International Journal of Applied Economics, Finance and Accounting
ISSN 2577-767X
Vol. 17, No. 2, pp. 553-571
2023
DOI: 10.33094/ijaefa.v17i2.1254

Determinants of internet banking usage in emerging markets: Evidence from Egypt

Shereen Aly Hussien Aly Abdou

Faculty of Commerce, Helwan University, Cairo, Egypt.
Email: shereenghazala6@gmail.com

Keywords:
Bank clients
Financial awareness
Internet banking
Perceived relative advantages
Perceived risk.

JEL Classification:
G21; O330.

Received: *8 June 2023*
Revised: *14 August 2023*
Accepted: *31 October 2023*
Published: *20 November 2023*

Abstract

This study aims to investigate the determinants of internet banking (IB) usage in emerging markets under five determinants that include demographic characteristics of bank clients, perceived risk, financial awareness, the bank's technology infrastructure, and perceived relative advantages of internet banking in Egypt. In accordance with a qualitative approach; a questionnaire was designed including five distinct variables of internet banking usage. The questionnaire was administered to the clients of Egyptian banks within the first quarter of 2023, with a total response of 384 participants. The study found that the perceived risk, financial awareness, the bank's technology infrastructure, and perceived relative advantages of internet banking have a significant effect on the attitudes of clients' usage of internet banking (IB) in Egypt. In addition to age, educational qualification, and occupation. Financial awareness and the demographic characteristics of age have a significant effect on the attitudes of clients' usage of internet banking in Egypt, but monthly income and gender have no significance in Egypt. Internet banking presents an opportunity for bank units to achieve entrepreneurial endeavours by providing benefits to their clients and to the overall economy.

Funding: This study received no specific financial support.
Institutional Review Board Statement: The Ethical Committee of the Helwan University, Egypt has granted approval for this study.
Transparency: The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Data Availability Statement: Shereen Aly Hussien Aly Abdou may provide study data upon reasonable request.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

1. Introduction

Throughout its history, The Egyptian banking system has experienced significant transformation overtime, adapting to shifting economic conditions and embracing technological advancements. The Egyptian banking industry facilitates financial intermediation, capital allocation, and economic expansion. The sector has undergone numerous reforms and innovations over the years, harmonizing with global trends and leveraging technology to increase its efficiency and reach. Late in the 20th century, the Egyptian banking sector began integrating technology, with an initial emphasis on automating fundamental banking procedures such as account management and transaction processing. The implementation of electronic data interchange, automated teller machines (ATMs), and telecommunication networks facilitated the efficiency and convenience of banking operations (Wagdi & Fathi, 2023).

In the 1990s, the advent of the internet paved the way for a substantial transition in the delivery of banking services. Egyptian banks have implemented internet banking services, enabling customers to carry out transactions, retrieve account details, and manage their financial affairs remotely. Internet banking revolutionized the traditional banking experience by bringing convenience, accessibility, and 24/7 service availability to consumers (Rensleigh, 2010), the banking sector has witnessed a remarkable technological innovation that combines technology with financial services (Lin, Wang, & Hung, 2020).

Nowadays, most banks have moved from the facility of traditional banking services to internet banking services (Anouze & Alamro, 2019). The emergence of financial technology (fintech) firms has presented a

significant challenge to the conventional banking sector, hence jeopardizing their existing business models. In response, bank are leveraging fintech to maintain their market dominance against intense market competition from non-banking services (Wagdi & Fathi, 2023).

Despite the benefits of online banking, many clients are still hesitant to switch their traditional banking practices Sampet, Changchit, and Lonkani (2020). Researchers' have shifted their focus towards the domain of Internet and mobile banking, prompted by meteoric rise in internet usage and the massive financial investments being allocated to electronic banking (Hye, 2022; Thangavel, Thangavel, Ramanujam, Bennet, & Bennet, 2022).

Internet banking is a contemporary technological advancement that enables clients to directly access their financial transactions online as well as offers them with a wide range of efficient banking services that can be accessed at any location and at any time (Arif, Aslam, & Hwang, 2020). Banks are facing fierce competition in the modern era of web-based technologies. So, banks realized that with the introduction of internet banking, they will be able to deliver their banking products and services in a cost-effective way, capture a larger market share worldwide, attain the slogan of client orientation, gain a better competitive position, as well as provide more convenient reliable and expedient services to clients (Munusamy & Annamalah, 2012; Nazari, Dehnavi, & Nayenzadeh, 2013; Rajapakse, 2017). Despite the numerous benefits resulting from using internet banking, the adoption rate of this service in Egypt is relatively low when compared to developed countries. Therefore, the primary objective of this study is to analyze the barriers hindering Egyptian clients from using internet banking. Hence, the actual reasons behind Egyptian clients' reluctance in using internet banking will be found out in this research. The key question is "what are the barriers hindering clients from using internet banking in Egypt?".

The study aims to investigate the barriers hindering clients to use internet banking in Egypt. So far, there has been a lack of comprehensive research performed to elucidate the underlying factors contributing to clients' hesitancy in adopting internet banking services in Egypt. Therefore, more studies are required to enhance the understanding of existing knowledge in this area. To fill this gap, the present study contributes to the literature by analyzing the barriers hindering clients to use internet banking in Egypt. Additionally, Future research directions are identified, and theoretical and practical contributions to the field of internet banking use in the context of developing nations like Egypt are made possible by this study. Moreover, the results of this research would aid Egyptian bank managers in creating efficient advertising tactics to raise client awareness of online banking among Egyptian consumers.

2. Theoretical Framework

2.1. Internet Banking Concept

Internet banking is known by various names. The names frequently used in scholarly literature, which are mutually interchangeable, include online banking, virtual banking, home banking, and remote electronic-banking (Bhai, 2018; Driga & Isac, 2014; Khan, 2021; Madushani & Balendran, 2020).

Reepu and Arora (2022) and Bhai (2018) defined internet banking as "The provision of information and services by the bank to its clients at their office or home through the internet. Internet banking services include opening accounts making deposits, writing checks, paying bills, transferring funds, inquiring about account balances and savings, paying mortgages, purchasing online products via the internet, as well as certificates of deposits (Alnaas, 2021; Anouze & Alamro, 2019; Goudarzi, Ahmad, Soleymani, & Mohammadhosseini, 2013; Madushani & Balendran, 2020; Mswahili, 2021). Thereby , clients can conduct their banking transactions electronically by using any technological device such as a personal computer , lap top, tablet or a mobile device that enable them to access the internet without any need to visit bank (Lin et al., 2020; Mswahili, 2021). Moreover, Alnaas (2021) and Nethananthan and Shanmugathas (2018) also defined internet banking as "An electronic payment system that clients can use to conduct their online financial transactions through financial institution's website".

Clients who use online banking may enjoy a number of conveniences, including the opportunity to save time. According to many sources (Bhai, 2018; Krishnan & Sheeja, 2020; Lin et al., 2020; Mswahili, 2021; Ronny, 2018), online banking has experienced a surge in popularity due to its quick and easy nature, providing clients with a convenient avenue to address a diverse array of banking requirements.

As opposed to the conventional practise of waiting for the bank's operating hours to address their financial requirements, consumers of online banking institutions have the convenience of accessing their services at any time, throughout the week (Alnaas, 2021; Fetu, 2019; Khan, 2021; Lusaya & Kalumba, 2018).

Furthermore, internet banking saves clients' efforts. Thanks to internet banking, clients don't need to visit the bank branch physically and stand in long queues (Alnaas, 2021; Lin et al., 2020). As a result this i reduces the physical presence of clients and mitigates the protracted waiting time associated with in-person service (Angelakopoulos & Mihiotis, 2011; Belay, Mengesha, & Gebreal, 2016; Havasi, Meshkany, & Hashemi, 2013; Kazmi & Hashim, 2015). Moreover, clients have a better opportunity to compare more products and services offered by different banks without spending too much time and effort (Angelakopoulos & Mihiotis, 2011; Bahl, 2012). Qureshi, Rizvi, and Whitty (2014), added that most of the banks charge their clients less fees for the transactions performed through internet banking in comparison to the fee charges offered by the

traditional banking. Internet banking not only provides many benefits to its clients but also facilitates conveniently to the customers. For example, with the advent of internet banking, financial institutions may now provide their services over the World Wide Web. The rationale behind this is to reduce overhead costs, personnel costs, operational costs and transaction costs. Additionally, Banks can gain closer access to clients through providing them with better services at reduced costs convenience and quicker response (Madushani & Balendran, 2020; Nethananthan & Shanmugathas, 2018). Furthermore, the utilisation of online banking enables banks to enhance their market presence, optimise their financial performance, foster expansion and sustainability, attain a competitive edge, as well as retain current customers and attract prospective ones. Furthermore, internet banking increases market penetration and helps the financial institutions to make improvements in client services (Bhai, 2018; Mswahili, 2021). All these relative advantages lead to drastic changes in the bank's operations such as higher efficiency, better control of operations and observed reduction in costs, less number of employees, lower error rates and paper work (Aslam, Khan, Tanveer, & Amber, 2011; Fetu, 2019; Monisha, Bhudhiraja, & Kaur, 2017). Despite the numerous benefits of internet banking usage, a large number of clients are still reluctant to use it due to some reasons that are considered as major barriers hindering their usage. A review of literatures have been undertaken to analyze these barriers including clients' demographic characteristics, perceived risk, lack of awareness, poor technology infrastructure and perceived relative advantages.

2.2. Internet Banking in Egypt

Despite the huge investments in technology and the introduction of internet banking services in Egypt, the number of internet banking users is still low compared to developed countries. Banks find it difficult to persuade banking clients to use internet banking. Therefore, it is necessary to analyze the major barriers hindering Egyptian clients from internet banking usage. The central bank of Egypt (CBE) has acknowledged that several challenges hinder the expansion of the digital financial services sector in the nation. to terms with the fact that the country's These difficulties include the widespread reliance on cash, its large size, limited internet accessibility, and the general lack of enthusiasm towards the adaptation of digital financial services (Nasr & Helmy, 2018). They added other challenges such as consumer protection and cyber security, lack of interoperability, lack of trust in financial services, small daily and monthly transfer limits, and limited time & resources for digital financial services by market players. Egypt's unstable mobile and internet connections are a major infrastructural problem. Mobile penetration in Egypt stands at 109.45%, indicating that users have more than one SIM subscription. But, only 24.42% of these subscriptions have internet access. Hence, overall penetration is relatively low at 37.8% and is a potential barrier to usage of mobile financial services according to the data of Egyptian Telecommunications Regulatory Authority (www.speed test.net/reports/Egypt).

The aforementioned difficulties have been the primary impetus behind the rise of digital financial services that are paving the way of internet banking towards a cashless world. Accordingly, the CBE has released internet banking regulations for its instant payment network (IPN) inside the Arab Republic of Egypt, with the aim of improving access to internet banking services and attracting more unbanked clients (CBE Report of rules regulating services for Instant Payment Networks inside the Arab Republic of Egypt, October, 2021). The rules governing the issuance of licences for banks, payment service providers, and acquiring banks outline distinct criteria pertaining to licencing, risk management, data protection, and security. Financial operations (like money transfers and purchases) and non-financial transactions (like checking account balances, seeing an abbreviated statement, and changing passwords) are only two examples of the types of internet banking services that banks may provide their clients with the use of IPN. In addition, the Central Bank of Ethiopia (CBE) has implemented a series of new measures to support the expansion of digital financial services (CBE, 2022). These new decisions were implemented on January1, 2023. These decisions encompass the exemption of bank clients from any charges or fees associated with the transfer of funds within the Egyptian pounds through electronic channels such as "internet and mobile bank" as well as instant payment network (IPN) applications. Furthermore, any charges associated with the initiation of electronic collection services through internet-based E-commerce have been waived for enterprises seeking to implement the digital financial service for the initial time. The Egyptian banking sector involves 38 operating banks and more than 2800 branches across Egypt (CBE, 2019). These banks include 5 public banks and 33 private commercial banks. Internet banking is available at 32 out of 38 Egyptian banks (75%), serving 1.4 million clients and 128 million transactions each year (Nasr & Helmy, 2018).

3. Literature Review and Hypotheses Development

3.1. Demographic Characteristics of Clients

Numerous empirical studies have been conducted to analyze the barriers hindering clients' adoption of internet banking across various national contexts. Previous researches have examined several demographic factors and such as age, gender, income, education level, and work status in order to ascertain the underlying factors and outcomes associated with the use of internet banking. Men are more likely to utilize online banking than women. These studies have utilised gender as a moderator variable to examine this phenomenon, according to the research investigations of Arif et al. (2020) & Borraz-Mora, Bordonaba-Juste,

and Polo-Redondo (2017). This is because women are more worried about their privacy and security while using the internet for financial transactions. Meanwhile, Jenkins, Hesami, and Yesiltepe (2022); Almutairi (2021); Fetu (2019); Serener (2018); Monisha et al. (2017); Belay et al. (2016) and Aslam et al. (2011) found that clients with higher education level including either bachelor degree or post graduate degree as well as clients with upper and middle income level are more likely to use internet banking. Regarding age, it was noted that the majority of internet banking customers tend to be young. Lastly, the results of the previous studies showed that internet banking usage were high among those clients who work in a private sector as compared to public sector (Alhassany & Faisal, 2018; Anouze & Alamro, 2019; Krishnan & Sheeja, 2020).

This hypothesis aims to investigate the influence of demographic characteristics on clients' usage of internet banking in Egypt. By examining various demographic factors, including age, gender, education, and income, this hypothesis sheds light on what promotes or inhibits the use of online banking in Egypt. The results may be used by politicians and banks to better target their efforts of increasing online banking among certain populations.

Age has been recognized as a crucial demographic factor influencing internet banking adoption. Younger individuals tend to be more familiar with technology and exhibit higher levels of comfort and confidence in using online platforms. However, older clients may face barriers related to technological literacy, security concerns, and resistance to change.

Studies investigating gender differences in internet banking usage have produced inconclusive results. Some suggest that men are more likely to adopt internet banking due to their greater affinity for technology. However, other studies have found no significant gender differences or even higher adoption rates among women. This may be attributed to women's inclination towards valuing the convenience and time-efficiency offered by internet banking services. The degree of education has been recognised as a significant factor influencing the adoption of internet banking. Higher education levels are generally associated with better technological skills, awareness, and a more positive attitude towards digital services. Individuals with lower education levels may face challenges in accessing and utilizing internet banking platforms.

Income plays a vital role in internet banking adoption, as it influences access to technology and affordability. Individuals with higher incomes are more likely to have access to computers, smart phones, and stable internet connections, enabling them to utilize internet banking services more easily. However, the affordability of traditional banking services may make internet banking more appealing to lower-income individuals.

This study takes a quantitative approach by polling a representative cross-section of Egyptians who make use of online banking services. The questionnaire will include items related to demographic characteristics (age, gender, education, income) and internet banking usage patterns. In order to assure representativeness, the sample will be picked by a systematic random selection technique. Based on the above discussion, it is plausible to postulate that the study may formulate the following hypothesis:

H_1: Demographic characteristics have a significant influence on clients' usage of internet banking in Egypt.

3.2. Perceived Risk of Internet Banking

Rosati, Fox, Cummins, and Lynn (2022) suggest that perceived risk was the most widely significant barrier hindering clients' propensity to use internet banking services. Perceive risk refers to clients' expectations of the occurrence of potential loss when performing online banking transactions (Lin et al., 2020; Razak, Hamid, Azhari, & Sonari, 2021; Solarz & Adamek, 2021). Additionally the influence of perceived risk dimensions including privacy, security, performance, time, financial, social and psychological risks have gained considerable empirical support in the previous literature studies (Almutairi, 2021; Amin, Ashraf, Nisar, & Hassan, 2021; Gelenske, Farias, & Santos Jr, 2018; Karim & Gide, 2019; Krishnan & Sheeja, 2020; Marriott & Williams, 2018; Reepu & Arora, 2022; Roy, Balaji, Kesharwani, & Sekhon, 2017). The results of these studies revealed that perceived risk dimensions have a negative influence on clients' usage of internet banking. Security and privacy risks are the various hazards that can arise, identity theft, phishing, hacking, intrusion, spyware, malware and other, inappropriate conducts (Angelakopoulos & Mihiotis, 2011; Karim & Gide, 2019; Razak et al., 2021). In contrast to previous research, Arif et al. (2020) used structured equation modelling (SEM) in their study and found that perceived risk had a positive influence on clients' adoption of internet banking in Pakistan.

This hypothesis aims to examine the impact of perceived risk on clients' usage of internet banking in Egypt by exploring the dimensions of perceived risk and their effects on client behaviour.

Perceived risk encompasses various dimensions, including financial risk, security risk, performance risk, privacy risk, and psychological risk. Each of these dimensions can influence clients' attitudes and intentions towards internet banking. Financial institutions need to understand these dimensions and their impact on clients' perceived risk to address their concerns effectively.

This study adopts a quantitative research approach, utilizing a survey questionnaire to collect data from a sample of internet banking users in Egypt. The questionnaire will include items related to perceived risk dimensions (financial risk, security risk, performance risk, privacy risk, and psychological risk) and clients' usage patterns of internet banking. The sample will be selected using a systematic random sampling technique to ensure representativeness. Hence, the following research hypothesis is derived from the preceding evidence:

H_2: Perceived risk negatively influences clients' usage of internet banking in Egypt.

3.3. Awareness of Internet Banking

According to previous studies including (Alnaas, 2021; Anouze & Alamro, 2019; Madushani & Balendran, 2020; Singh & Sharma, 2014), argue that only few clients are aware of internet banking availability and the benefits of its usage. Similarly, previous studies such as Lusaya and Kalumba (2018); Ronny (2018) and Monisha et al. (2017) showed that clients' lack of awareness of internet banking availability impacts its usage in Kasama, India and Spain respectively . Additionally, a significant obstacle impeding clients' utilisation of internet banking is their limited technical understanding or, in some cases, their lack of computer literacy. This requires enough education and training on the basic knowledge of internet for better usage of internet banking.

This hypothesis aims to examine the impact of awareness on clients' usage of internet banking in Egypt by exploring the dimensions of awareness and their effects on client behaviour.

Awareness in the context of internet banking includes dimensions such as knowledge of internet banking services, understanding of the benefits and features, familiarity with the technology and functionality, and awareness of the security measures in place. Each of these dimensions contributes to clients' overall awareness of internet banking and subsequently influences their adoption and usage behaviour.

This study employs a quantitative approach, specifically by the administration of surveys to a demographically representative sample of Egyptians who utilise online banking services. The survey will encompass inquiries pertaining to the many facets of awareness, including knowledge, benefits, technical familiarity, and security awareness. Additionally, it will encompass questions regarding clients' usage patterns of internet banking. The sample will be selected using a systematic random sampling technique to ensure representativeness. From what has been said above, the study may hypothesis that:

H_3: Awareness positively influences clients' usage of internet banking in Egypt.

3.4. Technology Infrastructure of Internet Banking

Numerous previous studies highlighted the importance of technology infrastructure, given that internet banking relies entirely on information technology (IT) and telecommunications. For example: the main findings of previous studies (Agwu, 2015; Almutairi, 2021; Belay et al., 2016; Karimzadeh & Alam, 2012; Qureshi et al., 2014) concluded that poor technology infrastructure of the bank is one of the major barriers hindering clients' ability to utilise internet banking services. The bank's website that is user-friendly and well-designed enables clients to navigate easily.

Furthermore, it is imperative that the information displayed on the bank's website is presented in a clear and comprehensive manner. Additionally, there is a need for expedient service delivery, as well as is the presence of proficient IT experts and specialists. Similarly , previous studies conducted by Fetu (2019); Janahi (2021); Krishnan and Sheeja (2020); Mir, Rameez, and Tahir (2022) and Shiferaw and Molla (2018) have identified a common barrier to internet banking usage, namely the lack of adequate information and communications technology (ICT) facilities for clients. According to Sunith (2019), clients who have a technological web-device such as computer, laptop, smart mobile phone, or tablet are more likely to use internet banking. In addition to the imperative of quick and reliable internet connectivity, this is of paramount importance for the usage of internet banking. This hypothesis aims to investigate the impact of technology infrastructure on clients' usage of internet banking in Egypt by examining the various dimensions of technology infrastructure and their subsequent effects on client behaviour. Technology infrastructure encompasses various dimensions, including internet connectivity, network reliability, speed, accessibility to devices, and availability of banking applications. Each of these dimensions contributes to the overall quality of the technology infrastructure and subsequently influences clients' adoption and usage manner.

This study employs a quantitative approach by surveying a representative cross-section of Egyptians who make use of online banking services. The questionnaire will include items related to the dimensions of technology infrastructure (internet connectivity, network reliability, speed, device accessibility, and availability of banking applications) and clients' usage patterns of internet banking. The sample will be selected using a systematic random sampling technique to ensure representativeness. Based on the aforementioned information, the study may propose the following hypothesis:

H_4: Technology infrastructure positively influences clients' usage of internet banking in Egypt.

3.5. Perceived Relative Advantages of Internet Banking

According to previous studies (Deventer, Klerk, & Dye, 2018; Ikechukwu & Abubakar, 2020; Lyimo & Dev, 2020; Rasull, Jantan, Ali, Jaharudin, & Mansor, 2020) clients are not willing to try or even use a new method other than the traditional banking method , unless they perceive relative advantages of internet banking usage . Several studies Ikechukwu and Abubakar (2020); Lyimo and Dev (2020); Rasull et al. (2020) and Deventer et al. (2018) have concluded that clients use internet banking services due to perceiving relative advantages compared to traditional banking methods. These advantages include convenience, 24/7

availability, time & effort savings, swift delivery, cost reduction, and increased opportunities for product and service comparison with less time & effort.

This hypothesis aims to investigate the impact of perceived relative advantages on clients' usage of internet banking in Egypt by examining the dimensions of perceived relative advantages and their effects on clients' behaviour. This research provides insights into the opportunities and challenges for promoting internet banking in the Egyptian market. The results of this study can provide valuable insights for financial institutions seeking to emphasise the advantages of internet banking in order to enhance client acceptance and usage. Perceived relative advantages encompass several dimensions, including convenience, accessibility, time-saving, cost-efficiency, and enhanced service offerings. Each of these dimensions contributes to clients' overall perception of the benefits and advantages associated with internet banking in comparison to traditional banking methods. Consequently, these dimensions have a direct impact on clients' decision to use internet banking and their future patterns of usage behaviour.

This study adopts a quantitative research approach, utilizing a survey questionnaire to collect data from a sample of internet banking users in Egypt. The questionnaire will include items related to the dimensions of perceived relative advantages (convenience, accessibility, time-saving, cost-efficiency, and enhanced service offerings) and clients' usage patterns of internet banking. The sample will be selected using a systematic random sampling technique to ensure representativeness; Hence, the study may hypothesis that:

H_5: Perceived relative advantages positively influence clients' usage of internet banking in Egypt.

4. Questionnaire Design

In order to examine the factors that discourage Egyptian clients from utilizing online banking, a two-part questionnaire was designed for this research. The initial section of the survey consists of six inquiries pertaining to the demographic attributes of the respondents. The subsequent portion has 64 questions, which are categorised into four sections, each addressing a distinct barrier encountered by Egyptian bank customers in their use of internet banking services. In the present study , the constructs used were adapted from previous studies of (Almutairi, 2021; Alnaas, 2021; Amin et al., 2021; Arif et al., 2020; Demirdogen, Yaprakli, Yilmaz, & Husain, 2010; Fetu, 2019; Mahfouz & Khourshed, 2016; Marriott & Williams, 2018; Mir et al., 2022; Razak et al., 2021; Reepu & Arora, 2022; Saravanakumar, Jayasubramanian, & Thomas, 2021; Solarz & Adamek, 2021; Sunith, 2019). Moreover, the viewpoints of Egyptian clients related to the barriers hindering their usage of internet banking were measured by a five-point likert scale from (1 = strongly agree to 5 = strongly disagree). Respondents who are users of internet banking services were included for completion of the questionnaire.

In order to ensure the completeness, clarity, and reliability of the questionnaire, a pilot study was conducted prior to the collection of data for the internet banking survey. The preliminary research involved a sample of 36 individuals who were randomly selected from four different banks, comprising both user and non user of internet banking services. This study led to minor modifications in the phrasing of survey questions pertaining to the perception of risk and the perception of relative benefits.

5. Data Collection

A survey was conducted on Egyptian bank clients during the first quarter of 2023. The survey elicited responses from a total of 384 participants, who were selected from a pool of 461 questionnaires distributed throughout various branches of Egyptian banks located in the governorates of Cairo, Giza and Qalyubia.

6. Test Hypotheses

6.1. Statistical Methods Used in Data Analysis

Using the means and standard deviations, a descriptive analysis may be performed to learn more about the characteristics of the research samples. The questionnaire's validity and reliability may be assessed using Cronbach's Alpha. If you want to know which statistical tests are best for analyzing your data, you may do it with a single sample by using the Kolmogorov-Smirnov test. Spearman's rho (Correlation analysis) is used to determine the magnitude and direction of the association between the independent variables and Egyptian consumers' use of online banking. Spearman's rho bias in responses may be corrected by doing a correlation analysis and calculating the relative contribution.

The utilisation of Multiple Regression Analysis is applicable in determining the primary predictive variables that influence the adoption of independent variables in relation to clients' usage of internet banking in Egypt. The inclusion of independent variables in the model serves to elucidate their significance in optimising clients' utilisation of internet banking in Egypt. Partial Least Square (PLS) regression can analyze the relationship between a set of independent variables and a dependent variable. It is particularly useful when dealing with high-dimensional data sets. PLS regression works by generating latent variables, which are novel independent variables. These latent variables are then used to predict the dependent variable.

6.2. Analysis of the Characteristics of the Study Sample

The study may put greater faith in the study outcomes because of the features of the sample used to conduct the research. Study participants' levels of comprehension may be largely predicted by demographic variables such gender, age, degree of education, monthly income in Egyptian pounds, and occupation.

Table 1. Distribution of the study sample according to the scientific qualification.

Qualification	Frequency	Percent
High secondary school	90	23.4
Diploma	83	21.6
Bachelor's degree	128	33.2
Master degree	30	7.8
PhD degree	54	14.0
Total	385	100.0

Table 1 illustrates that a big number of the respondents have a high level of education (Bachelor's degree) which represents 33.2 % of the respondents which are less than half of the respondents. On the other hand the (MSc, and PhD), represent (21%) of the respondents.

Table 2. Distribution of the study sample according to monthly income level (Egyptian pounds).

Monthly income level (Egyptian pounds)	Frequency	Percent
Less than 5000	150	39.0
From 5000 to 10000	126	32.7
From 10000 to 15000	63	16.4
More than 20000	46	11.9
Total	385	100.0

The Table 2 illustrates the distribution of sample respondents according to their monthly income levels. It is evident that a significant proportion of respondents, specifically (39.0%), reported earning a monthly income of Less than 5000. Also, (16.4.0 %) of the respondents earn from 10000 to 15000 Egyptian pounds.

Table 3. Distribution of the study sample according to gender.

Gender	Frequency	Percent
Male	175	45.5
Female	210	54.5
Total	385	100.0

The vast majority of the sample respondents are women (54.5%), as seen in Table 3. Also, men make up about half of the sample (45.0%).

Table 4. Distribution of the study sample according to age.

Age	Frequency	Percent
below 25 years old	143	37.1
From 25 to 35 years old	175	45.5
From 36 to 45 years old	26	6.8
above 55 years old	41	10.6
Total	385	100.0

Table 4 demonstrates that over half of the sample respondents (45.5%, to be exact) are between the ages of 25 and 35. In addition, 10.6% of the respondents are those who answered the survey 65 or older.

Table 5. Distribution of the study sample according to Occupation.

Occupation	Frequency	Percent
Student	68	17.7
Self – employed	132	34.3
Government sector	70	18.2
Private sector	97	25.2
Unemployed	18	4.7
Total	385	100.0

Table 5 reveals that a significant proportion of the sample population is employed in the Privet sector (25.2% of the total). In addition, 34.3% of respondents are self employed, and 18.2% are employed in various roles within the government sector.

6.3. Testing the Validity and Reliability of the Questionnaire List

To ensure the study's ability to make reliable generalisations based on the statistical analysis of the questionnaire, it is crucial to assess the stability and reliability of each axis and its corresponding questions. Cronbach's Alpha is a test used to quantify the reliability and stability of a survey, and may be used by the researcher to evaluate the effectiveness of the questionnaire list. If the number falls within the predetermined parameters (equal to or more than 60%), it may be generalized to the whole population (Sekaran & Bougie, 2016). The following options are up for consideration.

6.3.1. Reliability of Measurements in the Study

Redistributing the measurements at any time and under the same circumstances will provide the same findings. Cronbach's Alpha is used to examine the consistency and reliability of the survey.

6.3.2. Validity of the Items in the Study

As a primary statistical technique, the reliability coefficient was used to verify the accuracy of all measurements. The validity coefficient is equal to the square root of the Cronbach alpha coefficient, and it has to be adequate (more than or equal to 60%).The examination of the survey's fundamental variables' reliability and validity will be declared in Table 6 based on the collected data.

Table 6. The reliability & validity of the basic variables in the survey.

Basic axes of the questionnaire	Number of statements	Reliability coefficient	Validity coefficient
Clients' usage of internet banking in Egypt	8	0.798	0.893
Perceived risk	32	0.950	0.975
Awareness level	8	0.858	0.926
Technology infrastructure	16	0.624	0.790
Perceived relative advantages	8	0.815	0.903
All items	72	0.850	0.922

Table 6 shows that a validity coefficient value of 92.2% was found at the survey level as a whole. The validity coefficient values of (0.893, 0.975, 0.926, 0.790, and 0.903) obtained for the five major dimensions of the survey's list demonstrate significant statistical strength. Greater than or equal to 60% validity coefficient.

The value of the dependability coefficient at the survey level (85.0%) is shown in Table 6 and is statistically significant. Values of (0.798), (0.950), (0.858), (0.624), and (0.815) for the reliability coefficients of the primary axes of the survey list are likewise statistically reliable. The coefficient of dependability is more than 60%. Therefore, the researcher may depend on the survey list to accomplish the goals of the study and spread the findings widely since it has a high degree of internal consistency and reliability.

6.3.3. Analyze the Normal Distribution of the Data

After using the One-Sample Kolmogorov Smirnov test, a researcher can make informed decisions regarding the selection of appropriate statistical tests for the analysis of study data, contingent upon the adherence of the data to a normal distribution. The One Sample Kolmogorov-Smirnov test results are shown in Table 7.

Table 7. The results of (Kolmogorov-Smirnov) test for the normal distribution of the data.

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Basic axes of the questionnaire	**Statistic**	**Df**	**Sig.**	**Statistic**	**df**	**Sig.**
Clients' usage of internet banking in Egypt	0.260	385	0.000	0.908	385	0.000
A- Security risk	0.297	385	0.000	0.681	385	0.000
B- Privacy risk	0.282	385	0.000	0.740	385	0.000
C- Financial risk	0.243	385	0.000	0.733	385	0.000
D- Performance risk	0.201	385	0.000	0.823	385	0.000
E- Time risk	0.303	385	0.000	0.616	385	0.000
F- Psychological risk	0.304	385	0.000	0.636	385	0.000
G- Social risk	0.498	385	0.000	0.472	385	0.000
Perceived risk	0.223	385	0.000	0.731	385	0.000
I- Awareness of internet banking availability and its benefits	0.155	385	0.000	0.883	385	0.000
II- Technical knowledge or computer literacy	0.163	385	0.000	0.927	385	0.000
Awareness level	0.257	385	0.000	0.907	385	0.000
I- Efficiency of technology infrastructure of the bank	0.260	385	0.000	0.908	385	0.000
II- Availability information and telecommunications (ICT) to clients	0.297	385	0.000	0.681	385	0.000
Technology infrastructure	0.282	385	0.000	0.740	385	0.000
Perceived relative advantages	0.243	385	0.000	0.733	385	0.000

Note: Values are the minimum for significance at 5%.

As shown in Table 7, the data do not follow a normal distribution since the P-value (significant) for the test statistic in the Kolmogorov test is less than (0.05). However, in order to provide evidence for the hypotheses and get more precise findings, the researcher will use nonparametric tests.

According to the scale and numbers in the preceding Table 7, the study can see the relative relevance of the questionnaire elements.

6.4. Descriptive Analysis

6.4.1. The Descriptive Analysis of the Sample Responses Regarding Clients' Usage of Internet Banking in Egypt

The following table shows the descriptive statistics of clients' usage of internet banking in Egypt.

Table 8. The descriptive analysis of clients' usage of internet banking in Egypt.

Statements	Mean	Std. deviation	Relative proportions
Payment of bills via the internet such as telephone charges, school/college fees, electricity	4.03	0.64	80.62
Checking my account statement on the internet	4.21	0.41	84.21
Transferring funds within the same bank accounts through the internet	4.12	0.78	82.39
Transferring funds to other bank accounts through the internet	3.60	1.39	72.00
Deposits or of money through the internet	4.03	0.64	80.62
Applying for a loan request or any banking facilities through the internet	4.16	0.37	83.27
Purchasing online using my credit card	4.10	0.77	81.97
Purchasing of savings certificates through the internet	3.64	1.42	72.83
Clients' usage of internet banking in Egypt	3.99	0.57	79.74

Table 8 presents the most general agreement in the views of the sample is that the highest dimension to achieve this variable is (Checking my account statement on the internet) with a Mean (4.21) and standard deviation (0.41), followed by Applying for a loan request or any banking facilities through the internet with a Mean (4.16) and standard deviation (0.37). The lowest dimension is (Transferring funds to other bank accounts through the internet) with a mean (3.60) and standard deviation (1.39).

6.4.2. The Descriptive Analysis of the Sample Responses Regarding Perceived Risk

The following table shows the descriptive statistics of perceived risk according to the participants in the questionnaire.

Table 9. The descriptive analysis of perceived risk.

Statements	Mean	Std. deviation	Relative proportions
A- Security risk	1.41	0.59	28.25
B- Privacy risk	1.34	0.41	26.84
C- Financial risk	1.46	0.60	29.25
D- Performance risk	1.42	0.43	28.37
E- Time risk	1.69	1.10	33.78
F- Psychological risk	1.71	1.10	34.23
G- Social risk	1.18	0.39	23.69
Perceived risk	1.46	0.59	29.20

Table 9 presents that the most general agreement in the views of the sample is that the highest dimension to achieve this variable is (I fear of losing money due to internet connection problems and poor network) with a Mean (1.9) and standard deviation (1.49). The lowest dimension is (people who are important to me will think of me badly if I don't use IB) with a Mean (1.2) and standard deviation (0.33).

6.4.3. The Descriptive Analysis of the Sample Responses Regarding Awareness Level

The following table shows the descriptive statistics of awareness level according to the participants in the questionnaire.

Table 10. The descriptive analysis of awareness level.

Statements	Mean	Std. deviation	Relative proportions
I- Awareness of internet banking availability and its benefits:	4.02	0.49	80.48
II- Technical knowledge or computer literacy:	4.16	0.41	83.16
Awareness level	4.09	0.38	81.88

Table 10 shows that the most general agreement in the views of the sample is that the highest dimension to achieve this variable is (My bank uses different advertising media to increase clients' awareness level towards internet banking services) with a Mean (4.46) and standard deviation (0.61). The lowest dimension is (My bank provides me with enough information about the comparative benefits of using internet banking in contrast with the traditional banking method) with a Mean (3.65) and standard deviation (1.38).

6.4.4. The Descriptive Analysis of the Sample Responses Regarding Technology Infrastructure

The following table shows the descriptive statistics of technology infrastructure according to the participants in the questionnaire.

Table 11. The descriptive analysis of technology infrastructure.

Statements	Mean	Std. deviation	Relative proportions
I- Efficiency of technology infrastructure of the bank	3.82	0.45	76.32
II- Availability information and telecommunications (ICT) to clients	4.23	0.41	84.69
Technology infrastructure	4.03	0.29	80.53

Table 11 shows that the most general agreement in the views of the sample is that the highest dimension to achieve this variable is (The bank's website which offers enough information to answers my questions) with a Mean (4.36) and standard deviation (0.48). The lowest dimension is (Availability of IT experts and specialists who provide me high quality internet banking services) with a Mean (3.22) and standard deviation (1.35).

6.4.5. The Descriptive Analysis of the Sample Responses Regarding Perceived Relative Advantages

The following table shows the descriptive statistics of perceived relative advantages according to the participants in the questionnaire.

Table 12. The descriptive analysis of perceived relative advantages.

Statements	Mean	Std. deviation	Relative proportions
Flexibility, which means the accessibility to internet banking anytime and anywhere, as internet banking is available 24 hours a day for 7 days a week	3.99	0.74	79.84
The costs of using internet banking services are less than that of the traditional banking	4.18	0.36	83.40
Convenience, as internet banking enables me to save more time and effort compared to traditional banking	4.09	0.82	81.77
There is no need to visit the bank's branch personally and queue up as compared to traditional banking	3.58	1.44	71.53
IB enables me to accomplish my banking activities more quickly than traditional banking	3.99	0.74	79.84
IB enables me to do my banking transactions in private as compared to traditional banking	4.16	0.37	83.22
IB gives me more control over my financial issues as compared to traditional banking	4.09	0.82	81.77
IB allows me to manage my money well by viewing my accounts online	3.60	1.44	71.62
Perceived relative advantages	3.95	0.61	79.09

Table 12 shows that the most general agreement in the views of the sample is that the highest dimension to achieve this variable is (The costs of using internet banking services are less than the cost of traditional banking) with a Mean (4.18) and standard deviation (0.36). The lowest dimension is (There is no need to visit the bank's branch personally and queue up as compared to traditional banking) with a Mean (3.58) and standard deviation (1.44)

6.5. Testing the Association between the Independent Variables and Clients' Usage of Internet Banking in Egypt

Table 13 demonstrates the negative relationship between the two independent variables (X, Y) (Perceived risk and consumers' use of online banking in Egypt) using the Spearman correlation coefficient of -0.355** at the 0.000 level of significance. The reliability of the statements that may be utilized to quantify the research

variables is also observed, hence it follows that the underlying variables (X, Y) are in fact associated. Conversely, a positive association between (Awareness level and consumers' use of online banking in Egypt) can be shown in Table 13 thanks to a Spearman correlation coefficient of 0.594** at the 0.000 level of significance. In addition, a Spearman correlation value of 0.526** indicates a positive relationship between (Technology infrastructure and consumers' utilization of online banking in Egypt) at the 0.0001 level of significance. Finally, a positive correlation exists between (Perceived relative benefits and consumers' use of online banking in Egypt) at the 0.0001 level of significance (Spearman's rho =0.931**).

Table 13. Matrix correlation coefficients between the basic variables (X & Y).

Variables		Perceived risk	Awareness level	Technology infrastructure	Perceived relative advantages	Clients' usage of IB in Egypt
Perceived risk	Correlation coefficient	1.000	-0.277**	-0.171**	-0.378**	-0.355**
	Sig. (2-Tailed)		0.000	0.001	0.000	0.000
	N	385	385	385	385	385
Awareness level	Correlation coefficient	-0.277**	1.000	0.583**	0.623**	0.594**
	Sig. (2-Tailed)	0.000		0.000	0.000	0.000
	N	385	385	385	385	385
Technology infrastructure	Correlation coefficient	-0.171**	0.583**	1.000	0.562**	0.526**
	Sig. (2-Tailed)	0.001	0.000		0.000	0.000
	N	385	385	385	385	385
Perceived relative advantages	Correlation coefficient	-0.378**	0.623**	0.562**	1.000	0.931**
	Sig. (2-Tailed)	0.000	0.000	0.000		0.000
	N	385	385	385	385	385
Clients' usage of IB in Egypt	Correlation coefficient	-0.355**	0.594**	0.526**	0.931**	1.000
	Sig. (2-Tailed)	0.000	0.000	0.000	0.000	
	N	385	385	385	385	385

Note: **significant at 1%.

6.6. The First Hypothesis Test

The formulation of the hypothesis can be reviewed as follows:

H_1: Demographic characteristics have a significant influence on clients' usage of internet banking in Egypt.

To test the first hypothesis, states that "demographic characteristics have a significant influence on clients' usage of internet banking in Egypt. The Table 14 illustrates the results of multiple regression analysis as follows:

Table 14. The results of multiple regression test that demographic characteristics have a significant influence on clients' usage of internet banking in Egypt.

Variables	Unstandardized coefficients		Standardized coefficients	T	P-value	TOL	VIF
	B	Std. error					
Age	0.209	0.057	0.183	3.661	0.000	0.810	1.234
Educational qualification	0.138	0.025	0.288	5.468	0.000	0.729	1.372
Monthly income level	-0.009	0.021	-0.019	-0.412	0.681	0.904	1.106
Occupation	0.071	0.024	0.159	2.922	0.004	0.681	1.468
Gender	0.015	0.022	0.031	0.698	0.485	0.997	1.003

The model's importance in testing is indicated in Table 14. Clients' use of online banking in Egypt is affected by demographic factors; the F-test for this hypothesis yields a value of 10.125, and the associated P-value is less than 0.001. In addition, there is no multi-co linearity among the explanatory variables since the variance inflation factor (VIF) is smaller than (10) and the tolerance (T) is more than (0.1) for each variable. The independent variables in the previous table have a high correlation (0.592) with the dependent variable (Y: clients' usage of internet banking in Egypt), and the determination coefficient (R2) demonstrates that the explanatory variables are contributing to explain 35% of the variation in (clients' usage of internet banking in Egypt).

The results show that the variables (gender, age and monthly salary) have a positive impact on the dependent variable (Y: clients' usage of internet banking in Egypt) at 5% significance level, as shown in the following graph.

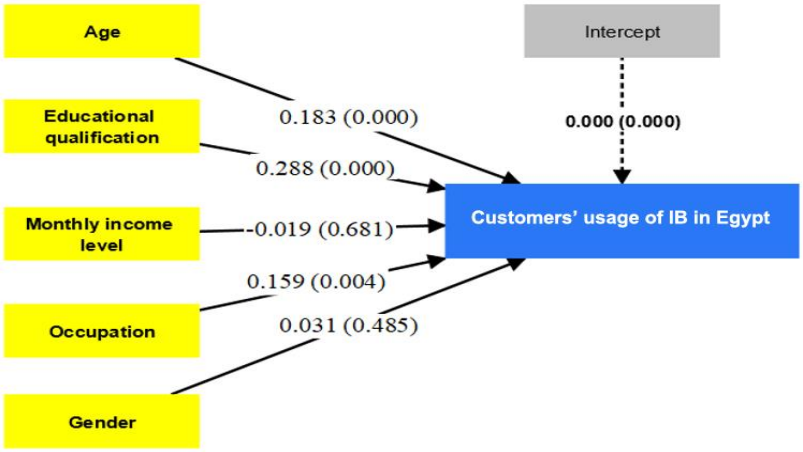

Figure 1. Demographic characteristics and clients' usage of internet banking in Egypt.

Figure 1 presents impact of demographic characteristics and clients' usage of internet banking in Egypt. Age, Educational qualification, Occupation were the significant Demographic characteristics which are affecting the clients' usage of internet banking in Egypt but among all the characteristics monthly income level was not significant.

Thus, the first hypothesis is accepted that demographic characteristics have a significant influence on clients' usage of internet banking in Egypt.

6.7. The Second Hypothesis Test

The formulation of the hypothesis can be reviewed as follows:

H_2: Perceived risk negatively influences clients' usage of internet banking in Egypt.

To test the second hypothesis, that states the "Perceived risk negatively influences clients' usage of internet banking in Egypt. The Table 15 illustrates the results of Partial Least Squares Regression analysis as follows:

Table 15. The results of multiple regression test that Perceived risk influences clients' usage of internet banking in Egypt.

Variables	PLS regression parameter estimate	T	P-value
Perceived risk	-0.535	-6.203	0.000

The model's importance in testing is indicated in Table 15. The F-test indicates that consumers' risk perceptions impact the dependent variable (their use of online banking in Egypt), and the corresponding P-value is 0.0001b. The determination coefficient (R2) indicates that explanatory factors explain 28.7% of the variance in the dependent variable, which pertains to clients' utilisation of internet banking in Egypt.

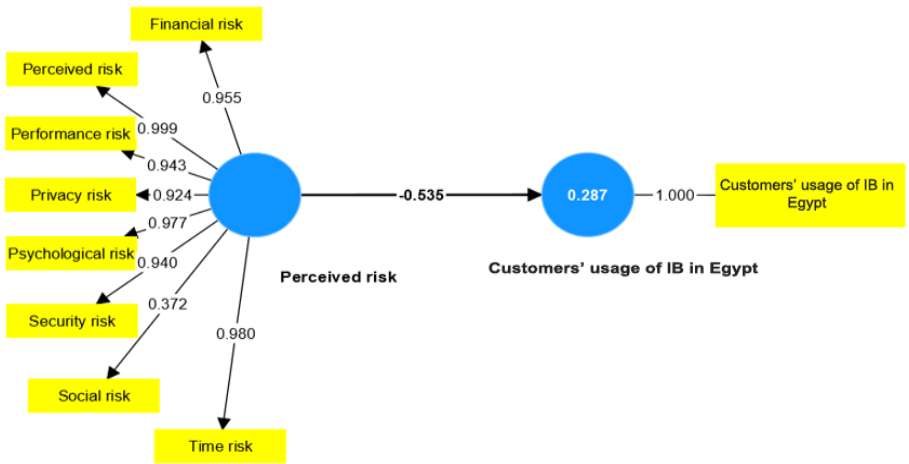

Figure 2. Perceived risk negatively influences clients' usage of internet banking in Egypt.

Figure 2 presents the influences of perceived risk on clients' usage of internet banking in Egypt. The findings indicate that the variables (Perceived risk) exert a detrimental influence on the dependent variable (Y:

clients' utilisation of internet banking in Egypt) with a significance level of 5%. Thus, the second hypothesis is accepted that Perceived risk negatively influences clients' usage of internet banking in Egypt.

6.8. The Third Hypothesis Test

The formulation of the hypothesis can be reviewed as follows:

H_3: Awareness positively influences clients' usage of internet banking in Egypt.

In order to examine the validity of the third hypothesis, which posits that "Awareness has a positive impact on the utilisation of internet banking services among clients in Egypt" The Table 16 illustrates the results Partial Least Squares Regression as follows:

Table 16. The results of multiple regression test that Awareness influences clients' usage of internet banking in Egypt.

Variables	PLS regression parameter estimate	T	P-value
Awareness	0.940	15.554	0.000

The importance of the model in the context of testing is seen in Table 16 The determination coefficient, shown as (R2), indicates that the independent factors are responsible for explaining 45% of the observed variability in the dependent variable, (clients' usage of internet banking in Egypt). This suggests that awareness exerts an effect on the dependent variable.

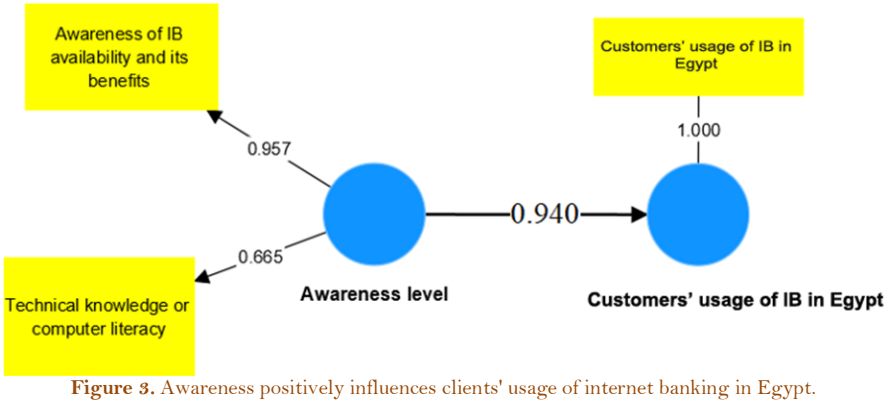

Figure 3. Awareness positively influences clients' usage of internet banking in Egypt.

Figure 3 presents the influences of awareness positively on clients' usage of internet banking in Egypt. The results show that the variables (Awareness) have a positive impact on the dependent variable (Y: clients' usage of internet banking in Egypt) at 5% significance level. From the previous explanation, it can be concluded that the third hypothesis, which posits a positive relationship between Awareness and clients' usage of internet banking in Egypt, is accepted.

6.9. The Fourth Hypothesis Test

The formulation of the hypothesis can be reviewed as follows:

H_4: Technology infrastructure positively influences clients' usage of internet banking in Egypt.

In order to examine the fourth hypothesis, which suggest a positive relationship between technology infrastructure and clients' utilisation of internet banking in Egypt. The Table 17 illustrates the results Partial Least Squares Regression as follows:

Table 17. The results of multiple regression test that Technology infrastructure influences clients' usage of internet banking in Egypt.

Variables	PLS regression parameter estimate	T	P-value
Technology infrastructure	1.076	12.975	0.000

The model's importance in testing is indicated in Table 17. Clients' use of internet banking in Egypt is affected by technological infrastructure, with an F-test of 37.913 and a P-value of.001b. The determination coefficient (R2) indicates that the explanatory variables explain 28.5% of the variance seen in the dependent variable.

Figure 4 presents the influences of Technology infrastructure on clients' usage of internet banking in Egypt. The results show that the variables (Technology infrastructure) have a positive impact on the dependent variable (Y: clients' usage of internet banking in Egypt) at 5% significance level. From the previous explanation, the fourth hypothesis is accepted that Technology infrastructure positively influences clients' usage of internet banking in Egypt.

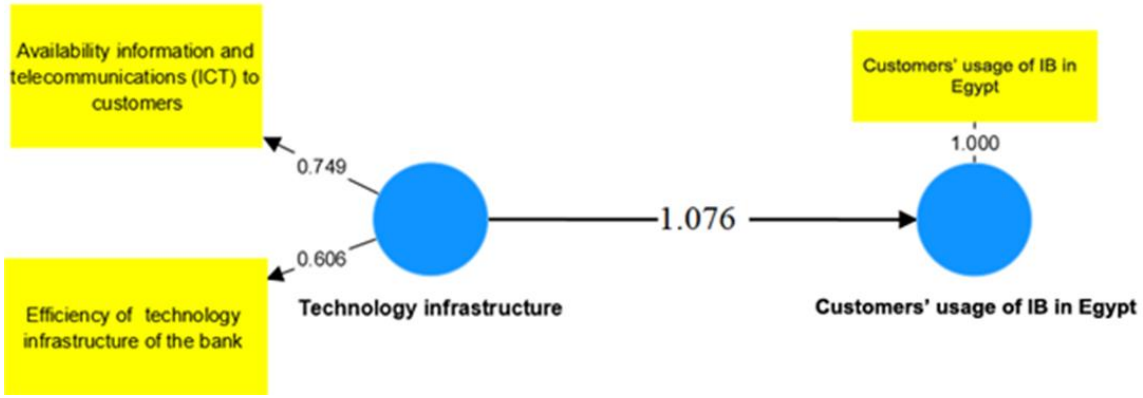

Figure 4. Technology infrastructure positively influences clients' usage of internet banking in Egypt.

6.10. The Fifth Hypothesis Test

The formulation of the hypothesis can be reviewed as follows:

H_5: Perceived relative advantages positively influence clients' usage of internet banking in Egypt.

In order to examine the Fifth hypothesis, which posits that "Perceived relative advantages have a positive impact on the adoption of internet banking by clients in Egypt," a research study was conducted. The Table 18 illustrates the results Partial Least Squares Regression as follows:

Table 18. The results of multiple regression test that Perceived relative advantages influences clients' usage of internet banking in Egypt.

Variables	PLS regression parameter estimate	T	P-value
Perceived relative advantages	0.834	40.197	0.000

The model's relevance in testing is indicated in Table 18. Clients' use of internet banking in Egypt is affected by perceived relative advantages, as the F-test yields (312.787) and the associated P-value is (0.001b). Furthermore, the coefficient of determination (R2) indicates that the independent variables are contributing to the explanation of 76.1% of the observed variance in clients' utilisation of internet banking in Egypt.

Figure 5. Perceived relative advantages positively influence clients' usage of internet banking in Egypt.

Figure 5 presents the influence of perceived relative advantage on clients' usage of internet banking in Egypt. The results show that the variables (Perceived relative advantages) have a positive impact on the dependent variable (Y: clients' usage of internet banking in Egypt) at 5% significance level, as shown in the above figure.

From the previous explanation, the fifth hypothesis is accepted that Perceived relative advantages positively influence clients' usage of internet banking in Egypt.

7. Conclusion and Recommendations

IB, also known as Internet banking or electronic banking is the delivery of banking services through digital platforms, allowing consumers to remotely access a variety of banking products and execute a variety of financial activities. There has been a dramatic increase in the use of online banking in Egypt over the last few years. The purpose of this essay is to evaluate the factors that have led to the present condition of online banking in Egypt. The Central Bank of Egypt has implemented proactive measures to assist the expansion of online banking services, recognising their potential to enhance financial inclusion.

Financial inclusion plays a crucial role in facilitating the advancement of socioeconomic prosperity. Internet banking services contribute in the promotion of financial inclusion by expanding access to financial services, reducing transaction costs, and fostering financial literacy. Simultaneously, Internet banking presents a prospect for bank units to engage in entrepreneurship by offering advantages to their clientele and contributing to the overall economy (Osama Wagdi & Hasaneen, 2019).

Internet banking services in Egypt have the potential to significantly enhance financial inclusion by providing convenient and accessible banking solutions to a wider population. The strategic orientation of the Central Bank of Egypt towards the promotion of internet banking services, along with its endeavours to enhance financial literacy and safeguard consumer rights, establishes a robust groundwork for fostering a more comprehensive financial ecosystem. However, it is essential to address the challenges and risks associated with these services to ensure their long-term sustainability and security. Egypt can leverage internet banking services to foster financial inclusion and drive economic growth in future by continuous efforts to embrace technological advancements and fostering collaboration between banks, fintech firms, and regulatory bodies. This study employed a qualitative methodology, utilising a questionnaire that encompassed five dimensions of internet banking usage. These dimensions encompassed the demographic characteristics of bank clients, perceived risk, financial awareness, the bank's technology infrastructure, and perceived relative advantages of internet banking.

The coefficient of determination (R2) indicates that the independent variables are responsible for explaining 35% of the variance in the utilisation of internet banking by clients in Egypt. Additionally, the demographic characteristics exhibit a statistically significant impact on the attitudes towards internet banking usage among clients in Egypt. Clients' online banking use in Egypt is influenced by age, level of education, and employment, but not by clients' monthly income or gender. On one hand; This result is consistent with Almutairi (2021); Aslam et al. (2011); Belay et al. (2016); Fetu (2019); Jenkins et al. (2022); Monisha et al. (2017); and Serener (2018), But on the other hand, It contradicts the results of both Arif et al. (2020) and Borraz-Mora et al. (2017).

Clients' views about using online banking are significantly influenced by their assessment of the dangers inherent in doing so. Explanatory factors account for 28.7% of the variance in consumers' attitudes about the usage of online banking in Egypt, as measured by the determination coefficient (R2). On one hand; This result is consistent with their researches Almutairi (2021); Amin et al. (2021); Gelenske et al. (2018); Karim and Gide (2019); Krishnan and Sheeja (2020); Marriott and Williams (2018); Reepu and Arora (2022); Rosati et al. (2022) and Roy et al. (2017).

The level of awareness has a notable impact on the attitudes exhibited by clients towards their utilisation of internet banking services in Egypt. The determination coefficient (R^2) reveals that the explanatory variables are contributing to explain 45 % of attitudes of clients' usage of internet banking in Egypt. This result is consistent with their results Almutairi (2021); Alnaas (2021); Arun (2019); Eleyan, Yousef, and Eleyan (2022); Fetu (2019); Nwuba and Nkamnebe (2020); Rajapakse (2017) and Shanmugapriya and Lakshmirani (2021).

The impact of the bank's technology infrastructure on clients' attitudes towards internet banking usage in Egypt is shown to be statistically significant. The determination coefficient (R2) indicates that the explanatory variables account for 28.5% of the variation in clients' attitudes towards internet banking usage in Egypt. This result is consistent with both Agwu (2015); Almutairi (2021); Belay et al. (2016); Karimzadeh and Alam (2012) and Qureshi et al. (2014).

Perceived relative advantages have a significant effect on the attitudes of clients' usage of internet banking in Egypt. The determination coefficient (R^2) reveals that the explanatory variables are contributing to explain 76.1% of attitudes of clients' usage of internet banking in Egypt. This finding aligns with the findings of Deventer et al. (2018); Ikechukwu and Abubakar (2020); Lyimo and Dev (2020) and Rasull et al. (2020).

According to the nature of social sciences, the stability of certain results over time is lacking, indicating variations in the outcomes when examining the impact of demographic factors, such as income level and gender, on the use of internet banking services. This can be explained by the effect of sustainable plans in Egypt (and most of the emerging markets) to reduce income inequality in addition to supporting women in society and the financial system.

Sustainable development plans have contributed to fundamental changes in emerging markets, which make it necessary to re-test many theories, models and assumptions to know the extent to which these results continue in the contemporary business environment.

Based on the aforementioned information, this paper proposes recommendations for banks to enhance awareness of internet banking in emerging markets.

7.1. Research and Analysis

To better understand the specific challenges and opportunities in each target market, conduct thorough research and analysis. Several important factors to take into account are: a) Market Landscape: Identify the current state of internet banking adoption, existing barriers, and client preferences in each emerging market.

b) Client Segmentation: Analyze client demographics, behaviours, and financial needs to tailor awareness campaigns and initiatives effectively.

c) Competitor Analysis: Study the strategies and success factors of competing banks and fintech companies already operating in the target markets.

7.2. Customized Education and Training Programs

Develop comprehensive education and training programs that cater to the unique needs and preferences of clients in each emerging market. These programs should include:

a) Online Tutorials: Create user-friendly online tutorials, videos, and interactive guides that demonstrate the benefits, functionalities, and security measures of internet banking.

b) In-person Workshops: Organize workshops and seminars in partnership with local community organizations, educational institutions, and business associations to educate clients about internet banking.

c) Mobile Apps and Gamification: Develop mobile applications that provide interactive learning experiences, incorporating gamification elements to engage and educate clients effectively.

7.3. Building Trust and Security Awareness

Address client concerns about security and build trust in internet banking systems through the following measures:

a) Security Awareness Campaigns: Conduct public awareness campaigns which highlight the advanced security measures employed by banks and the importance of personal security practices (e.g., password hygiene, avoiding phishing attempts).

b) Collaborate with Security Experts: Collaborate with cyber security firms or organizations in order to validate the security measures implemented in online banking systems and acquire their official endorsements.

c) Transparent Communication: Clearly communicate the security protocols, encryption technologies, and client protection policies employed by the bank to instil confidence in potential users.

7.4. Partnerships and Alliances

Establish strategic collaborations and alliances with pertinent stakeholders in order to enhance the scope of awareness campaigns and accelerate the process of adoption. Potential partners include:

a) Mobile Network Operators: Collaborate with local mobile network operators to leverage their extensive client base and mobile technologies for promoting internet banking services.

b) Government Agencies: Collaborate with government agencies responsible for financial literacy and digital inclusion programs in order to synchronise efforts and expand the scope of impact.) Local Businesses and Microfinance Institutions: Establish partnerships with local businesses and microfinance institutions in order to offer incentives, such as discounts or preferential loan terms, to clients who embrace the use of internet banking services.

7.5. User-Friendly Technology Infrastructure

Ensure that the internet banking infrastructure is user-friendly, robust, and capable of meeting the needs of clients in emerging markets:

a) Simplified Interfaces: Design intuitive and user-friendly internet banking interfaces that are accessible to clients with varying levels of digital literacy.

b) Multilingual Support: Offer internet banking services in local languages to overcome language barriers and ensure inclusivity.

c) Cross-Platform Compatibility: Develop internet banking applications and platforms that are compatible with various devices, including feature phones, smartphones, and desktop computers, to cater the diversity of clients.

7.6. Continuous Evaluation and Improvement

Regularly evaluate the effectiveness of awareness campaigns and client adoption rates. Gather feedback from clients and make necessary adjustments to improve the overall strategy and implementation.

Based on the constraints inherent in performing the study inside a single emerging market country, it is recommended that further examination should be conducted across multiple emerging markets in order to validate the findings. Finally, growing awareness of the significance of internet banking inside emerging markets requires a holistic approach that encompasses education, security measures, partnerships, and user-friendly technology. The implementation of the suggested plan has the potential to enable banks to empower their clients and promote financial inclusion, resulting in numerous good consequences. According to Osama Wagdi and Tarek (2022), there are four most important reflections of financial inclusion that have significant importance. These include the "improved credit risk scoring efficiency", "enhances the relation between income inequity and economic development", "improves Gross domestic product (GDP) per capita" and "supports financial sustainability".

References

Agwu, E. (2015). Analysis of obstacles to uptake of internet banking services in Nigeria. *Research Journal of Business and Management*, *2*(1), 1-16. https://doi.org/10.17261/pressacademia.201519824

Alhassany, H., & Faisal, F. (2018). Factors influencing the internet banking adoption decision in North Cyprus: An evidence from the partial least square approach of the structural equation modeling. *Financial Innovation*, *4*(1), 1-21. https://doi.org/10.1186/s40854-018-0111-3

Almutairi, M. F. (2021). Internet banking adoption challenges in Saudi Arabia. *International Journal of Scientific & Technology Research*, *10*(2), 353-358.

Alnaas, H. (2021). The barriers of adoption the E-banking in the Libyan banks—A case study of commercial banks in Tobruk city. *Open Journal of Business and Management*, *10*(1), 501-524. https://doi.org/10.4236/ojbm.2022.101028

Amin, S. M., Ashraf, A., Nisar, S., & Hassan, M. M. (2021). Performance, time, and financial risks in internet banking adoption: A case of emerging economy. *Indian Journal of Economics and Business*, *20*(2), 1363-1374.

Angelakopoulos, G., & Mihiotis, A. (2011). E-banking: Challenges and opportunities in the Greek banking sector. *Electronic Commerce Research*, *3*(11), 297-319. https://doi.org/10.1007/s10660-011-9076-2

Anouze, A. L. M., & Alamro, A. S. (2019). Factors affecting intention to use e-banking in Jordan. *International Journal of Bank Marketing*, *38*(1), 86-112. https://doi.org/10.1108/ijbm-10-2018-0271

Arif, I., Aslam, W., & Hwang, Y. (2020). Barriers in adoption of internet banking: A structural equation modeling-neural network approach. *Technology in Society*, *61*(C), 1-19. https://doi.org/10.1016/j.techsoc.2020.101231

Arun, A. (2019). A study on awareness of internet banking services in college students of Lucknow city. *International Journal of Scientific Development and Research*, *4*(7), 451 – 455.

Aslam, H. D., Khan, M., Tanveer, A., & Amber, T. (2011). Perceived barriers towards adoption of internet banking among non-metropolitan internet users of Pakistan. *International Business & Economics Research Journal*, *10*(4), 45-56. https://doi.org/10.19030/iber.v10i4.4182

Bahl, S. (2012). E-banking: Challenges & policy implications. *International Journal of Computing & Business Research*, *5*(3), 84-101.

Belay, M., Mengesha, T., & Gebreal, D. H. (2016). Perceived benefits and challenges of electronic banking adoption in Ethiopian private commercial banks. *European Journal of Business and Management*, *8*(19), 22-31.

Bhai, L. (2018). E-banking in India problems and prospects. *Technical Research Organization India*, *5*(1), 77-81.

Borraz-Mora, J., Bordonaba-Juste, V., & Polo-Redondo, Y. (2017). Functional barriers to the adoption of electronic banking: The moderating effect of gender. *Revista de Economía Aplicada*, *25*(75), 87-107.

CBE. (2019). *Annual report 2018-2019. The Central Bank of Egypt.* Retrieved from https://www.cbe.org.eg/-/media/project/cbe/listing/research/annual-report/annual-report-2018-2019.pdf

CBE. (2022). *Annual report 2021-2022. The Central Bank of Egypt.* Retrieved from https://www.cbe.org.eg/-/media/project/cbe/listing/research/annual-report/annual-report-2020-2021.pdf

Demirdogen, O., Yaprakli, S., Yilmaz, M. K., & Husain, J. (2010). Customer risk perceptions of internet banking – A study in Turkey. *The Journal of Applied Business Research*, *26*(6), 57-68. https://doi.org/10.19030/jabr.v26i6.329

Deventer, M. V., Klerk, N. D., & Dye, A. B. (2018). Influence of perceived ease of use and perceived relative advantage on Generation Y students, attitudes towards and usage behavior of mobile banking in South Africa. *International Journal of Business and Government Studies*, *10*(1), 18-33.

Driga, I., & Isac, C. (2014). E-banking services - features, challenges and benefits. *Annals of the University of Petrosani, Economics*, *14*(1), 49-58.

Eleyan, D., Yousef, R., & Eleyan, A. (2022). Assessment of cyber security awareness among E-banking in Palestine - Empirical study from customer's perspective. *Journal of Theoretical and Applied Information Technology*, *100*(16), 4952-4962. https://doi.org/10.3390/bdcc5020023

Fetu, A. (2019). Opportunity and challenges of electronic-banking system in commercial bank of Ethiopia a case study on Gyrage Zone. *Journal of Accounting, Finance and Auditing studies*, *23*, 106-122. https://doi.org/10.32602/jafas.2019.23

Gelenske, T. L., Farias, J. S., & Santos Jr, C. D. (2018). The perceived risk and trust in the bank's brand on the mobile banking user vision. *Revista Reuna*, *23*(2), 1-22. https://doi.org/10.21714/2179-8834/2018v23n2p1-22

Goudarzi, S., Ahmad, M. N., Soleymani, S. A., & Mohammadhosseini, N. (2013). Impact of trust on internet banking adoption: A literature review. *Australian Journal of Basic and Applied Sciences*, *7*(7), 334-347.

Havasi, F., Meshkany, F. A., & Hashemi, R. (2013). E-banking: Status, implementation, challenges, opportunities. *IOSR Journal of Humanities and Social Science*, *12*(6), 40-48. https://doi.org/10.9790/0837-1264048

Hye, Q. M. A. (2022). Revisiting the linkage between financial inclusion and economic growth: Time series evidence from Vietnam. *Edelweiss Applied Science and Technology*, *6*(1), 15–25. https://doi.org/10.55214/25768484.v6i1.302

Ikechukwu, E. V., & Abubakar, H. B. S. (2020). An assessment of bank customers' intention to use internet banking: The role of service quality and perceived security. *Journal of International Business Research*, *19*(3), 1-19.

Janahi, Y. (2021). The impact of internet banking adoption in the Kingdom of Bahrain – overcoming barriers to adoption through the use of biometrics. *International Journal of Innovation Creativity and Change*, *15*(2), 992-997.

Jenkins, H., Hesami, D., & Yesiltepe, F. (2022). Factors affecting internet banking adoption : An application of adaptive LASSO. *Computers, Materials & Continua*, *72*(3), 6167–6184. https://doi.org/10.32604/cmc.2022.027293

Karim, S., & Gide, E. (2019). The challenges and opportunities of E-banking adoption for SME, in Bangladesh. *Global Journal of Information Technology: Emerging Technologies*, *9*(1), 1-11. https://doi.org/10.18844/gjit.v9i1.3758

Karimzadeh, M., & Alam, D. (2012). Electronic banking challenges in India: An empirical investigation. *Interdisciplinary Journal of Contemporary Research in Business*, *4*(2), 31-45.

Kazmi, S. S. A., & Hashim, M. (2015). E-banking in Pakistan: Issues and challenges. *International Journal of Academic Research in Business and Social Sciences*, *5*(3), 50-54. https://doi.org/10.6007/ijarbss/v5-i3/1498

Khan, H. F. (2021). E-banking system benefits and issues. *Insights into Economics and Management*, *11*, 38-48. https://doi.org/10.9734/bpi/ieam/v11/9085D

Krishnan, N., & Sheeja, R. (2020). *A study on customer's problems and prospects towards e-banking with special reference to Palakkad district, Kerala.* Paper presented at the Indian Institute of Management Kozhikode. 4th International Conference on Marketing, Technology.

Lin, W.-R., Wang, Y.-H., & Hung, Y.-M. (2020). Analyzing the factors influencing adoption intention of internet banking: Applying DEMATEL-ANP-SEM approach. *Plos One*, *15*(2), 1-25. https://doi.org/10.1371/journal.pone.0227852

Lusaya, S., & Kalumba, B. (2018). The challenges of adopting the use of e-banking to the customers: The case of Kasama district banking customers. *Scholar Journal of Applied Sciences and Research*, *1*(2), 26-31.

Lyimo, V., & Dev, J. (2020). The influence of complexity, perceived benefits, social influence, and demographics on adoption of internet banking in Tanzania. *University of Dar es Salaam Library Journal*, *15*(1), 125-138.

Madushani, S., & Balendran, S. (2020). Factors influencing on the usage of internet banking in Puttalam District of Sri lanka. *International Journal of Advance Research and Innovative Ideas in Education*, *6*(1), 64-75.

Mahfouz, M., & Khourshed, N. (2016). The impact of E-banking on service quality in the Egyptian banking sector. *Journal of the Faculty of Commerce for Scientific Research*, *53*(1), 1-28.

Marriott, H. R., & Williams, M. D. (2018). Exploring consumers perceived risk and trust for mobile shopping: A theoretical framework and empirical study. *Journal of Retailing and Consumer Services*, *42*, 1-42. https://doi.org/10.1016/j.jretconser.2018.01.017

Mir, R. A., Rameez, R., & Tahir, N. (2022). Measuring Internet banking service quality: An empirical evidence. *The TQM Journal*, *35*(2), 492-518. https://doi.org/10.1108/tqm-11-2021-0335

Monisha, Bhudhiraja, K., & Kaur, J. (2017). Electronic banking in India: Innovations, challenges and opportunities. *International Journal of Engineering Research & Technology*, *5*(11), 1-8.

Mswahili, A. (2021). Factors affecting the adoption and use of internet banking in Tanzania. *The Journal of Informatics*, *1*(1), 58-79. https://doi.org/10.22161/ijaers.83.32

Munusamy, J., & Annamalah, S. (2012). Perceived barriers of innovative banking among Malayssian retail banking customers. *Journal of Internet Banking and Commerce*, *17*(1), 1-15.

Nasr, E., & Helmy, M. (2018). *Financial inclusion through digital financial services and fintech: The case of Egypt.* Working Paper, CBE: Digital Financial Services (DFS) Working Group. Retrieved from: https://fount.aucegypt.edu/etds

Nazari, T., Dehnavi, H. D., & Nayenzadeh, S. (2013). Explaining the barriers and approaches of E-banking extension case study: Melli Bank in Iran. *Journal of Basic and Applied Scientific Research*, *3*(5), 726-736. https://doi.org/10.5829/ije.2022.35.05b.23

Nethananthan, S., & Shanmugathas, S. (2018). Exploring the factors influencing adoption of internet banking in Jaffna district. *Global Journal of Management and Business Research: E- Marketing*, *18*(5), 10-23. http://dx.doi.org/10.24327/ijrsr.2018.0904.2053

Nwuba, C. O., & Nkamnebe, A. D. (2020). Customers perceived risk and the adoption of electronic banking in South – East Nigeria. *International Journal of Trend in Scientific Research and Development*, *4*(4), 2456-6470.

Qureshi, I. A., Rizvi, S. N., & Whitty, M. (2014). Perceived barriers towards adoption of internet banking among rural dwellers: An empirical study of Pakistan. *The International Journal of Business & Management*, *2*(9), 42-48.

Rajapakse, R. P. (2017). E-banking: A review of status, implementation, challenges and opportunities. *International Journal of Economics Business and Management Research*, *1*(5), 386-400.

Rasull, A., Jantan, A. H., Ali, M. H., Jaharudin, N. S., & Mansor, Z. D. (2020). Benefit and sacrifice factors determining internet banking adoption in Iraqi Kurdistan region. *Journal of International Business and Management*, *3*(1), 1-20. https://doi.org/10.37227/jibm.2020.65

Razak, D. A., Hamid, R. A., Azhari, N. I. T., & Sonari, P. S. Q. (2021). Factors influencing the adoption of online banking services in the Klang Valley. *Asian Journal of Research in Business and Management*, *3*(3), 50-66.

Reepu, & Arora, R. (2022). The effect of perceived risk on intention to use online banking. *Universal Journal of Accounting and Finance*, *10*(1), 62-71. https://doi.org/10.13189/ujaf.2022.100107

Rensleigh, C. (2010). Customer perceptions on internet banking information protection. *South African Journal of Information Management*, *12*(1), 1-6. https://doi.org/10.10520/AJA1560683X_331

Ronny, R. (2018). Customer loyalty characteristic obstacles of internet banking adoptions. *Russian Journal of Agricultural and Socio-Economic Sciences*, *1*(73), 124-130. https://doi.org/10.18551/rjoas.2018-01.16

Rosati, P., Fox, G., Cummins, M., & Lynn, T. (2022). Perceived risk as a determinant of propensity to adopt account information services under the EU payment services directive 2. *Journal of Theoretical and Applied Electronic Commerce Research*, *17*(2), 493-506. https://doi.org/10.3390/jtaer17020026

Roy, S. K., Balaji, M., Kesharwani, A., & Sekhon, H. (2017). Predicting Internet banking adoption in India: A perceived risk perspective. *Journal of Strategic Marketing*, *25*(5-6), 418-438. https://doi.org/10.1080/0965254x.2016.1148771

Sampet, J., Changchit, C., & Lonkani, R. (2020). A comparative study of mobile banking adoption: An analysis of banking customers in US and Thailand in novel theories and applications of global information resource management. In (pp. 109-153). United States of America: IGI Global.

Saravanakumar, S., Jayasubramanian, P., & Thomas, S. S. (2021). A study on awareness towards internet banking among senior citizens with special reference to Colmbatore city. *International Journal of Multidisciplinary Educational Research*, *10*(1), 131-136.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach.* West Sussex: John Wiley & Sons.

Serener, B. (2018). Barriers to the use of internet banking among Nigerian and Zimbabwean students in Northern cyprus. *Journal of Management and Economic Research*, *16*, 347-357. https://doi.org/10.21506/j.ponte.2017.1.11

Shanmugapriya, B., & Lakshmirani, A. S. (2021). Study on customer awareness towards digital banking services. *Palarch's Journal of Archaeology of Egypt*, *18*(1), 4599-4604.

Shiferaw, B., & Molla, T. (2018). Does behavior of clients matter in adoption of internet banking? Evidence from Commercial Bank of Ethiopia. *Journal of Economics and International Finance*, *10*(6), 58-64. https://doi.org/10.5897/jeif2018.0901

Singh, S., & Sharma, D. K. (2014). Analysis of problems faced by customers during use of internet banking. *International Journal of 360 Management Review*, *2*(1), 1-11.

Solarz, M., & Adamek, J. (2021). Factors affecting mobile banking adoption in Poland: An empirical study. *European Research Studies Journal*, *24*(4), 1018-1046. https://doi.org/10.35808/ersj/2648

Sunith, C. K. (2019). Customer reluctance to use banking technologies. *International Journal of Business and Management Invention*, *8*(1), 40-45.

Thangavel, C., Thangavel, R., Ramanujam, E., Bennet, D. T., & Bennet, P. S. (2022). Consumer perception of internet banking and mobile banking using twitter analytics. *International Journal of Sociotechnology and Knowledge Development*, *14*(1), 1-14. https://doi.org/10.4018/ijskd.297978

Wagdi, O., & Fathi, A. (2023). The fintech banking role of improving banking market share in emerging markets: Evidence from egypt. *Scientific Journal of Financial and Commercial Studies and Research*, *4*(2), 37-65. https://doi.org/10.21608/cfdj.2023.288978

Wagdi, O., & Hasaneen, A. (2019). Obstacles and success factors for entrepreneurship: A comparative analysis between Egypt and Nigeria. *Entrepreneurship and Sustainability Issues*, *7*(2), 962-976. https://doi.org/10.9770/jesi.2019.7.2(12)

Wagdi, O., & Tarek, Y. (2022). Determinants and reflection of financial inclusion: An international evidences. *Review of Economics and Finance*, *20*, 1346-1357.