Behavior

In the context of the UTAUT2, Behavioral Intention and Use Behavior are the two central constructs that represent the results of multiple influences from previous model components. These components provide an insight into how and why individuals decide to adopt and to use technology in the context of a consumer:

Behavioral Intention refers to the degree of which the user is inclined to engage in the use of a technology. It is a predictive indicator on if the user is intending on using a technology in the future. According to Venkatesh et al. (2012) UTAUT2 model behavioral intention is influenced by each of the core constructs.

Use Behavior refers to a user's actual usage of a technology. It is the actualization of behavioral intention in practice. In contrast to behavioral intention, use behavior is directly influenced by behavioral intention, facilitating conditions and habit (Venkatesh et al., 2012).

Both of these components are important in determining what influences technology adoption and integration into daily activities. Behavioral intention is the forerunner to use behavior and understanding its determinants is vital in predicting technology adoption and use. Since there is some overlap in these two terms, and they collectively describe the individuals use of a certain technology, we decided to combine these two components to one component named Use, which could be observed in figure 2.1. Additionally, Kim and Crowston (2011) described the term adoption in technological contexts to be heavily associated with use. Aiming to not confuse the reader, these terms will both be represented by the component Use in the framework.

2.1.1.5 Justification for Using UTAUT2 in the Yemeni Context

The UTAUT2 was specifically chosen as the theoretical framework for this study, which is justified by its extensive approach and its focus on consumer behavior rather than studying individuals from an organizational context. In contrast to the Technology Acceptance Model and the Original UTAUT, the UTAUT2 also takes habit into account as a predictor of adoption. In the context of Yemen, where individual behavior influences the adoption and use of new technologies, the additional predictor is especially relevant.

Additionally, the use of UTAUT2 as the framework of this study enables us to take a range of perspectives into account in exploring the factors influencing the adoption and use of e-banking in Yemen. By carefully studying each construct's role within the context of Yemeni consumers, this research aims to deliver not only a better understanding of the factors influencing use amongst Yemeni consumers but also valuable insights into designing and implementing effective strategies to raise the adoption of e-banking services.

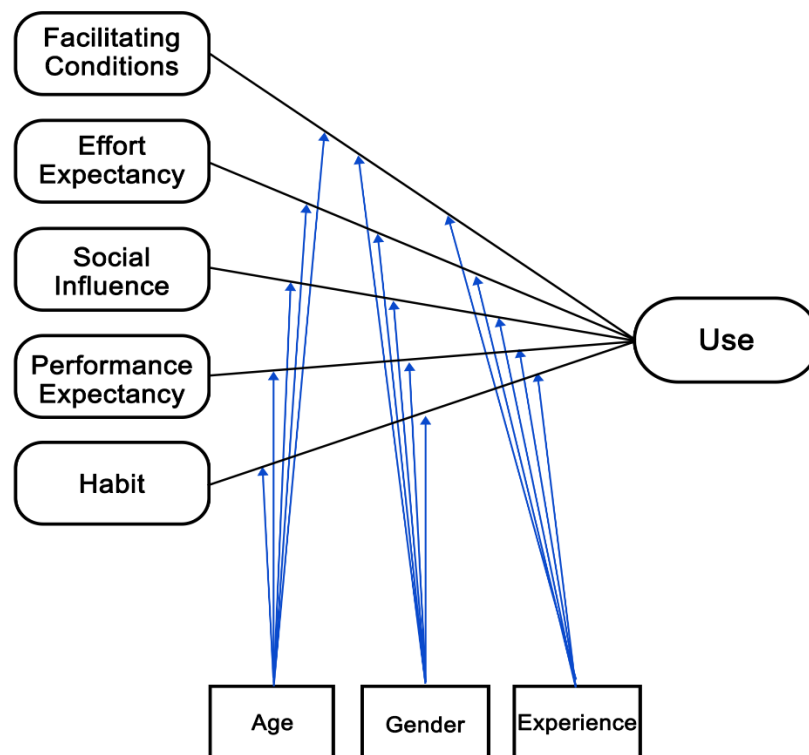


Figure 2.1: UTAUT2 without Hedonic Motivation and Price Value (adapted from Venkatesh et. al. 2012)

2.1.2 Digital Divide

2.1.2.1 Defining the Digital Divide

The Digital Divide, a term that was first coined in the mid-90s in the United States, described the gap between those who do and those who do not have access to new forms of information technology (Van Dijk, 2006). It goes without saying that the technological landscape has advanced rapidly since the early 2000s and the term Digital Divide evolved into describing the gap between people who do and do not have access to forms of information and communication technology. However, such a simple term has caused more confusion rather than clarification. Van Dijk (2006) argued that the confusion was due to misunderstandings such as there being a simple divide between two clearly divided groups with a big gap between them, the gap being difficult to bridge or even the suggestion that the divide is a static condition while in fact the gaps are continually shifting. Due to these misunderstandings and difficulties from a scientific point of view, he reviewed research on digital divide from the years 2000-2005 in order to carefully distinguish between different kinds of digital divide.

In his research, Van Dijk (2006) discusses four types of access: material access, motivational access, skills access, and usage access. He started his discussion on material access which was focused on people's physical access and the most notable demographical categories in this context included income, education, age, sex, and ethnicity. He showed that there were growing gaps between people with different income levels and levels of finished education, however the gaps between the genders had closed in over the years.

Next, Van Dijk (2006) discussed the motivational access which proposed that some people just remain on the “wrong” side of the digital divide due to motivational problems and showed that some of the main factors influencing people's motivation were: no need or significant usage opportunities, lack of money or lack of skills.

A person may have the motivation to use a computer and can gain access to one as well, however, without the proper abilities to make full use of the hardware and software, the person cannot be considered to have full access, since he or she lacks the necessary skills. On account of there being multiple definitions of the concept “Digital Skills” in prior research, Van Dijk (2006) proposed a distinction between information skills and strategic skills. Information skills being the skills to search, select, and process information in computer and network sources, whereas strategic skills can be described as the ability to use computer and network sources as a tool for reaching particular goals and for the general goal of improving one's position in society. This research showed that at the time that prior research on digital skills was relatively scarce. Although it did show that the divides of skills access were bigger than the divides of physical access and that while the physical access gaps were closing in on each other, the skills gap tended to grow. Additionally, Van Dijk (2017) argued that the reason that there has been little research done on the actual level of digital skills people possess is because most digital skills are not the result of computer courses but rather of learning through practice in particular social user environments.

The last type of access, usage access, refers to the actual usage of digital media, which is the final goal in adoption of technology. As stated by Van Dijk (2006), while at the time the gender physical access gap in the Netherlands almost had been closed, the usage gender gap was still significant. Further research showed significant differences between users with different social classes, education, and ethnicity as well.

Moreover, the evolving nature of the Digital divide suggests new perspective with exploring within the context of e-banking adoption. As identified by Lythreatis et al. (2021), newer forms and levels of digital divide, such as type-of-internet access and data inequalities have emerged to explain the differences in digital access. Their insights invite further examination into how the newer aspects of the digital divide might affect individuals' adoption and usage of e-banking services in Yemen.

2.1.2.2 Evolution and Scope of the Digital Divide

As Van Dijk (2006) stated, early Digital Divide research mainly focused on measuring the number and categories of people who had access to a computer with a network connection. This approach mainly focused on the binary classification of individuals as either having or lacking physical access to digital technologies. However, in 2002 this view of strictly focusing on physical access came to be seen as overly simplistic and the scope of research began shifting towards a more multifaceted understanding of the digital divide. It was during this time that Hargittai (2002) coined the term “second-level digital divide,” directly addressing the need to move past mere physical access as she argued that “as more people start using the Web for communication and information retrieval, it becomes less useful to merely look at binary classifications of who is online when discussing questions of inequality in relation to the Internet. Rather, we need to start looking at differences in how those who are online use the medium, that is, differences in people’s online skills” (Hargittai, 2002). The important contributions by Hargittai emphasized the importance of researching the quality of Internet use and skills required to effectively navigate and utilize online resources.

Building upon these insights offered by Hargittai (2002), Van Dijk (2006) further explored the complexities of the digital divide as he discussed how early research had concentrated all too narrowly on physical access. This led him to introduce the term “deepening divide” as he was trying to address that the real issue actually begins as individuals attempt to integrate digital technologies into their daily lives, which involves social, psychological and cultural aspects. Van Dijk’s work thereby complemented Hargittai’s work by highlighting a more comprehensive view that acknowledges that the journey toward digital adoption involves motivation, attitudes, and expectations before physical access, requiring the acquisition of necessary skills and competencies for a meaningful use of the technology.

The deepening divide, as discussed by Van Dijk, aligns with the findings from more recent studies which argue for a more comprehensive approach to understanding digital inequalities. The work of Lythreatis et al. (2021) supports this view by highlighting the role that education, digital training, and social support has in adopting and using information technology. Their research suggests that effective strategies to bridge the digital divide in e-banking must go beyond improving mere physical access, emphasizing the importance of improving digital skills and ensuring equal access to digital technologies across different sociodemographic groups in Yemen.

Van Dijk (2017) noted that between the years 2005 and 2015, the focus of the digital divide research shifted to a great degree towards the second-level digital divide, further investigating the qualitative aspects of technology use. This shift highlights the more nuanced understanding of digital divide, that full technical adoption is not achieved until the technology is actively used in a way that enriches the user's life.

More recent literature has further expanded the insights of the Digital Divide research, highlighting not only the traditional binary distinction of access, but also the multifaceted nature of digital access. Lythreatis et al. (2021) categorize factors influencing the digital divide into

sociodemographic, socioeconomic, personal elements, social support, type of technology, digital training, rights, and infrastructure. This broader perspective underlines the complexities of digital access and shows how multiple interrelated factors contribute to digital inequalities. This understanding supports the inclusion of nuanced moderators in the UTAUT2 framework, reinforcing the necessity to address diverse elements influencing e-banking adoption in Yemen.

2.1.2.3 Integrating the Digital Divide into the UTAUT2 Framework

The more nuanced view of the Digital Divide, specifically the distinctions made by Van Dijk (2006; 2017) regarding material, motivational, skills, and usage access, can offer a more comprehensive lens through which the use of e-banking services in Yemen is observed. To effectively incorporate these insights into the UTAUT2 framework and to consider the broader socio-technical landscape influencing users' interactions with e-banking technologies, certain adjustments and expansions are proposed.

As highlighted by the Digital Divide regarding people's capabilities and motivations, Trust in e-banking systems, which is influenced by perceptions of security, privacy, and reliability, must play an important role in the adoption process. This notion is supported by Gorbacheva et al. (2011) who in their study seeking to understand the factors influencing internet banking adoption, by developing a research model derived from the original UTAUT model and Digital Divide research, found that the strongest factor influencing the adoption of internet banking services is the individual's degree of perceived security. However, since their research was published the technical landscape has changed considerably and people's basic knowledge regarding technology has improved as well, which makes it interesting to investigate whether the construct Trust has the same influence in today's Yemen.

Similarly, to address the insights gathered from the discussion of the Digital Divide, our UTAUT2 framework will examine additional moderators, such as Education and Income Level. These factors directly influence the Digital Divide and have been shown to affect the process of adopting information technology. For instance, Van Dijk's identification of educational and income-related differences in digital skills and usage patterns indicates the importance of these as moderators in the context of e-banking use. This aligns with Lythreitis (2021) research which showed that education was the factor with the strongest relation to the Digital Divide.

Aligning with Hargittai's (2002) findings, experience with technology significantly improves users' online skills, supporting its use as a moderator in the UTAUT2 framework. Its inclusion acknowledges the positive effect of technology experience on e-banking adoption, which is particularly relevant in Yemen's diverse technological landscape.

Considering Yemen's ranking as number 155 of 156 in the Global Gender Gap Index (United Nations Development Programme, n.d.) in 2021, it remains highly relevant to address the gender gap in digital access and usage within Yemen in the adapted UTAUT2 framework. This inclusion allows for a deeper understanding of how gender, alongside the other moderators, influences the adoption of e-banking services, in a way which will reflect the complex interplay of social, cultural, and technological factors highlighted by the Digital Divide.

By adapting the UTAUT2 framework to incorporate insights from literature on Digital Divide, this research acknowledges the multifaceted nature of technology adoption and the specific challenges faced in Yemen. The inclusion of Trust as a core construct, alongside the moderators of Education, Income Level, and Experience, offers a comprehensive framework

to analyze e-banking adoption in Yemen, addressing both access and usage differences and their impact on digital inequality.

2.2 Review of Related Literature

2.2.1 Previous Research

In this subsection we will review the existing literature that contributes to understanding the adoption and use of e-banking services, primarily through adaptations of the UTAUT model and considerations of the Digital Divide across different cultural and demographic contexts. By highlighting various factors that influence the adoption of e-banking services in different contexts, these studies lay the groundwork for our investigation which is crucial for adapting the UTAUT2 framework to the socio-economic landscape of Yemen and the context of our research.

Abu-Shanab (2011) argued that the internet banking adoption was lagging in the Arab world. Therefore, he utilized an adapted UTAUT model, which incorporated perceived trust as a core construct and education as the only moderator, in his study focused on Jordan. This is especially relevant to our research as it highlights the importance of education as a moderator in technology adoption and use, which can be a significant factor in Yemen due to its diverse educational landscape. However, even though the two countries both are a part of the middle eastern region, the study's geographical focus on Jordan may limit its direct applicability to Yemen since there might be differences due to local conditions.

Using a different approach, Gorbacheva et al. (2011) developed a model combining UTAUT with Digital Divide insights to examine internet banking adoption in Western Europe. Unlike the typical applications of the UTAUT that examine the moderating effects, their research focused on the direct effects of certain demographic factors on the UTAUT constructs, which provides a useful perspective for our study since it offers a new way to look at how individual characteristics directly influence e-banking use.

Furthermore, Tamilmani et al. (2019) who evaluated hedonic motivation usage in UTAUT2 based studies, critiqued the appropriateness of including hedonic motivation in UTAUT2, when studying the adoption of technologies primarily used for utilitarian purposes like e-banking. Through meta-analysis they found that the relationship between hedonic motivation and behavioral intention was non-significant and consequently suggested that future researchers, who use the UTAUT2, to make the necessary adaptations to only include constructs that are relevant for the context of their study.

Similarly, Hilal and Varela-Neira (2022) found that hedonic motivation and price value had a limited influence in mobile banking adoption, by expanding the UTAUT2 to include proactive personality in their study of mobile banking in Lebanon. They argued that the non-influence of the price value was due to mobile banking services being done through free applications or websites and that since mobile banking can be categorized as self-business and serious financial service, it is not really considered a fun technology for enjoyment. Therefore, when adopting and using mobile banking users mainly focus on its utilitarian value.

Gharaibeh et al. (2018) used a qualitative approach to integrate mass media and trust into their study of mobile banking adoption in Jordan. While their research found mass media to have

an influence on the mobile banking adoption, its applicability to Yemen may be limited due to different media consumption patterns affected by the ongoing conflict. Hadi et al. (2022) and Hamdan and Zhu (2022) emphasized the significance of perceived trust and perceived risk in the adoption of mobile and electronic banking services. Their findings highlight the importance of these factors, which are also expected to have an effect in Yemen due to the current instability affecting institutional trust and technological infrastructure.

Moreover, Alhakimi and Esmail (2020) exploring the factors that influence people's intention to adopt internet banking in Yemen, they found that technological readiness and internet knowledge had a significant influence. This highlights the need to consider factors like how skilled people are with digital tools and the state of the infrastructure in Yemen, which can vary greatly across different regions. Additionally, they found that perceived risk, and perceived security does not influence people's intention to adopt internet banking in Yemen, which contradicts the outcomes of the research by Hadi et al. (2022) and Hamdan and Zhu (2022).

Further insights into the applicability of the UTAUT model in Yemen are provided by Al-Muhrami et al. (2021), who conducted quantitative research to explore the factors influencing the usage of e-banking government services among Yemeni citizens. By adjusting the UTAUT model to include factors such as culture, IT support, and familiarity alongside traditional constructs like performance expectancy and social influence, they found that these factors positively affected the behavioral intention to use e-banking government services. Similarly, Alduais and Al-Smadi (2022) used the UTAUT model to investigate the adoption of e-payment systems in Yemen, surveying 486 individuals. Their study revealed that performance expectancy, effort expectancy, and social influence positively influenced the behavioral intention to use e-payment systems, while facilitation conditions were negatively correlated with the behavioral intention. Notably, their findings suggested that age does not moderate the impact of these factors.

The reviewed literature provides a broad understanding of the factors influencing e-banking adoption and use and highlights the flexibility of the UTAUT and UTAUT2 frameworks to incorporate various contextual factors affecting e-banking use. However, there remains a lack of research specifically addressing the unstable conditions in Yemen, specifically in non-Houthi controlled areas. Our study aims to fill this gap by adapting the UTAUT2 framework to better reflect the socioeconomic and political realities of Yemen, thus providing deeper insights into the factors driving e-banking use in this region.

2.2.2 Integration of the UTAUT2 and Digital Divide

The dynamic landscape of e-banking use in Yemen presents a complex relationship between technological acceptance and various access issues, warranting for an integrated approach in seeking to better understand and address the challenges that arise due to this complex relationship. Although the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) provides a solid framework for examining technology acceptance behaviors, it is highly critical to adapt the framework with considerations of the Digital Divide to fully capture the multifaceted challenges and drivers influencing e-banking use in the context of Yemen. This integration aims to provide a comprehensive analysis that acknowledges not only individual and technological factors but also broader socio-economic and infrastructural factors that impact e-banking services' accessibility and usability in Yemen.

More recent studies have applied the UTAUT2 model within the Yemeni context, such as Al-Muhrami et al. (2021) and Alduais and Al-Smadi's (2022) work which validates the framework's relevance and adaptability to environments characterized by significant digital divide. Their research highlighted how the users' behavioral intentions towards adopting e-banking services is greatly shaped by performance expectancy, effort expectancy, social influence, and facilitating conditions. Their findings suggest that these constructs not only are integral to the UTAUT2 model, but also in describing e-banking adoption in environments like Yemen, where the technological adoption is affected by cultural, social and infrastructural conditions.

Al-Aghbari et al. (2015) offer crucial insights in describing the various challenges that e-government efforts face, which could be seen as similar to those of e-banking services. These challenges are categorized into organizational, technical and adoption challenges, which collectively contribute to creating gaps in the Digital Divide. When viewing their insights in the context of e-banking, it becomes clear that understanding and improving digital access, providing the necessary infrastructure, and improving people's skills in using digital technology will play an important role in increasing the use of e-banking services in Yemen. By closing these digital access gaps, e-banking services can more easily be accessed and used.

As emphasized by Gorbacheva et al. (2011), the importance of perceived security cannot be overlooked as their study showed how it plays a crucial role in the adoption of internet banking. Their research highlights the necessity of incorporating the construct trust and security into the UTAUT2 framework, which could show to be effective in describing the adoption and usage of e-banking among users in Yemen, where trust in financial institutions and digital platforms may be negatively affected by security and privacy concerns.

By adapting the UTAUT2 framework to include the Digital Divide insights, a more comprehensive understanding of e-banking use in Yemen could be attained. This approach not only acknowledges the individual and technological factors of the UTAUT2 but also highlights the broader socio-economic and infrastructural challenges that contribute to gaps in digital access. Applying this nuanced view is essential for developing effective e-banking strategies that satisfy the needs of the Yemeni people, which ultimately increases e-banking adoption in Yemen and demands for efforts to improve technological infrastructure, raise digital skills, and build user trust and security in order to bridge the gap between technology acceptance and broader access issues.

2.2.3 Trust as a Core Construct in E-banking Use

In the evolving world of e-banking, the term trust stands out as an essential factor that influences its adoption and sustained use (Hamdan & Zhu, 2022; Hadi et al., 2021; Hadi et al., 2022; Alhakimi & Esmail, 2020). The construct does not merely cover the faith in security and privacy of e-banking systems, but also the perceived reliability and integrity of the institutions that operate them. The relevance of trust is supported by a consensus in the literature which highlights its complex role in the use of e-banking services in Yemen.

The contributions of Hamdan and Zhu (2022) and Hadi et al. (2021) emphasizes the importance of perceived security and privacy with respect to e-banking adoption in Yemen. Their research illustrates the complex nature of trust by highlighting how it includes concerns over security, privacy, and the weighing of perceived risks against perceived benefits. Such insights are invaluable in understanding the complexity of trust and its impact on users' decisions to adopt e-banking services. Despite the existence of widespread concerns regarding

security and privacy, the contributions of Hamdan and Zhu (2022) show that these worries do not completely hinder people from using e-banking services. This suggests that other factors, like the ease of use and people's awareness of the benefits of using e-banking, also have important roles in influencing the use of e-banking services. This highlights the necessity of addressing a wider range of factors to effectively raise the e-banking adoption rates in Yemen.

The evidence presented in the literature supports the inclusion of Trust as a core construct within the adapted UTAUT2 framework for studying e-banking use in Yemen. This addition to the framework is vital in seeking to understand the multifaceted influence trust has on e-banking adoption and use, including both direct impacts but also those that are indirect through some other variable such as perceived risks, benefits, and ease-of-use. Previous work such as the ones of Alhakimi and Esmail (2020) and Hadi et al. (2022) provide support for this inclusion which seeks to highlight the role of trust in the user adoption process.

In conclusion, the role of trust in the use of e-banking services, particularly in the context of Yemen, cannot be overstated. The discussions and evidence presented highlight the need for banking institutions and policymakers to prioritize building and maintaining trust as a core strategy to encourage wider acceptance of e-banking services. The need for targeted strategies to build and sustain trust, can through improved security measures, open communication, and efforts to improve digital skills, bridge the digital divide as well. Ultimately, leveraging the construct of trust within the adapted UTAUT2 framework provides the opportunity to make advancements in understanding e-banking use in Yemen.

2.2.4 Justifying the Exclusion of Hedonic Motivation and Price Value

Hedonic motivation, which is described as the pleasure or enjoyment derived from using a certain technology, often plays a crucial role in the adoption of technologies such as social or entertainment platforms. However, on the subject of e-banking adoption, which is mainly driven by utility, some reevaluation of hedonic motivation's role within the UTAUT2 framework has to be made, especially in the context of Yemen.

Gharaibeh et al. (2018) utilized the UTAUT2 framework with a qualitative approach seeking to identify the factors influencing the adoption of mobile banking services in Jordan, suggest that hedonic motivation has a minimal impact and emphasizes the utility-driven nature of such services. Similarly, Hilal and Varela-Neira's (2022) work showed that Price Value and Hedonic Motivation were insignificant determinants in influencing mobile banking adoption in Lebanon, and instead proposed aspects like performance expectancy and effort expectancy playing a major role.

These findings, in addition to Tamilmani et al. (2019) suggestions that researchers who apply the UTAUT2 model adapt the constructs of the model to the context of their study and to omit hedonic motivation as a construct when the users of the technology primarily uses the technology for utilitarian purposes, supports the assumption that more practical benefits, such as efficiency and convenience, are the primary motivators of adopting e-banking. This is especially relevant in the socio-economic landscape of Yemen, where the technology adoption is influenced more by necessity and the facilitation of essential transactions rather than by the search for pleasure.

Given the utility-focused nature of e-banking and the empirical findings suggesting hedonic motivations minimal role on its adoption, excluding this construct from the adapted UTAUT2

framework in the study of e-banking adoption in Yemen is justified. Similarly, since there is no cost associated with using e-banking services, the construct Price Value could also be excluded. These exclusions ensures that the research remains aligned with the actual motivators driving e-banking use in the context of Yemen.

2.2.5 Including Education, Occupation, and Income Level as a Moderators

Incorporating Education, Occupation, and Income Level as possible moderators in our UTAUT2 framework, as can be observed in figure 2.2, is essential in our attempts to better understand e-banking adoption within the socio-economic landscape of Yemen. This approach aligns with Hargittai's (2002) emphasis on the digital divide's second level, where such socio-economic factors play crucial roles in technology adoption.

The role of education in digital skills as well as for e-banking adoption is indicated in studies like Abu-Shanab's (2011), where they found education to significantly moderate the relationship between performance expectancy, self-efficiency, perceived trust, locus of control and the intention to use internet banking in Jordan, a socio-cultural landscape similar to Yemen's. This suggests that higher educational levels correlate with an increased likelihood of e-banking adoption, suggesting the necessity of including Education as a moderator in the UTAUT2 framework to be applied on describing the use of e-banking services in Yemen.

As occupation influences individuals' exposure to digital tools, potentially affecting their openness and necessity toward adopting e-banking services. Specific Yemen-focused studies on occupation as a moderator are quite scarce, however its inclusion recognizes the diversity in occupational backgrounds in Yemen and their potential impact on e-banking adoption rates, as indicated in the digital divide literature. This factor can provide insights into how various employment sectors in Yemen differ in their e-banking adoption rates.

Income level's effect on access to necessary technology for e-banking is significant, especially in economically diverse settings like Yemen. Gorbacheva et al. (2011) identifies financial resources as an important factor in technology adoption, supporting the inclusion of Income Level as a moderator in our UTAUT2 framework. This aligns with the notion that economic barriers significantly influence the accessibility and use of e-banking services among different income groups.

Adapting the UTAUT2 framework to include these socio-economic moderators enhances its analytical capacity to explore e-banking adoption in Yemen more extensively. Research shows that Education, Occupation, and Income Level directly interact with the UTAUT2 core constructs, such as Performance Expectancy and Social Influence. The inclusion of these moderators seeks to get a deeper understanding of the digital divide's impact on technology use but also in offering targeted strategies to enhance digital financial inclusion across Yemen's diverse socio-economic landscape.

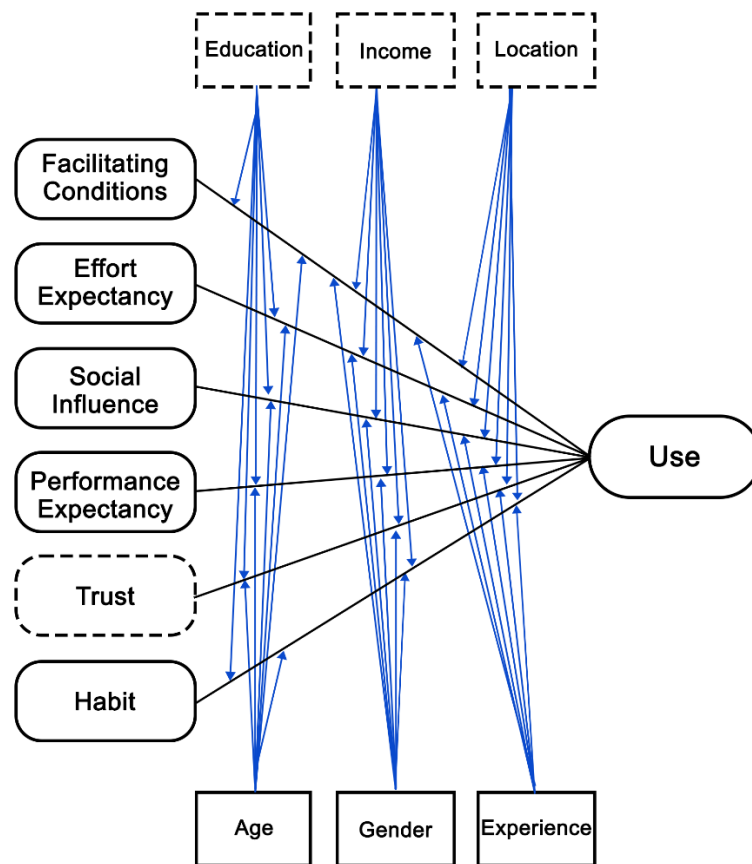


Figure 2.2: UTAUT2 incorporating Trust and additional Moderators (adapted from Venkatesh et. al. 2012).

3 Methodology

This section of the study is dedicated to outlining the methodology that was utilized to examine the factors influencing the use of e-banking in Yemen, taking into consideration the socio-economic conditions and the political instability. The primary aim of this research is to identify how various elements, such as performance expectancy, effort expectancy, social influence, facilitating conditions, trust, and habit, impact the use of e-banking. These factors, which are the core constructs within our adapted UTAUT2 framework, were examined for their influence on e-banking use in Yemen. Furthermore, the digital divide was integrated into the adapted UTAUT2 framework for this study by examining how education and income levels, geographical conditions, and occupation contributed to this divide. An essential part of the study focused on the moderating roles of education and income level on e-banking adoption in addition to the original moderators: age, gender, and experience. This methodology section provides an overview of the research design, sampling strategy, data collection methods, variable definitions, data analysis plan, ethical considerations, and limitations in the study design.

3.1 Literature Search Methodology

The literature search for this study was conducted using both the Internet and the resources of Lund University Library. Google Scholar was chosen as the main search engine due to its advanced search capabilities, which enable precise query adjustments, including the ability to specify publication years and exclude particular terms. Furthermore, Google Scholar displays citation counts for each publication, enabling researchers to assess the study's impact, quality and its scholarly relevance. Given that many of the sources cited in this study are from subscription-based scientific journals, LUBsearch (Lund University Publications) was employed as a centralized portal to access these journals.

As Yemen serves as the geographical focus of this study, the National Information Center - Yemen was employed as a resource as well. This center provides access to peer-reviewed graduate research from Yemeni universities. While the center does not always offer the ability to download complete studies, it provides abstracts and contact details for the researchers, including email addresses. This feature has enabled us to contact researchers directly, facilitating access to the required studies.

In the process of searching for literature about e-banking, several synonymous terms were identified and used as search keywords. These included "Internet banking," "Online banking," "Web banking," "Digital banking," and "Mobile banking". In addition to terms directly related to e-banking, the literature search was further expanded by including keywords such as "Technology adoption," "UTAUT," "UTAUT 2," "Digital divide," "Yemen," and "Middle East." The literature search was expanded to include Arabic terms such as 'الانترنت البنكي في اليمن' (e-banking in Yemen) and 'تبني الأنظمة البنكية' (Adoption of e-banking in Yemen), ensuring that the review encompassed non-English sources and reflected the cultural perspective of the study area.

3.2 Research Design

The design of this research is quantitative, chosen for its suitability in addressing the research problem amid logistical and geographic limitations. Conducting this research from Sweden, with the target population in Yemen, presented challenges that were mitigated by a quantitative research design specifically, an online survey. Given the limited access to participants and the difficulty of conducting qualitative interviews in a conflict-affected area like Yemen, a quantitative approach using online surveys offered a sensible solution for collecting and analyzing data.

The quantitative approach is often considered the most suitable for studying people's behavior and social phenomena, as it enables systematic measurement and evaluation using scientific methods (Nardi, 2018). Furthermore, in a study conducted by Choudrie and Dwivedi (2005), which analyzed research from the years 1985 to 2003 on technology adoption, it was found that the survey approach had been the most commonly used.

This approach is particularly well-suited for examining the use of e-banking in Yemen for several reasons. First, a quantitative method allows for the statistical analysis of data collected from a broad segment of the population, which is critical for examining correlations between identified factors and e-banking use. Second, considering the digital divide in Yemen, an online survey targeted participants who had some level of access to digital technologies, aligning with our focus on e-banking services. A research design using online interviews may result in participation being limited to people with sufficient levels of access—physical, motivational, skills, and usage—to the necessary technologies, which could lead to biased results as the research might only target a specific group of people. Lastly, the nature of our research questions, which aim to measure the influence of certain factors on the adoption and continued use of e-banking services and to analyze their statistical relationships, requires an approach that is structured and analytical.

However, it must be noted that the quantitative approach, particularly the use of online surveys, had its disadvantages and limitations. For instance, online surveys risk having a low return rate (Nardi, 2018). Nonetheless, it remained the best method in the context of Yemen, as it enabled access to a wider range of people who were difficult to reach for personal interviews. Additionally, as researchers located outside of Yemen, conducting online surveys was the only efficient method to reach out to a diverse group of people through our network.

3.3 Population and Sample

The target population for this study included Yemeni individuals who resided in areas under the control of the government based in Aden, excluding regions controlled by the Houthi movement. This exclusion of the regions controlled by the Houthi movement was due to the current political and administrative division within Yemen and the significant economic differences. For instance, the rules and official announcements that apply to citizens and banks in the areas under the control of the Aden government are not implemented in the areas under Houthi control. Moreover, since the official currency of Yemen was valued considerably

differently between the regions, including the region under Houthi control would have complicated the analysis and interpretation of economic factors such as income levels in relation to e-banking use. Additionally, the varying levels of technological infrastructure and access to banking services between the regions could have led to distorted results. Efforts were made to ensure that the sample was as diverse as possible, trying to include a wide range of individuals in terms of age, gender, education, occupation, etc., to accurately measure the variability within the Yemeni regions not under Houthi control.

The study utilized a non-probability sampling method, specifically combining convenience sampling and snowball sampling through the networks of one of the researchers. Galloway (2005) defines convenience sampling as an approach where the researcher involves respondents who are 'convenient' to the researcher but notes that this approach carries a high risk of bias. Dahmström (2011, pp. 269-270) describes snowball sampling as beneficial when the researcher faces difficulties in reaching the target population. In this method, the researcher can tap into a small network of people who fit the target group; these individuals, in turn, can help the researcher connect with more people who fit the target population. This approach was primarily chosen due to the logistical challenges of conducting research from abroad and the need to access a population that is difficult to reach through more structured sampling methods. As mentioned, the survey was distributed among the researcher's network, who were then encouraged to further distribute it within their networks, aiming for a wide-reaching effect. This method, while not random, allows for a broader coverage of the population, considering the constraints imposed by the geographical and political context of the study.

Given the practical limitations, such as the researcher's location in Sweden and the reliance on networks within Yemen to distribute the survey, the aim was to collect at least 100 responses. This number was set with the intention of ensuring a sufficient sample size for meaningful statistical analysis, recognizing that a larger sample size would eliminate deviating responses and contribute to more accurate results. Given the circumstances, the chosen sample size and sampling method were considered the most optimal approach, allowing for the collection of data that can provide valuable insights into the factors influencing e-banking use among the target population in Yemen.

3.4 Data Collection Methods

3.4.1 Instruments

To analyze the factors influencing e-banking use in Yemen, an online survey was selected as the primary instrument for data collection. Since the researchers are based in Sweden, with the target population in Yemen, an online survey simplifies the data collection process, eliminating the need for physical presence. Online surveys are recognized for their convenience and efficiency, which encourage participation among respondents (Dahmström, 2011, pp. 88-89). Due to its user-friendly interface and widespread accessibility, Google Forms was chosen as the platform for conducting the survey.

3.4.2 Ensuring reliability and validity

To ensure the reliability and validity of the research, several steps were taken. The original questionnaire developed by Venkatesh et al. (2012), which proved successful in measuring a

wide range of factors influencing technology acceptance, served as the foundation for this study's questionnaire. To better fit the adapted UTAUT2 framework and align with the context of the research aiming to measure e-banking use within Yemen's socio-cultural landscape specific adjustments were made.

Making adjustments to the UTAUT2 model is not an unfamiliar practice among researchers in technology adoption studies, who aim to enhance its applicability to the study's specific context by focusing on the most relevant variables. In a study conducted by Syamsudin et al. (2018) to explore factors influencing behavioral intention to use e-government services, the authors replaced the price value with public value, excluded hedonic motivation, and added the trust variable to the model to better fit the context of their study. As previously mentioned, both the price value and hedonic motivation variables were excluded from this study, as detailed in the 'Justifying the Exclusion of Hedonic Motivation in the Context of E-banking Adoption' section. Consequently, questions related to these variables were also omitted from the survey. Moreover, the question HT2, 'I am addicted to using...' was excluded as well due to its unsuitability in the context of e-banking use, which is typically utilized for managing financial transactions. The rest of the questions from the UTAUT2 model were used as is, with 'mobile Internet' replaced by 'e-banking'.

Integrating trust as a variable into the UTAUT2 model necessitated adding questions to the survey aimed at evaluating the level of participants' trust in e-banking in Yemen. These questions employ a five-point Likert scale, ranging from 'Not at all' (1) to 'Totally' (5). The first question is designed to measure the level of security felt by participants when using e-banking, while the second aims to compare their trust levels in conducting financial transactions through e-banking versus traditional banking.

The survey questions related to the digital divide were designed by drawing upon the conference paper by Srinuan and Bohlin (2011). They identified several factors determining the digital divide, including geographical location, income, education, age, occupation, speed, and quality of service to name a few. To capture the demographic profile of participants, the survey included questions on occupation, level of education, and residential environment, classified as either urban or rural. Additionally, the survey solicited information on the participants' provincial location, thereby facilitating the exclusion of participants from provinces under Houthi control, consistent with the exclusions outlined in the Delimitations section. Additionally, participants were queried regarding their ownership of Internet-capable devices, specifying the type of device owned: mobile, tablet, or computer. Further investigations were made into the frequency of Internet access and the quality of their Internet connection.

Assessing income levels presented a special challenge, primarily due to the outdated labor force data from Yemen published by the International Labour Organization in 2015. At that time, the exchange rate was approximately 1 US dollar to 215 Yemeni riyals (xe.com, n.d.). The income categories were originally delineated as follows: up to 20,000 YER, 20,001 to 51,500 YER, 51,501 to 65,800 YER, and over 65,800 YER (salaryexplorer.com, n.d.). However, due to inflation in areas under the administration of the Aden government in 2024, the exchange rate has surged to 1 US dollar equivalent to 1,680 Yemeni riyals (aden-tm.net, 2024). Moreover, feedback from local networks indicates that the 2015 data does not accurately reflect current conditions. To address this issue, this study employed a calculation, facilitated by the artificial intelligence chatbot ChatGPT, using 2014 data and the current exchange rate to estimate updated salary income categories. This resulted in a revised salary range that more accurately reflects current conditions, which was further validated by participants in a pilot study. Details of the calculation are provided in Appendix 2.

After completing a preliminary version of the survey, it was translated into Arabic, the official language of Yemen, to facilitate a pilot study. This pilot study, aimed at testing the clarity and comprehension of the survey questions, involved a small, diverse group of participants from Yemen. A common oversight highlighted by Van Teijlingen and Hundley (2002) is that researchers often announce modifications to their surveys without providing sufficient detail for the reader or future researchers. Bearing this in mind, and based on the feedback received from nine of the eleven participants who received the preliminary survey, the following adjustments were made to enhance clarity and cultural appropriateness:

Firstly, the response option 'Prefer not to reveal' was removed from the question asking participants to disclose their gender. This option was originally included with the ethical intention of respecting participants who did not want to reveal their gender or who did not identify as either female or male. However, feedback from the pilot study indicated that this option caused discomfort among participants due to the prevailing cultural norms in Yemeni society, which traditionally recognizes only two genders. Consequently, the option was removed to prevent discomfort and potential withdrawal from the study.

Secondly, the 'Suburban' category was removed from the question asking participants to describe the community they live in. Based on the feedback, participants found it difficult to determine what constitutes a suburban area within their contextual environments. Since the distinction between urban and rural settings is more pronounced and suburban communities are less common, this option was removed to avoid confusing the participants.

Thirdly, the difference between income ranges was set at 1,000 riyals instead of one riyal, based on feedback from participants in the pilot study. They noted that numbers ending in figures such as 999 cause confusion when reading the survey and that one riyal no longer holds value in daily life. The final version of the survey after the adjustments following the pilot study had been made can be observed in Appendix 1.

Moreover, given the quantitative nature of this study and the need to analyze a large volume of responses, statistical methods were employed. This approach helps mitigate the impact of deviating responses and ensures the reliability of the collected data.

3.4.3 Procedure

After the pilot study, adjustments were made to the questionnaire based on feedback, and key stages in the data collection procedure were established. Leveraging local connections, the survey was initially distributed through the network of one researcher to participants in Yemen. This was followed by a broader distribution, as participants were encouraged to further share the survey within their networks, enhancing our reach across various provinces and demographic groups. This approach not only improved reach and participation rates but also ensured broader coverage across different regions and demographics.

3.4.4 Confidentiality

As will be discussed more extensively in the subsection on Ethical Considerations, the survey was designed to protect the confidentiality of the participants by collecting data without requiring any personally identifiable information, thus ensuring respondent anonymity. The introductory section informs participants of the anonymous nature of their participation and that they may withdraw from the study at any time, giving them control over their data.

Additionally, sensitive questions that could have compromised the participants' comfort or privacy were avoided.

3.5 Variables

As mentioned, an adaptation of the UTAUT2 framework served as the foundation for studying the factors influencing the adoption and use of e-banking services in Yemen. In this adaptation, Hedonic Motivation and Price Value were removed, while Education, Occupation, and Income Level were included as additional moderators, and Trust was added as a core construct as well. In this section, we outline the independent, dependent, and moderating variables central to our investigation.

In the context of this study, the core constructs Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Habit, and Trust represented the independent variables. These were all measured using a Likert scale from 'Strongly disagree (1)' to 'Strongly agree (5)', except for Trust, which uses a Likert scale from 'Not at all (1)' to 'Totally (5)'.

Age, gender, experience, education, and income level, which were grouped as moderators within the framework, represented moderating variables. These can be described as variables that affect the relationship between an independent and a dependent variable (Bobbit, 2021). This means that these variables do not directly influence the use of the technology themselves but affect the relationship between the core constructs and use of. Age was categorized into ranges, while gender was measured as male or female. Education was categorized based on the highest level of formal education completed. Income level was grouped into ranges representing monthly income, and occupation was posed as an open question.

In this study, behavioral intention and use behavior, collectively represented by the component Use, represent the dependent variable. Behavioral intention was measured through a series of statements assessing the likelihood of using e-banking, each rated on a Likert scale. Use behavior was gauged by asking participants about their past and current use of e-banking, with options ranging from 'never used (1)' to 'very frequently used (5)'.

3.6 Data Analysis Plan

This section outlines the statistical methods and technology utilized to analyze the survey data collected for this study. The analysis sought to examine the relationship between the core constructs of our adapted UTAUT2 framework and the dependent variable, e-banking use, with a focus on understanding the moderating effects of demographic and socio-economic factors.

In examining the factors influencing the use of e-banking in Yemen, several statistical methods were used in this study, each bringing special insights. The use of multiple methods is derived from the notion that no single statistical method can fully capture the complexities of technology adoption behaviors.

Initially, *descriptive statistics* were utilized to summarize the collected data and present an overview of the demographics of the participants and their overall responses. This was achieved by using measures such as frequencies, and percentages, and graphical representations, setting the stage for deeper analysis.

To verify the reliability and validity of the survey instrument, factor analysis was applied. As argued by Sundell (2011), factor analysis becomes very handy when there is reason to suspect that a variable is influenced by multiple factors. This method helps determine whether the items on the survey accurately reflect the constructs they are intended to measure, such as performance expectancy, effort expectancy, social influence, facilitating conditions, habit, and trust. Additionally, factor analysis aided in understanding how these core constructs might be clustered together.

Following the factor analysis, *regression analysis*, which Dahmström (2011, pp. 219-223) defines as the process of analyzing the relationship between an independent and a dependent variable, was utilized to examine the relationships between the independent variables and the dependent variable. This specifically included *multiple regression* analysis, which helped us assess how a combination of independent variables, core constructs, and moderators affects e-banking use. As a result of the regression analysis, an Analysis of Variance, better known as ANOVA, was produced to test the overall significance of the model. Dahmström (2011, pp. 283-284) describes ANOVA as a method for determining whether the differences measured between groups or levels in the independent variables are significant or merely due to coincidence. In doing so, we could assess whether the model setup was statistically justified and that the core constructs and moderators are predictors of e-banking use in Yemen.

The analysis of the collected survey data was performed using SPSS, a widely used statistical software, due to its wide range of statistical tools and user-friendly interface. This software is especially well-suited for performing the aforementioned statistical techniques, which allowed the interpretation of complex data relationships.

3.7 Ethical Considerations

In this study on the use of e-banking services in Yemen, ethical considerations were important to ensure the respect, privacy, and protection of all participants involved. Given the nature of this study, we have implemented specific measures to uphold these ethical standards throughout the data collection process. According to Misra and Tyragi (2019), in the context of scientific research, the term 'ethics' describes the rules and principles that dictate appropriate approaches for conducting research. They further highlight the critical need to implement these ethical principles from the initial phases of the research.

Furthermore, Vanclay, Baines, and Taylor (2013) identify 18 ethical principles concerning scientific research that involve human participants, such as respect for participants, informed consent, voluntary participation, and the participant's right to withdraw. They emphasize the importance of avoiding any harm to the participants, whether physical or psychological, and further explain that the researchers should ensure that people's participation in the study will not impact them negatively in the future. Additionally, as argued by Singer (2004), the integrity of a study relies on the participants' ability to provide informed consent freely and knowingly, without being subjected to force or fraud.

Given the limitations of conducting an online survey and the nature of this study, we have adopted a practical approach to obtaining informed consent. A brief introduction in simple language was included in the survey to clarify the purpose of the study, the identity of the researcher, the confidentiality and privacy of the participants, as well as the voluntary nature of their participation. It specifically states that by proceeding with the survey, participants

consent to the use of their anonymized responses in our study. This approach ensures that participants are fully informed about the study's aims and their role, allowing them to make an informed decision about their involvement.

The survey was designed to ensure that no harm could happen to the participants by safeguarding their anonymity and confidentiality. The survey does not request any personally identifiable information from the participants, such as their names, addresses, or email addresses. This approach guarantees that the participants' responses cannot be traced back to any individual. Additionally, questions of a sensitive nature that might cause discomfort or psychological harm have been avoided to minimize any negative effects on the participants' well-being.

By implementing these ethical measures, we aim to conduct this research with the highest integrity, ensuring that the data collection process is treated with respect, security, and consideration for the privacy and well-being of the participants.

3.8 Limitations

This study encounters several challenges limitations that might impact the findings of this research and their implications. These limitations are influenced by the Yemeni context, the methodological choices, and external factors affecting the data collection process.

Due to the research being conducted from outside of Yemen during Ramadan, participants may not be as available and motivated to participate in the survey, which could lead to a smaller and less diverse sample size. A small sample size could then affect the generalizability of the findings from the analysis. Moreover, the research design could be flawed and not properly capture the complexities of e-banking use in a conflict-affected area like Yemen. For instance, the survey questions might not measure its constructs adequately or important factors might have been overlooked.

As argued by Dahmström (2011), online surveys are prone to participation loss due to technical inexperience and issues. Variability in internet access and technological infrastructure across Yemen might hinder participation and lead to biased data. Participation may be hindered by the lack of motivation or physical access to the technology required to participate in the study. Even if participants have both the motivation and the technological access required to participate, they might lack the digital skills to participate in an online survey. Recognizing these challenges is crucial for interpreting the results in relation to the context of the study.

4 Results

4.1 Descriptive statistics

The study initially received responses from 100 respondents. However, to maintain the focus on the target population and ensure the validity of the results, responses from individuals in areas under Houthi control were excluded. Consequently, the analysis that follows is based on the remaining 67 participants who met the inclusion criteria of this study.

As depicted by figure 4.1 there was a distinct gender imbalance favoring males. Out of the 67 participants that were analyzed, a substantial majority of 59 (88%) were males, while the females were represented by a mere 8 (12%) participants. This significant difference highlights the male-dominant nature of the surveyed group. The participants of the study were adults aged between 18 and 64 years, with no representation from individuals older than 65. The distribution across the age groups as can be observed in figure 4.2 indicates a concentration in the younger to middle-age brackets, while people in the ages 45 and above were represented by solely 4 (7%) people.

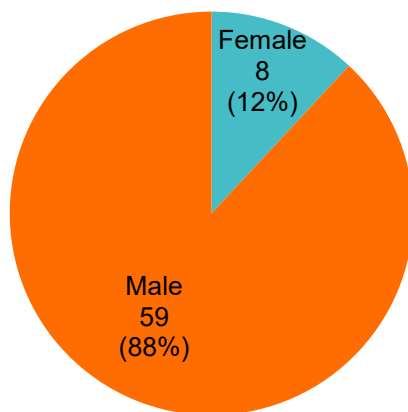


Figure 4.1: Gender distribution of participants.

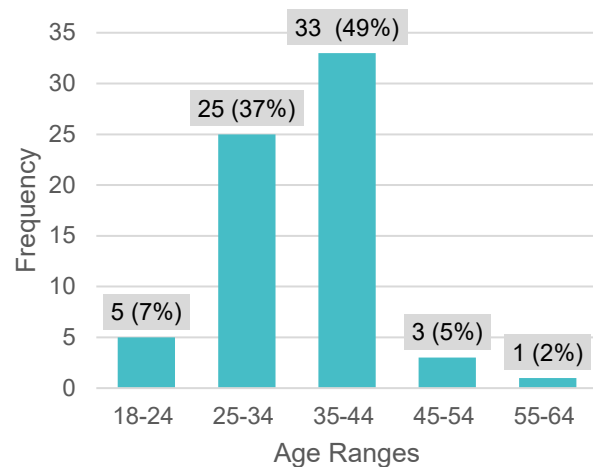


Figure 4.2: Age distribution of participants

Furthermore, the participants in the study reported a diverse range of occupations, reflecting a wide range of sectors that could contribute to understanding the occupational differences or effects related to e-banking use and adoption. The representation across the different work fields is illustrated by figure 4.3.

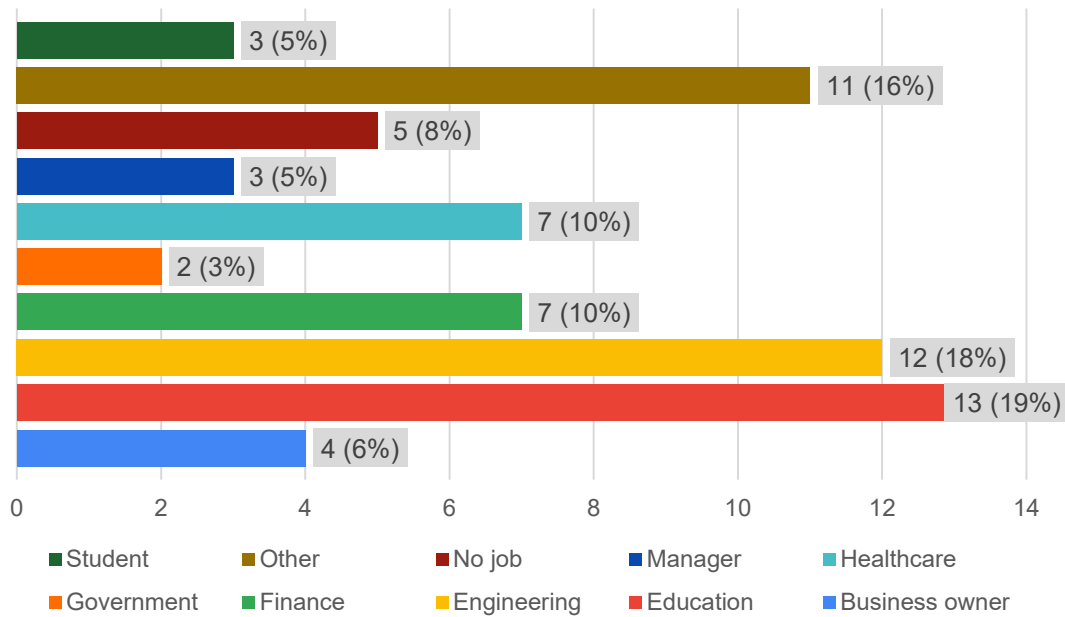


Figure 4.3: Distribution of participants' occupations by categories.

As shown by figure 4.4 most of the participants who took part in the study had completed higher education as 56 (84%) people went to college or university, while only 1 person had not passed primary school. This shows that most of the participants in the study are well-educated. The majority of the participants lived in urban areas, which suggests an urban bias in the collected data. As can be seen in figure 4.5 out of the total participants, 51 (76%) individuals were from urban areas while 16 (24%) individuals were residing in rural areas.

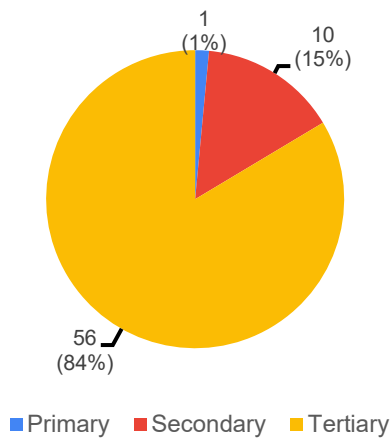


Figure 4.4: Educational background of participants

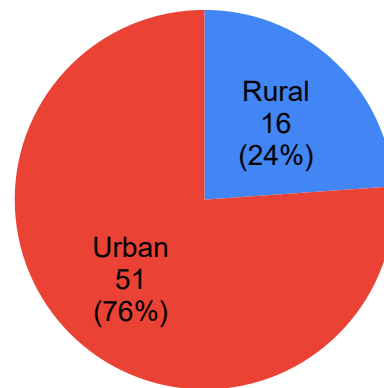


Figure 4.5: Distribution of participants by urban and rural residency

The income levels among the participants showed a significant concentration at the lower end of the income range, with 42 (63%) participants being in the lowest income range of making 155,000YER or less yearly.

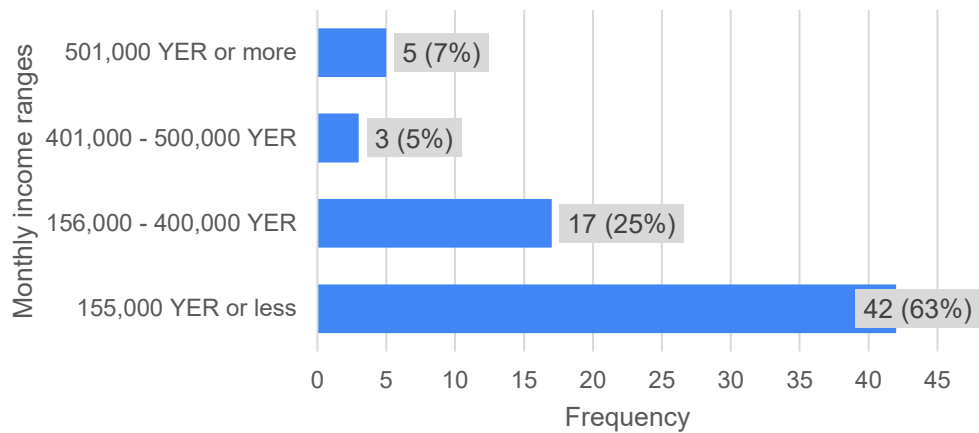


Figure 4.6: Income levels of participants.

The survey further evaluated the proportion of device ownership among the participants. A significant majority, 65 out of 67 (97%), stated that they own at least one digital device, such as a smartphone, computer, or tablet. This high proportion of device ownership highlights the low gap in physical technological access among the survey population. Further exploration into types of device ownership revealed that all the 65 individuals that owned a device in actuality owned a smartphone as can be observed in figure 4.7.

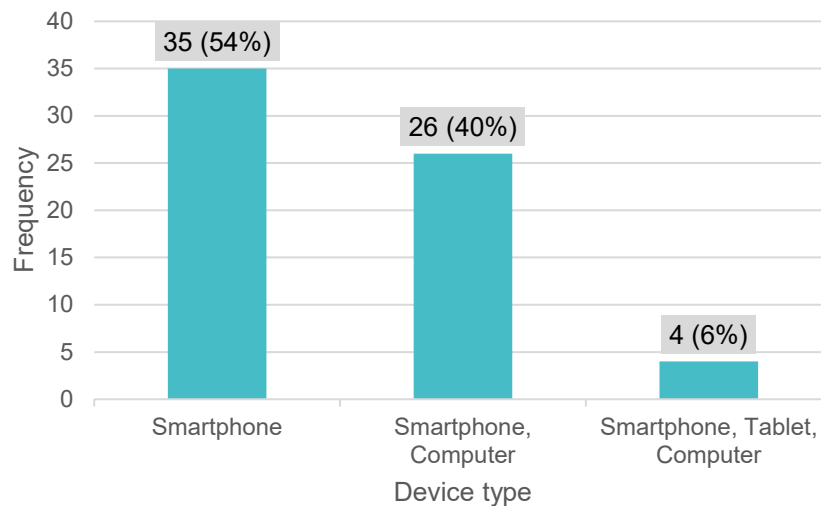


Figure 4.7: Device ownership among participants.

Additionally, the survey examined how often participants accessed the internet and the quality of their internet connection. A vast majority, 64 out of 67 (95.5%), had access to the internet daily, indicating a high degree of integration into their daily life. For the small minority that accessed the internet less frequently 2 (3%) only had access to the internet weekly, while only 1 (1.5%) had monthly access to the internet.

As for the quality of the internet connection, responses presented some variation. As presented in figure 4.8, 19 (28%) participants reported poor connectivity, which could hinder effective online activities, 34 (51%) participants reported average quality, indicating adequate but potentially inconsistent access; 6 (9%) participants experienced good connectivity, facilitating more reliable online interactions, while 8 (12%) reported excellent connectivity, likely providing optimal online experiences.

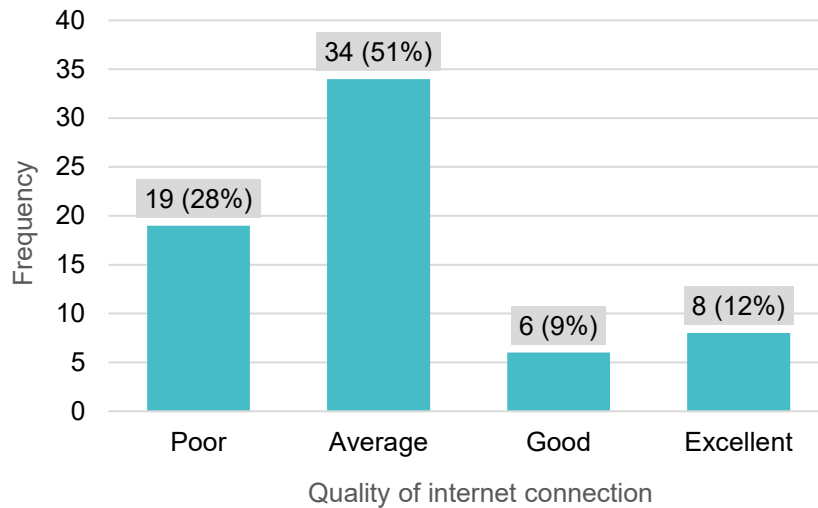


Figure 4.8: Quality of Internet connectivity among participants.

Regarding the actual use of e-banking among the participants, out of the 67 participants, 41 (61%) reported that they are using e-banking; among these, 5 (11%) are female and the remaining 36 (89%) are male, indicating a substantial adoption rate as the majority are users. However, 2 out of 5, or in terms of percentages, 39% of the respondents, do not use e-banking services, which suggests that there is still a significant proportion of people who are not users of these services. Furthermore, to assess the experience level with their e-banking use, the participants who were using e-banking services were asked about the duration of their usage. As depicted in figure 4.10 the responses varied among the participants, where the majority were early adopters with 66% of the survey population only had used it no more than 2 years. Interestingly, 17% had used it for 5 years or more, which was the same number of individuals who had used it between 3 and 5 years.

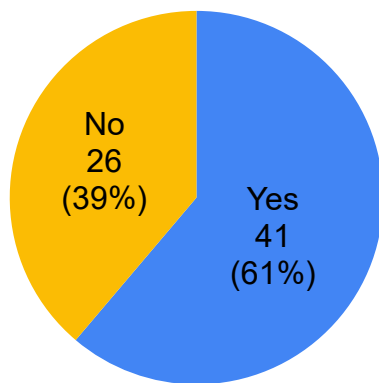


Figure 4.9: Adoption of E-banking among participants.

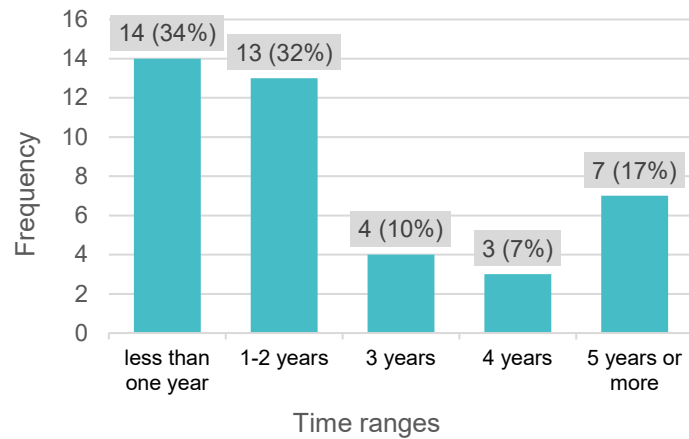


Figure 4.10: Duration of E-banking usage among participants by time ranges.

Lastly, the participants were asked about the e-banking service which they used the most, since it could help in identifying the user preferences and functionalities that drive e-banking usage. As can be observed in figure 4.11, the majority primarily used e-banking services for money transfers and bill payments. This suggests that the convenience and immediate transaction capabilities are the main benefits that drive e-banking usage in Yemen.

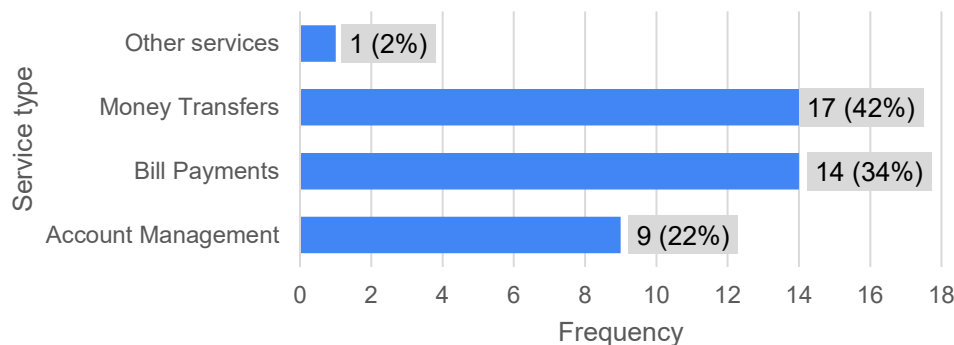


Figure 4.11: Primary uses of E-banking services among participants.

The descriptive statistics provided in this subsection provide a foundational understanding of the demographic and socio-economic profiles of the participants, which is crucial for interpreting the forthcoming statistical analyses. The next section will delve into the statistical analysis to further analyze the survey items validity and the relationships between the constructs in the adapted UTAUT2 framework.

4.2 Statistical Analysis

4.2.1 Factor Analysis

Initially, Factor Analysis was applied to validate the reliability and the validity of the survey instruments, as well as the validity of the constructs derived from the adapted UTAUT2 framework, which are crucial for understanding the use of e-banking services in Yemen. This

statistical method helps identify which underlying factors or hidden variables connect the answers given in our survey (Sundell, 2011). By doing this, we verify that the questions asked in the survey actually measure what they intend to measure, like for instance how much people expect to benefit from e-banking (Performance Expectancy) or how easy they find it to use (Effort Expectancy). This validation of the constructs and survey instruments is vital for ensuring the reliability and precision of the conclusions drawn about factors influencing e-banking use in this study.

Table 4.1: The study constructs

Construct	Code	Items
Performance expectation (PE)	PE1	I find e-banking useful in my daily life
	PE3	Using e-banking helps me accomplish things more quickly
	PE4	Using e-banking increases my productivity
Effort expectation (EE)	EE1	Learning how to use e-banking is easy for me
	EE2	My interaction with e-banking is clear and understandable
	EE3	I find e-banking easy to use
	EE4	It is easy for me to become skillful at using e-banking
Social influence (SI)	SI1	People who are important to me think that I should use e-banking
	SI2	People who influence my behavior think that I should use e-banking
	SI3	People whose opinions that I value prefer that I use e-banking
Facilitating conditions (FC)	FC1	I have the resources necessary to use e-banking
	FC2	I have the knowledge necessary to use e-banking
	FC3	E-banking is compatible with other technologies I use
	FC4	I can get help from others when I have difficulties using e-banking
Habit (HT)	HT1	The use of e-banking has become a habit for me
	HT3	I must use e-banking
Trust (TR)	TR1	How secure do you feel using e-banking services?
	TR2	To what extent do you trust e-banking compared to traditional banking?

4.2.1.1 Communalities

The Communalities table provides an initial insight of how much of the variance in each variable (survey question) is accounted for by the extracted factors. More specifically, the extraction communalities represent the amount of variance in each variable that is explained by the retained factors after the factor extraction process (Sundell, 2011). For example, a value close to 1 suggests that the variable fits well within the factor structure determined by the factor

analysis, while a low value indicates that the extracted factors do not account for much of the variance in that particular variable.

For our analysis, the communalities table indicates that the variance of most of the survey items is well-accounted for by the extracted factors, as the communalities extracted after the factor analysis ranged from 0.606 to 0.934. This implies that the factors identified in the analysis are strong representations of the constructs that they are intended to measure. The question “People who are important to me think that I should use e-banking” (SI1) which is related to the construct Social Influence presented the highest value as 93.4% of its variance could be described by the factors. This suggests that this variable fits very well with the factor structure identified. The survey items TR1 and TR2, aiming to measure the construct Trust in the adapted UTAUT2 framework, resulted in the values 0.724 and 0.775 respectively, which suggests that more than 72% of the variance in these survey items is explained by the extracted factors. However, the variables PE3, SI 2, FC2 and HT3 presented lower extraction communality values, which indicates that they are not as well represented in the factor solution. Although their values are not extremely low, as more than 60% of their variance could be explained by the extracted factors, it might still be worth reviewing these items to ensure that they align well conceptually with our constructs and considering if there are other survey questions that would benefit the factor structure better.

Table 4.2: Communalities

Variables	PE1	PE3	PE4	EE1	EE2	EE3
Extraction	0.733	0.611	0.785	0.775	0.731	0.785
Variables	EE4	SI1	SI2	SI3	FC1	FC2
Extraction	0.684	0.934	0.631	0.795	0.731	0.606
Variables	FC3	FC4	HT1	HT3	TR1	TR2
Extraction	0.876	0.712	0.727	0.613	0.724	0.775

4.2.1.2 Total Variance Explained

Sundell (2011) argues that the Total Variance Explained table is critical as it shows how much of the overall variance in the data is captured by the factors extracted. It provides a breakdown of the eigenvalues associated with each factor, the percentage of variance each factor accounts for, and the cumulative percentage of variance explained by all factors. The initial eigenvalues indicate the total variance each factor accounts for before any rotation and a general rule of thumb being that factors with eigenvalues over 1 should be considered for inclusion. The Rotation Sums of Squared Loadings section reflects the total variance explained by the factors after rotation, which is crucial for understanding how well the rotated factors represent the data. The rotation typically helps to make the factor structure clearer and more interpretable by maximizing the high loadings and minimizing the lower ones on each factor. After the extraction and rotation process, the table presents the proportion of variance accounted for by each factor, cumulatively adding to the total. A good factor analysis model might explain 60% or more of the total variance, which would indicate a strong construct validity.

As can be observed in table 4.3, the factor analysis reveals that the first five factors identified explain a significant portion of the variance in the survey responses since they all have initial eigen values over 1. Prior to the rotation, the first factor alone accounts for almost 42% of the variance, indicating that it represents a major underlying factor or theme in the data that describes e-banking use in Yemen. However, it is important to look at which survey items that load heavily on that factor to acquire a better understanding of what construct or concept it might be representing. The cumulative variance explained by these five factors reaches around 73% after extraction and rotation, which suggests a strong model that captures a substantial amount of the variability within the data, confirming that the factors derived are relevant. It can further be observed that the proportion of the variance explained by each of the 5 identified factors diminishes from around 20% to 8.2%. The high level of variance explained supports the model's capacity to capture most of the variability in the survey data, thus affirming the relevance of the factors to analyze e-banking use in the Yemeni context. However, it needs to be further analyzed, which specific survey items that load heavily on each factor.

Table 4.3: Total variance explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.550	41.945	41.945	7.292	40.514	40.514	3.601	20.007	20.007
2	2.564	14.242	56.187	2.291	12.726	53.239	3.094	17.187	37.194
3	1.738	9.655	65.841	1.489	8.270	61.510	2.978	16.547	53.741
4	1.473	8.185	74.026	1.245	6.918	68.428	2.076	11.535	65.276
5	1.182	6.569	80.596	0.909	5.052	73.480	1.477	8.204	73.480
6	0.905	5.027	85.623						
7	0.576	3.201	88.824						
8	0.401	2.230	91.053						
9	0.356	1.975	93.028						
10	0.278	1.545	94.574						
11	0.234	1.299	95.873						
12	0.194	1.079	96.952						
13	0.145	0.803	97.754						
14	0.132	0.736	98.490						
15	0.102	0.565	99.056						
16	0.078	0.431	99.487						
17	0.068	0.377	99.863						
18	0.025	0.137	100.00						

4.2.1.3 Rotated Factor Matrix

The Rotated Factor Matrix is used to interpret the loadings of variables on each of the identified factors, post-rotation. The rotation simplifies the structure and makes it easier to interpret. This matrix is crucial for confirming that the survey items (variables) group together in a way that aligns with the core constructs of the adapted UTAUT2 Framework as they are supposed to measure. Each of the columns in the matrix represents one factor, and the rows depict the survey items. The numbers in the cells are factor loadings, which measures the correlation between a certain variable and its factor. High values, typically above 0.5, on a factor indicates that the item correlates well with the factor, suggesting that the factor strongly represents the survey item's underlying construct. This table allows us to identify which items load on which factors and how well they load on their respective factor, thereby validating whether our survey design appropriately captures the constructs in the adapted UTAUT2 framework (Sundell, 2011).

Looking at table 4.4 there are five distinct factors identified, each representing a group of variables that are conceptually linked together.

The matrix mainly shows a strong alignment of survey items with their respective theoretical constructs derived from the adapted UTAUT2, indicating effective construct validity. However, some overlapping can be observed, which suggests that there could be some interdependencies that exists between constructs or survey items. The first factor seems to be strongly associated with Performance Expectancy (PE1, PE3, PE4) and Effort Expectancy (EE1, EE4), which suggests that this factor might represent the general perception and ease of use of e-banking services. That the variables of these two constructs load highly on one single factor could mean several things. There could be some overlap between the constructs in the context of our study, where the respondents may not differentiate strongly between the usefulness (Performance Expectancy) and ease of use (Effort Expectancy) of e-banking services. It could also be that the way that the questions were phrased, they sounded like they were similar or related to each other by the respondents, or possibly that these variables are captured by a single, broader dimension of user attitudes towards using e-banking services.

The second factor primarily relates to the construct Facilitating Conditions (FC2, FC3, FC4) and both items measuring the construct Habit (HT1, HT3). This suggests that factor 2 could represent the interplay between the users' habits in relation to their use of e-banking services and the facilitation provided by the environment and resources to support these habits. However, the variable HT3, measuring the statement "I must use e-banking," received value of 0.555 which is quite low and might suggest revisiting the survey questions measuring the construct habit and whether to adjust these.

Factor 3 is tied to Social Influence since it captures each of the survey items aimed to measure the construct. This highlights the role of social factors in regard to shaping individuals' e-banking use in Yemen. The fourth factor captured the variables of Effort Expectancy not included in the first factor, which might indicate that these were specific attributes of ease of use that were not captured in Factor 1. Finally, the fifth factor associated very well with the construct Trust, as it captures both of these items, which received values above 0.70. This emphasizes the importance of security and reliability perceptions among individuals regarding e-banking services in Yemen.

Table 4.4: Rotated factor matrix

Variables	Factor				
	1	2	3	4	5
PE1	0.770				
EE1	0.757				
PE4	0.754				
FC1	0.644				
EE4	0.618				
PE3	0.601				
HT1		0.734			
FC2		0.706			
FC3		0.697			
FC4		0.696			
HT3		0.555			
SI1			0.887		
SI3			0.715		
SI2			0.670		
EE3				0.834	
EE2				0.742	
TR2					0.769
TR1					0.721

4.2.2 Regression Analysis

The multiple regression analysis provided three tables. An ANOVA, which tests the overall significance of the model. It provides an F-value, which describes how well the independent variables can predict the dependent variable as a group, and a p-value which is represented by the 'Sig.' column. A p-value less than 0.05 means that the model significantly predicts the outcome (Körner & Wahlgren, 2015). In addition to the ANOVA, a coefficients table and an excluded variables table were generated. The coefficients table provides the estimated values for each predictor and their statistical significance. The B values in this table tell us both the direction and the strength of the relationships between each independent variable and dependent variable. The Sig. column is also of interest as it represents the p-value, which determines whether the independent variable significantly influences the dependent variable (Sundell, 2009). The excluded variables table lists any variables that were excluded from the regression model. This could be due to various reasons, but it mainly suggests that there is some correlation or overlap with other variables.

The multiple regression analysis between the independent variables - the core constructs and the moderating effects of the moderators - and the dependent variable e-banking use, resulted in the ANOVA table in table 4.5. with an F-value of 14.22 and significance level of 0.004, which tells us that the model is statistically significant and that the core constructs and moderators are predictors of e-banking use.

Table 4.5: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	31.027	35	0.886	14.223	.004 ^b
Residual	0.312	5	0.062		
Total	31.339	40			

The Coefficients table 4.6 provided various results. Firstly, it can be observed that the construct Habit was not included from this table as it can be noted in table 4.7 that it was one of the variables excluded from the regression model following the analysis. Secondly, it seemed like the constructs Social Influence and Trust negatively affected e-banking use, however due to their significance levels being 0.763 and 0.243 respectively, these results are not statistically significant. This could mean that these factors may not be as influential in the use of e-banking services as other factors in the context.

Furthermore, similar to the factor analysis, Performance Expectancy and Effort Expectancy influences e-banking use the most. Effort expectancy received a positive B value of 12.633 with a significance level of 0.017, which suggests that as the perceived ease of using e-banking increases, so does the use of e-banking services, aligning with expectations from the UTAUT2 model. However, the negative B value of -16.983 with a significance level of 0.007 for Performance Expectancy suggests that as Performance Expectancy increases, the use of e-banking services decreases, which is counterintuitive based on the theory and suggests further examination. Facilitating Conditions received a positive B value of 7.272 as well with a significance level of 0.006, suggesting a significant positive effect on e-banking use, meaning that better facilitating conditions (like infrastructure and support) are associated with increased usage of e-banking services in Yemen.

As for the interaction variables, meaning the effect of the moderators on the relationship between the core constructs and e-banking use, the following results can be derived. First, it can be concluded that gender had no moderating effect since none of the p-values were below 0.05. Second, age has a significant influence on Performance Expectancy, Facilitating Conditions and Habit. While the effect on Performance Expectancy and Habit were positive, interestingly the effect on Facilitating Conditions was negative, implying that as age increases, the influence of Facilitating Conditions on e-banking use decreases. Third, it can be noted that education had a significant influence on Performance Expectancy, Effort Expectancy, Habit, and Trust. While it positively influenced Performance Expectancy and Trust, it negatively influenced Effort Expectancy and Habit. The residential area and income of the participants showed no significant results, except for income moderating effect on Trust. The results showed that income had a negative effect on the relationship between trust and e-banking use which suggests that as the individuals income increases, the importance of trust decreases. Lastly, the moderating effect of experience of the user happened to only be significant for Perceived Expectancy and Social influence.

Table 4.6: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-1.523	0.642		-2.372	0.064	-3.174	0.128
PE_Score	-16.983	3.914	-15.746	-4.339	0.007	-27.044	-6.922
EE_Score	12.633	3.582	10.372	3.527	0.017	3.426	21.841
SI_Score	-0.362	1.136	-0.446	-0.319	0.763	-3.282	2.558
FC_Score	7.272	1.619	6.874	4.492	0.006	3.111	11.433
TR_Score	-0.932	0.704	-1.079	-1.325	0.243	-2.740	0.877
Int_GenderMale_PE	-0.470	0.911	-0.866	-0.515	0.628	-2.812	1.873
Int_GenderMale_EE	0.047	0.523	0.081	0.090	0.932	-1.298	1.392
Int_GenderMale_SI	0.207	0.807	0.368	0.256	0.808	-1.869	2.282
Int_GenderMale_TR	0.305	0.272	0.551	1.120	0.314	-0.395	1.005
Int_Age_PE	0.790	0.260	3.419	3.039	0.029	0.122	1.459
Int_Age_EE	-0.188	0.661	-0.734	-0.284	0.788	-1.886	1.510
Int_Age_SI	-0.024	0.244	-0.107	-0.099	0.925	-0.651	0.603
Int_Age_FC	-3.067	0.580	-12.124	-5.292	0.003	-4.557	-1.577
Int_Age_HT	1.658	0.284	7.611	5.844	0.002	0.929	2.388
Int_Education_PE	3.901	0.983	14.869	3.970	0.011	1.375	6.427
Int_Education_EE	-2.687	0.795	-9.192	-3.382	0.020	-4.730	-0.644
Int_Education_HT	-1.346	0.274	-6.466	-4.913	0.004	-2.051	-0.642
Int_Education_TR	0.215	0.059	4.128	3.672	0.014	0.065	0.366
Int_AreaUrban_PE	0.440	0.379	0.964	1.161	0.298	-0.534	1.414
Int_AreaUrban_EE	-0.898	0.698	-1.931	-1.286	0.255	-2.694	0.897
Int_AreaUrban_SI	-0.720	0.613	-1.473	-1.174	0.293	-2.297	0.856
Int_AreaUrban_FC	0.211	0.862	0.430	0.244	0.817	-2.007	2.428
Int_AreaUrban_HT	0.634	0.944	1.347	0.672	0.532	-1.792	3.059
Int_AreaUrban_TR	0.391	0.755	0.792	0.518	0.627	-1.550	2.331
Int_Income_PE	0.340	0.357	1.678	0.953	0.385	-0.578	1.258
Int_Income_EE	-0.460	0.358	-2.246	-1.286	0.255	-1.380	0.460
Int_Income_SI	0.142	0.276	0.611	0.515	0.628	-0.567	0.851
Int_Income_FC	0.397	0.353	1.710	1.123	0.312	-0.511	1.304
Int_Income_HT	0.311	0.260	1.457	1.197	0.285	-0.357	0.979
Int_Income_TR	-0.692	0.249	-2.469	-2.784	0.039	-1.331	-0.053
Int_Experience_PE	-0.431	0.157	-3.552	-2.737	0.041	-0.835	-0.026
Int_Experience_SI	0.351	0.128	2.575	2.737	0.041	0.021	0.680
Int_Experience_FC	0.243	0.238	1.807	1.019	0.355	-0.370	0.855
Int_Experience_HT	0.173	0.181	1.479	0.952	0.385	-0.293	0.638
Int_Experience_TR	-0.345	0.220	-2.564	-1.569	0.178	-0.910	0.220

Table 4.7: Excluded Variables

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
HT_Score	-8.884 ^b	-0.935	0.403	-0.424	2.261E-05
Int_GenderMale_FC	-.442 ^b	-0.003	0.998	-0.002	1.236E-07
Int_GenderMale_HT	-2.016 ^b	-0.330	0.758	-0.163	6.467E-05
Int_Age_TR	-18.780 ^b	-1.498	0.209	-0.599	1.013E-05
Int_Education_SI	-81.745 ^b	-0.485	0.653	-0.236	8.259E-08
Int_Education_FC	-.105 ^b	-0.017	0.987	-0.008	6.320E-05
Int_Experience_EE	7.007 ^b	1.517	0.204	0.604	7.396E-05

5 Discussion

The central objective of this thesis was to examine the factors that drive the use of e-banking services in Yemen – a nation where both socio-economic challenges and opportunities for digital advancements coexist. The core research question that was developed, which guided this study was: *What key factors influence the adoption and use of e-banking services in Yemen and how do demographic and socioeconomic conditions impact the use of e-banking services?*

By adapting the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), a well-known framework for describing technology adoption and use, to remove constructs that are less relevant in the context of e-banking and adding the core construct Trust, this research aimed to identify the important factors influencing e-banking use in Yemen. Additionally, the inclusion of additional demographic factors as moderators to capture the findings regarding the Digital Divide, such as education and income levels aimed to explore their moderating effects on the relationship between these factors and e-banking use.

Our primary goal was to shed light on e-banking use, striving to contribute to strategies that could improve e-banking services and increase its adoption in Yemen. The following discussion draws from our findings to discuss the implications of the factors influencing e-banking use, which could highlight potential approaches to improve e-banking services in Yemen.

5.1 Key Findings Derived from the Descriptive Statistics

The findings of this research offer valuable insights regarding the use of e-banking services in Yemen, highlighting the underlying factors that promote or hinder digital financial inclusion. Notable results from the factor analysis revealed that the adapted UTAUT2 model accounted for a significant part of the variance in the e-banking use, which verifies strong construct validity for the identified factors within the UTAUT2 framework.

In contrast to similar studies in Yemen, where the average number of participants was above 350 in most cases, such as the studies by Al-Muhrami et al. (2021) and Hamdan and Zhu (2022), which had 393 and 684 participants, respectively, the participation rate in this study was relatively small. Due to the logistical circumstances of the study, with the researcher being positioned in Sweden, it was hard to reach a large amount of people in Yemen. The research period also happened to coincide with the month of Ramadan, a holy month for Muslims, many of whom spend time in prayer and fasting, which led to our network facing difficulties in receiving responses from potential participants during this period.

The distinct gender imbalance in the sample, with a predominant male participation, reflects the societal structures in Yemen, where women's role is mostly limited to managing the internal affairs in the household. As the World Bank (2022) reported, females only make up a mere 5.1% of the labor force in Yemen. This raises important questions about whether they are even included in the decision making regarding the household's financial affairs and about their actual access to the necessary technology to utilize e-banking services. Due to the low number of women that participated in the study, no concrete conclusions could be drawn regarding the moderating effect of gender on the relationships between the core constructs and e-banking use.

Similarly, the age distribution among the respondents indicated a stronger representation by younger to middle-aged adults, as only 3 out of 67 participants were in the ages of 45 or above. The small participation rate by older age groups could be explained by various factors. In terms of digital divide, it could fall under any of the levels of access. The older respondents might not have the physical access to the technology needed to conduct the survey. It could be that they do have physical access, but perhaps no motivation or the actual skills to participate in the survey. Given the small participation rate among ages 45 and older, no firm conclusions can be made regarding how age moderates the relationship between the core constructs and the use of e-banking services. However, since the significant results from the multiple regression analysis indicated that age moderates Performance Expectancy, Facilitating Conditions and Habit, it can only be confirmed that these results are relevant for the ages 18 to 44. Contrary to expectations, age had a negative effect on Facilitating Conditions, which could be due to the low participation rate from the older age groups who would find Facilitating Conditions important. The findings that suggest that age increases the sensitivity to the participants performance expectancy could be explained by increased financial responsibilities or greater reliance on banking services with age.

The sample primarily consisted of participant that had pursued higher education and had occupations in fields like engineering, health, education, and finance. This aligns with the findings by Reinikainen et al (2017) that people with a higher occupational class or more educated were more likely to participate in surveys.

Among the 67 participants that remained after excluding respondents from Houthi-controlled areas, around 60% of the participants used e-banking, and about 39% of the e-banking used had been using it for more than a year. These results suggest that there has been an increase in the number of e-banking users since the Official Announcement No.6 by the government in Yemen, requiring that all central and local government bodies disburse employee salaries only via banking channels. The increased use of e-banking services may have been facilitated by the improvements in the infrastructure of Internet services, aligning with the findings by Al-duais and Al-Smadi (2022), that people have no intention of using e-payments as long as the quality of Internet services are poor. Interestingly, the bill payment and money transfer services were the most used services among the e-banking users in the sample, which highlights the utilitarian nature behind e-banking use and supports the exclusion of Hedonic Motivation from the framework as suggested by Tamilmani et al. (2019) and Hilal and Varela-Neira (2022).

5.2 Key Findings Derived from the Statistical Analysis

The factor analysis which intended to verify the validity of the core constructs in the adapted UTAUT2 framework as well as the survey items, produced three tables that were used in the study. The initial communalities table indicated strong construct and survey item validity, since the values obtained from the factor analysis were high, ranging from 0.606 to 0.934 after extraction. These high values indicates that the extracted factors accounted for a substantial proportion of the variance in the survey responses, suggesting that the survey items are good measures of the underlying constructs they are supposed to measure. For instance, the item related to Social Influence (SI1) had a particularly high extraction communalities value (0.934), meaning that the factor structure explained a significant portion of the variance in this survey item. Although, all of the survey items received high values, some of these, such as the

item related to Habit (HT3), stating “I must use e-banking”, could be reconsidered as it only accounted for 61.3% of the variance in the survey responses.

Following the Communalities table the Total Variance Explained table showed that first five factors that were extracted in the factor analysis had eigenvalues greater than 1, and cumulatively accounted for 73% of the total variance after extraction and rotation. The first factor alone, explained nearly 42% of the variance, suggesting that it represents a significant aspect of e-banking use in Yemen. The large proportion of explained variance by the factors implies that the adapted model was strong and captured a significant amount of the variability within the data to describe e-banking use.

The subsequent Rotated Factor Matrix assisted in identifying the underlying factors and revealed distinct groups of variables clustering together, which indicates that the survey items representing each of the constructs in the adapted UTAUT2 model had high loadings on specific factors. This grouping of the survey items confirmed the validity of the survey instruments and provided clear indications of the underlying dimensions captured by the factor analysis.

Firstly, some overlap in constructs could be observed among the variables being grouped into the extracted factors. Similar to Hilal and Varela-Neira's (2022) study in Lebanon that found that aspects like Performance Expectancy and Effort Expectancy play a major role in mobile banking adoption, the factor analysis indicated that the variables related to Performance Expectancy and Effort Expectancy clustered strongly together in the first factor, suggesting a possible interrelation between the perceived benefits and ease of use of e-banking services in the minds of e-banking users in Yemen. This explains why the first factor extracted in table 4.3 explained a great part of the variance in the responses and could mean that in the context of e-banking use in Yemen, these two constructs may be seen as more interconnected than distinct constructs.

Furthermore, the inclusion of Trust as a core construct for describing e-banking use was affirmed, with both items related to Trust loading highly on the fifth factor, emphasizing its importance in e-banking use. This aligns with Hamdan and Zhu (2022) and Hadi et al.'s. (2021) research that highlighted the necessity for incorporating the constructs trust and security into the UTAUT2 framework in contexts of e-banking in Yemen.

The Habit construct presented mixed results, with some of the items loading well and others less, which could be hinting at a more nuanced role for Habit in e-banking usage in Yemen or perhaps that the construct was not well represented by the survey questions. While Habit may be an important factor influencing the use of digital technologies, in the context of e-banking services in Yemen, other factors might be more important.

Following the Factor Analysis, the Multiple Regression Analysis provided insights into the relationship between the independent variables (the core constructs) and the dependent variable measuring the participants' e-banking use, while also considering the moderating effects of various socio-economic and demographic variables on this relationship. The initial ANOVA table indicated that the regression model as a whole is statistically significant, which means that when being considered together, the core constructs predict the use of e-banking services very well in the Yemeni context. However, a deeper examination of the data suggests nuanced interpretations, especially in the case of Performance Expectancy.

Effort Expectancy and Facilitating Conditions both had a strong positive influence on e-banking use, aligning with Alhakimi and Esmail's (2020) research on the factors influencing people's intention to adopt Internet banking in Yemen. They highlighted the need to consider factors like how skilled people are with digital tools and the state of the infrastructure in Yemen. As users perceive e-banking services as easier to use, their actual usage increases. Similarly, the availability of necessary resources and support encourages e-banking use. This aligns with the broader understanding that supportive infrastructure is crucial for e-banking in Yemen.

In contrast to expectations, Performance Expectancy showed a negative relationship with e-banking use, which is counterintuitive. Typically, one would expect that as users perceive e-banking to be more beneficial, they would use it more as found in Hilal and Varela-Neira's (2022) studies. This result could indicate an issue with the data, perhaps the relatively small sample size, or the need for a deeper examination of the contextual factors that may influence this relationship in Yemen. It is worth examining the wording of the questions, the sample characteristics, or considering other variables that might explain this unexpected finding.

Contrary to the findings derived from the factor analysis and from Gharaibeh et al. (2018), which showed that Trust positively influences mobile banking use in Jordan, in our analysis the construct Trust, showed non-significant negative influence on e-banking. This might imply that while trust is an important factor, other factors are greater predictors and have a stronger direct impact on e-banking usage, which is not so unlikely since Trust was the fifth factor extracted from the factor analysis.

The multiple regression analysis additionally examined the potential moderating effects of the demographic variables on the relationship between the core constructs and e-banking use. Similar to the findings of Abu-Shanab (2011), that higher education level increased the likelihood of adopting e-banking services in Jordan, we found that education positively influences Performance Expectancy and Trust, which implies that more educated people may perceive greater benefits from e-banking and have more confidence in its security and reliability. Contrastingly, the negative influence on effort expectancy indicates that more educated users might find e-banking services less effortless to use.

In contrast to the findings by Gorbacheva et al. (2011) who found that income and education did not influence Perceived Security, our analysis found that higher income levels were associated with a decrease in the influence of trust on e-banking use. This could suggest that individuals with higher income feel more secure in their financial standing and are therefore less concerned about the risks associated with e-banking use.

The findings from the multiple regression analysis, particularly the surprising negative relationship between Performance Expectancy and e-banking use, highlight the complexity of technology adoption behaviors, suggesting that when applying the UTAUT2 framework to study technology adoption and use, the framework should be adjusted based on the context. For instance, the exclusion of the factor Habit points to the need for further research to refine the model and better understand the socio-economic conditions at play.

5.3 Digital Divide

In terms of Digital Divide, it is quite clear that access, both in terms of technology and the internet, alongside education and income levels, significantly impact e-banking adoption in

Yemen. For device ownership, the data suggested high device ownership, but the internet quality varied. This inconsistency in internet quality could act as a barrier to the continuous and effective use of e-banking services in Yemen, especially in rural areas. Additionally, the negative relationship between effort expectancy and education that was derived from the sample data might indicate a skills gap. Even though individuals are educated, their specific skills in using e-banking platforms might not be developed, suggesting a need for targeted educational programs focusing on digital financial skills.

The socioeconomic status of the participants appeared to influence their trust in e-banking services, as individuals with higher income levels displayed a decrease in the influence of trust on e-banking use. This might reflect the fact that individuals in higher income levels have access to a wider range of financial tools and services, and therefore might find other factors more such as ease of use and facilitating conditions more important. In contrast, individuals with lower income may depend more heavily on the security and trust aspects of e-banking services due to a lack of alternatives.

Moreover, the low participation rate among females suggests a possible gender divide in access to devices needed to participate in surveys, such as smartphones, laptops, or tablets. This is in line with broader societal structures in Yemen, where women are largely responsible for managing internal household affairs and have limited representation in the workforce. As such, they may have less exposure to e-banking services and could benefit from initiatives aimed to increase their digital financial inclusion. The age distribution among the participants, with very few older participants, suggests that older generations might be experiencing a digital divide, potentially due to the lack of access, motivation, or skills. This could call for the implementation of age-specific initiatives to foster inclusivity in e-banking services.

5.4 Practical Implications

The insights attained in this study provide several practical implications for the banking sector, policymakers, and other stakeholders interested in increasing the use of e-banking services in Yemen. By recognizing the role of socio-economic factors and the digital divide in influencing e-banking use, these stakeholders should focus on the following: firstly, improve the digital infrastructure to provide more reliable and high-quality internet services, especially in rural areas where the digital divide is more noticeable. Secondly, develop user-friendly e-banking platforms that cater the need of individuals with varying digital skills across different demographic groups. Thirdly, encourage the participation of women in the financial sector by offering e-banking services that consider cultural sensitivities and practical constraints faced by females in Yemen. Lastly, trust issues should be addressed through security measures and clear communication about the safety and privacy of e-banking services to build user confidence.

5.5 Methodological Reflections

The methodological approach revealed a robust framework for analyzing e-banking use, however it raised several areas for reflection. The use of the UTAUT2 model was crucial in identifying the factors influencing e-banking adoption. However, the necessity to adapt the model further suggests that context-specific adjustments are crucial for its application in different

cultural settings. The sample size and its composition highlighted the challenges of collecting responses from a large sample of diverse participants, indicating for a more inclusive data collection strategies in future research. Furthermore, the gender imbalance and low representation of older age groups in the sample provided a skewed understanding of e-banking use, calling for methodological strategies that ensure broader demographic participation. Lastly, the varying results for the construct Habit suggests the need for revisiting these survey questions or exploring the removal or addition of constructs that might better capture the complexities of e-banking usage behaviors in Yemen.

6 Conclusion and Recommendations

6.1 Conclusion

The central objective of this thesis was to investigate which key factors influence the adoption and use of e-banking services in Yemen and how demographic and socioeconomic conditions impact the use of e-banking services. The study, supported by the adapted Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), provided insights into how demographic and socio-economic conditions affect e-banking practices in a country where the digital divide is apparent.

The research confirmed that the constructs Performance Expectancy, Effort Expectancy and Facilitating Conditions are critical drivers of e-banking use, however the unexpected negative influence of Performance Expectancy highlights contextual challenges which need to be further investigated.

Clear differences in digital access and e-banking use were noted, which could be affected by the differences in internet access, technological availability, and varying levels of digital skills among different demographic groups. Furthermore, the low participation rate among females and individuals of older age groups, points to a broader societal and technological exclusion. However, it could be noted that the adoption of e-banking services in Yemen has increased in the last two years.

Trust, a core construct that was added to the adapted UTAUT2 model in this study, had mixed influences, suggesting that while the construct is crucial, its impact could be moderated by other stronger factors such as income levels, infrastructure quality and service usability. Furthermore, the varying results for constructs such as Habit highlights the need for adapting UTAUT2 model to the contexts it is applied to.

6.2 Limitations and Recommendations

The limitations of this research study can be summarized into three main components: sample size, diverse participation, and education levels. Interestingly, these limitations address one of the research questions in exploring how demographic and socioeconomic conditions affect the use of e-banking in Yemen. The study was met by a relatively small sample size, particularly a small participation rate by females and individuals with lower education. These limitations yielded results on a specific sample size of the Yemeni population as opposed to larger size that could speak to the broader context of Yemen.

Furthermore, the age representation in the sample did not fully reflect the age distribution in Yemen. The representation from ages 18 to 44 was large, while the representation by individuals older than 44 was limited to few or no participants in some cases. Additionally, the structure of the survey, which allowed participants to choose their age from specific age groups instead of writing their actual age directly, limited the analysis. Allowing the respondents to input their actual age could have enabled a more accurate regression analysis. Lastly, allowing participants to write their occupations as open text resulted in answers that were difficult to

categorize and analyze. It would have been more beneficial to have participants choose from a list containing specific categories of occupations.

The aforementioned limitations serve as points of departure for future research on the adoption and use of e-banking in Yemen. The sample size and demographics associated with the sample size create a sample study on a particular group in the population of Yemen as opposed to a broader and more inclusive sampling. Future research should aim for broader participation that includes wider demographic variables to ensure a holistic analysis of e-banking use across all aspects of the Yemeni population. The digital divide also plays a role in limiting the research findings, so a qualitative approach is suggested to provide deeper insights. A mixed-methods approach of conducting quantitative and qualitative research methods serves as an excellent point of departure for future research.

7 Appendix 1: Survey

Table 7.1: Survey form

No.	Question	Answer options						
		Male	Female					
1	Gender	Male	Female					
2	Age	18-24	25-34	35-44	45-54	55-64	Above 65	
3	Occupation	Open text						
4	Education Level	No formal education	Primary	Secondary	Tertiary			
		Abyan	Aden	Al-Bayda'	Al-Hudaydah	Al-Jawf	Al-Mahra	
5	Province	Al-Mahra	Amran	Dhale	Dhamar	Hadhrannaut	Hajjah	
		Ibb	Lahij	Marib	Raymah	Sa'dah	San'a'a	
		Shabwah	Socotra	Taizz				
		Urban	Rural					
7	Monthly Income	155.000 YER or less	156.000 to 400.000 YER	401.000 to 500.000 YER	501.000 YER or more			
8	Do you own a smartphone, computer, or tablet?	Yes	No	If the answer is Yes: Go to question number 9. If the answer is No: Go to question number 10.				

No.	Question	Answer options				
9	What device do you own?	Smartphone	Tablet	Computer		
10	Frequency of internet access	Daily	Weekly	Monthly	Yearly	Never
11	Quality of internet connection	Poor	Average	Good	Excellent	Don't have access
12	Do you use e-banking?	Yes	No	If the answer is Yes: Go to question number 13. If the answer is No: Go to the submission page.		
13	How long have you been using it?	less than one year	1-2	3 years	4 years	5 years or more
14	What is the most used service while using e-banking?	Account Management	Money Transfers	Bill Payments	Loan Applications	Other
UTAUTT2						
15 (PE1)	<i>I find e-banking useful in my daily life</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
16 (PE3)	<i>Using e-banking helps me accomplish things more quickly</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
17 (PE4)	<i>Using e-banking increases my productivity</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
18 (EE1)	<i>Learning how to use e-banking is easy for me</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)

No.	Question	Answer options				
19 (EE2)	<i>My interaction with e-banking is clear and understandable</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
20 (EE3)	<i>I find e-banking easy to use</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
21 (EE4)	<i>It is easy for me to become skilful at using e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
22 (SI1)	<i>People who are important to me think that I should use e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
23 (SI2)	<i>People who influence my behavior think that I should use e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
24 (SI3)	<i>People whose opinions that I value prefer that I use e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
25 (FC1)	<i>I have the resources necessary to use e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
26 (FC2)	<i>I have the knowledge necessary to use e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
27 (FC3)	<i>e-banking is compatible with other technologies I use</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
28 (FC4)	<i>I can get help from others when I have difficulties using e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)

No.	Question	Answer options				
29 (HT1)	<i>The use of e-banking has become a habit for me</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
30 (HT3)	<i>I must use e-banking</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
31 (BI1)	<i>I intend to continue using e-banking in the future</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
32 (BI2)	<i>I will always try to use e-banking in my daily life</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
33 (BI3)	<i>I plan to continue to use e-banking frequently</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Trust						
34 (HR1)	<i>How secure do you feel using e-banking services?</i>	Not at all (1)	To a small extent (2)	Neutral (3)	To a large extent (4)	Totally (5)
35 (HR2)	<i>To what extent do you trust e-banking compared to traditional banking?</i>	Not at all (1)	To a small extent (2)	Neutral (3)	To a large extent (4)	Totally (5)

8 Appendix 2: GPT



ChatGPT



To update the salary ranges from 2014 to 2024, considering inflation and the change in the exchange rate of the Yemeni Riyal against the US dollar, we first need to understand how the value of the Yemeni Riyal has changed against the dollar. According to the information provided, \$244 was equivalent to 52,500 Yemeni Riyals in 2014, giving us an exchange rate of about 215 Yemeni Riyals per dollar at that time. In 2024, the exchange rate has become 1670 Yemeni Riyals per dollar.

To determine how the salary ranges will change based on inflation and the change in exchange rate, we calculate the inflation coefficient by dividing the new exchange rate by the old one:

$$\text{Inflation Coefficient} = \frac{\text{Exchange Rate in 2024}}{\text{Exchange Rate in 2014}}$$

Then, we apply this coefficient to each of the original salary ranges to find the new ranges. Let's calculate that now. Given the calculation:

- Original salary ranges were defined as:
 - 0 to 20,000 Yemeni Riyals
 - 20,001 to 51,500 Yemeni Riyals
 - 51,501 to 65,800 Yemeni Riyals
 - 65,801 Yemeni Riyals or more
- The inflation coefficient was calculated using the formula above.
- The new salary ranges for 2024, after applying the inflation coefficient, are as follows:
 - 0 to 155,349 Yemeni Riyals
 - 155,357 to 400,023 Yemeni Riyals
 - 400,031 to 511,098 Yemeni Riyals
 - 511,105 Yemeni Riyals or more

.1.

9 Appendix 3: Official Announcement No.6 July 2023 - Ministry of Finance Yemen



تعميم رقم (٦) لسنة ٢٠٢٣ م

بشأن صرف مرتبات موظفي السلطة المركزية والمحلية

المحترمون	معالي الاخوة /السوزراء
المحترمون	الاخوة /محافظي المحافظات رؤساء المجالس المحلي
المحترمون	الاخوة / رؤساء الهيئات والمصالح والحكومية
المحترمون	الاخوة / مدراء عموم مكاتب السلطة المركزية في المحافظات
المحترمون	الاخوة /مدراء عموم مكاتب المالية بالمحافظات
المحترمون	الاخوة / مدراء عموم الشئون المالية لدواوين الوزارات

تحية طيبة وبعد،،،

وفقا لما تقتضيه المصلحة العامة وفي إطار مصفوفة الاصلاحات المالية التي تنتهجها وزارة المالية لتطبيق نظام معلومات الإدارة المالية الحكومي التقني المتكامل للوصول الى مالية عامة تعمل بكفاءة وفاعلية وتقديم خدمات للموظفين بنوعية جيدة وتمكين السوزارات والإدارات الحكومية من اعداد وتنفيذ منظومة السياسات والإجراءات المالية التي تعكس الأولويات الوطنية يتم صرف مرتبات موظفي السلطة المركزية والمحلية عبر البنوك المؤهلة التي تم ترشيحها من قبل البنك المركزي كالتالي: -

م	اسم البنك
١	البنك الاهلي اليمني
٢	بنك التسليف التعاوني والزراعي
٣	بنك الكريمي للتمويل الاصغر الاسلامي
٤	بنك التضامن
٥	بنك اليمن والبحرين الشامل
٦	بنك القطيبي للتمويل الاصغر الاسلامي
٧	بنك عدن للتمويل الاصغر

على ان يتم مراعاة الضوابط التالية:-

- ١- اختيار البنك الملانم بحسب الانتشار الذي يخدم موظفي الجهة والقدرة على تقديم خدمات نوعية تحقق أكبر قدر من الاستفادة من تلك الخدمات مع منع الصرف عبر وكلاء الصرافة لتلك البنوك نهائياً.
- ٢- موافاة وزارة المالية وفروعها بالمحافظات بنسخة من العقود المبرمة مع البنوك.

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وزارة المالية

٣- يتم التقيد بأحكام المادة (١٤٨) من اللائحة التنفيذية للقانون المالي رقم (٨) لسنة ١٩٩٠م وتعديلاتهما وفق النموذج التالي: -
• نقر بان الموظفين المبينة أسمائهم في الكشف موجودين فعلاً في خدمة الجهة ولهم الحق باستلام مرتباتهم وان المرتبات تمثل الاستحقاقات طبقاً للقوانين والقرارات واللوائح النافذة

الاسم	مدير عام الموارد البشرية	مدير عام الشؤون المالية	رئيس الجهة / المصلحة
التوقيع			

٤- موافاة وزارة المالية بنسخة الكترونية من كشوفات المرتبات المسلمة للبنوك التي تم اختيارها لصرف المرتبات شهرياً فيما يخص الدواوين وفروعها بالمحافظات أما فيما يخص السلطة المحلية يتم موافاة فروع وزارة المالية بالمحافظات.
٥- فيما يخص الأسماء المصفرة مرتباتهم بكشف الراتب يتم استبعاد أسمائهم من كشف الاستحقاق الإلكتروني المرفق للبنك المعني بصرف المرتبات.
٦- فتح حسابات بأسماء الموظفين لدى البنوك.
٧- لا يتم إضافة الراتب إلى حساب الموظف الأبعد موافاة الموظف ورغبته في إضافة المرتب لحسابه.
٨- يستثنى من هذا التعميم الفقرتين (٧-٨) فلا يتم فتح حسابات للأخوة النازحين ويتم مراعاة التعميم الصادر من وزارة الخدمة المدنية رقم (٣) لعام ٢٠٢٣م.
٩- يتم الالتزام بما ورد أعلاه في مدة أقصاها عند صرف مرتبات شهر اغسطس ٢٠٢٣م، مالم فإن الوزارة ستضطر إلى وقف تعزيز مرتبات الجهة.

وتقبلوا خالص التحايا
سليم صالح بن بريك
وزير المالية



10 Appendix 4: Official Announcement No.6 July 2023 - Ministry of Finance Yemen (Translated)

Official Announcement No.6, 2023

Regarding the Disbursement of Salaries for Employees of Central and Local Authorities

A copy of the official announcement to:

Their Excellencies the Ministers,

Directors of Governorates, and Heads of Local Councils,

Heads of Government Agencies and Departments,

Directors of Central Authority Offices in the Governorates,

Directors of Financial Offices in the Governorates,

Directors of offices of the Ministries of Finance

Following the public interest and as part of the administrative reforms pursued by the Ministry of Finance, it was decided to disburse the salaries of central and local authority employees through banks. This decision aligns with the implementation of the financial management information system, which enhances efficiency and effectiveness, provides good services to employees, and enables ministries and government departments to implement better financial policies that reflect national priorities. The banks nominated by the Central Bank are as follows:

No.	Bank name
1	National Bank of Yemen
2	Cac Bank
3	Al-Kuraimi Islamic Microfinance Bank
4	Tadhamon Bank
5	Shamil Bank of Yemen & Bahrain
6	Al-Qutaibi Islamic Bank For Microfinance
7	Aden Islamic Bank for Microfinance

The following regulations must be considered:

1. Choosing the appropriate bank located in the region that serves employees and ensuring it can provide good services. Moreover, the disbursement of salaries through unofficial agents of these banks is not allowed.
2. Provide the Ministry of Finance and its branches in the governorates with a copy of the contracts concluded with the banks.

3. Comply with the provisions of Article (148) of the Executive Regulations of Financial Law No. (8) of 1990 and its amendments, according to the following:
We confirm that the employees whose names appear on the list are in service and have the right to receive their salaries and that these salaries represent their entitlements by the laws, decisions, and regulations.

Name	Director of Human Resources	Chief Financial officer	General Director
Signature			

4. Provide the Ministry of Finance with an electronic copy of the payrolls that are submitted to banks. This includes the ministries and their branches in the governorates. For local authorities, the payrolls should be provided to the branches of the Ministry of Finance in their respective governorates.
5. Regarding the employees whose salaries are zeroed on the payrolls, their names should be excluded from the electronic payrolls submitted to the bank responsible for disbursing salaries.
6. Open accounts in the names of employees at banks.
7. The salary should not be sent to the employee's account unless the employee approval and desires to add it.
8. Paragraphs (7-8) do not apply to those displaced from war, as bank accounts do not need to be opened for them. Additionally, Official Announcement No. (3) of 2023 issued by the Ministry of Civil Service should be considered while addressing their situation.
9. The above regulations should be adhered to within a maximum period for salary payment in August 2023; failure to comply may force the Ministry to stop enhancing salaries.

Best regards,

Minister of Finance

Salem Saleh Salem bin brek

11 Appendix 5: AI Contributions

AI tools: Chatbot ChatGPT

ChatGPT was used in the thesis "*Examining E-banking Use in Yemen*" to help with the following points:

- Correct grammar in some sentences.
- Ensure that references are not repeated in the reference list.
- Perform some mathematical calculations (calculating current income levels for the survey).
- Provided a structure for the thesis and explained the aim for each chapter in the early writing stages, recommended the subchapters needed in a thesis and tips for how to approach each chapter.
- Explained certain statistical terms and their meanings.
- Assist in making sure the correct steps were taken when analysing the data in SPSS.

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