Determinants of E-Commerce Adoption in Ethiopia: The Case of Tele-birr Transaction in Addis Ababa

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Abstract

Issue: This research aims to examine the major determinant factors influencing e-commerce adoption in Telebirr, Addis Ababa.

Method: An explanatory and descriptive research approach was employed to analyze the data collected using a 5-point Likert scale questionnaire. The data was collected from consumers, sellers, service providers, and Telebirr agents in Addis Ababa.

Finding: The results from the descriptive statistics analysis showed that user-friendliness-related factors, functionality-related factors, and consumers' persona-related factors play a crucial role in the adoption of e-commerce in Telebirr. On the other hand, perceived risk-related factors do not seem to be a significant concern for consumers in the context of e-commerce. Furthermore, the correlation analysis results suggest that user-friendliness related, functionality-related, and consumers' persona-related factors have a significant positive correlation with e-commerce adoption. Multiple regression analysis results showed that all four factors (user friendliness-related, functionality related, perceived risk-related, and consumers' persona-related factors) significantly contribute to the adoption of e-commerce by customers. Thus, the findings highlight the significance of user friendliness, functionality, personalized and customized services, and personal characteristics of users to enhance e-commerce adoption. Though the perceived risk-related factor was not found to be significantly correlated, e-commerce businesses should not overlook the importance of their customers' sense of security when using their e-commerce platforms. The results provide valuable insights for e-commerce businesses to design and implement more effective strategies to increase customers' adoption of their platforms.

Key words: e-commerce adoption, user-friendliness, functionality, perceived risk, and consumers' persona

1. Introduction

In recent years, there has been a great deal of development on the Internet, leading to an increasing number of Internet users around the world, which has increased the importance of e-commerce. The importance of this comes from the lack of regional or political barriers to e-commerce as a business for millions of consumers around the world. Electronic commerce, or e-commerce, is defined as doing business electronically. E-commerce covers any form of business, business organization, or exchange of information using any information and communication technology (ICT) (Becker, Sulikowski, and Zdziebko 2018).

E-commerce has grown rapidly all over the world; it is recognized as a new type of business in which the sale of products and services takes place on the Internet. E-commerce, also known as online shopping, allows customers to buy or shop 24 hours a day, year-round, from almost anywhere. It also gives consumers more options and allows them to compare them quickly. Moreover, it allows consumers to interact, exchange ideas, and compare their experiences with other consumers in the electronic sector (Rahayu and Day 2015). As a result, e-commerce has gradually faced tough

competition, and the market is changing dramatically as online shoppers increasingly seek fun and excitement in the shopping experience(Dennis et al. 2009).

E-commerce is an inevitable reality for any promoter of business and commerce and is becoming one of the most important aspects of international business today. It has significantly changed the normal international business model ("Internet Edition Prepared by the UNCTAD Secretariat," n.d.) (UNCTAD, 2004). Technology has inspired business people to use it in their daily work. This made the shopping process easier. Today, it plays an important role in improving businesses by helping them transform from traditional work styles to new, better ways of working.

Today, businesses have started to operate through websites and sell or buy through the Internet. This type of business is called e-commerce (Almtiri and Miah 2019). Besides, electronic commerce can be defined as "the process of buying, selling, transferring, or exchanging products, services, and/or information through computer networks, especially through the Internet and intranets" (Misganaw and Singh 2020). Types of e-commerce include business-to-consumer (B2C), e-banking, business-to-business (B2B), consumer-to-consumer (C2C), peer-to-peer (P2P), and mobile commerce (*Could You Increase Your Knowledge — and Raise Your Grade — If You ...*, n.d.)(Kenneth & Laudon, 2009).

Therefore, e-commerce, which is the main contributor to the spread of information technology worldwide, is a process that includes not only businesses that focus on buying and selling products and services to make money but also businesses that support income generation.

Determinants of e-commerce adoption have been the subject of previous empirical studies. They were mainly focused on the field of e-commerce acceptance at the macro level in Ethiopia and at the secretary level, such as in banks, insurance, small and medium enterprises (SMEs), supermarkets, and travel agents. For instance, Misganaw AA, Singh A (Misganaw and Singh 2020) conducted research on e-commerce adoption in Ethiopian tourism businesses, focusing on how to implement e-commerce. They identified three admissions. Tesfahun (Study 2019) also conducted research on factors affecting the adoption of electronic marketing in Ethiopian supermarkets. The study applied the technology, organization, and environment framework and identified five factors affecting the adoption of e-commerce in Ethiopia.

Today, the rapid expansion of globalisation through information and communication technology (ICT) has become the most powerful force affecting the global economy and industry (Ogazi-onyemaechi 2019). The distribution of the Internet is growing rapidly around the world, and because of the various services it offers in business transactions, it is becoming more and more important for consumers and sellers to a large extent. Hence, suppliers and customers should follow up (Makki and Chang 2014).

As a result, rapid technological progress in the market has created a new business environment known as e-commerce, which can be considered a business engine due to the increase in Internet technology(Cudjoe and Anim 2015). Due to the increasing use of internet technology and information technology awareness among businesses, e-commerce is now on the rise. With the rapid expansion of internet technologies, businesses of all sizes and ages have been able to embrace e-commerce; this means that the e-store on the web has made it possible to expand the market by offering products internationally, which has led to a competitive advantage(Hassan et al. 2014).

Although ethical behavior may be similar in traditional business and e-commerce, other factors, including trust and safety related to the Internet, also affect the rate of purchase in e-commerce (Razafindrambinina and Kariodimedjo 2011). The new and fraudulent nature of online business and the unpredictable technology of the Internet reduce the perception of consumers in control of their online business, increasing trust and beliefs about risks and the inevitability of online customer behavior (Rahayu and Day 2015).

E-commerce businesses face the problem of not being able to define customer intent and trust. Cudjoe AG, Anim PA, Gerald J, Tetteh N. (Cudjoe et al. 2015) found that one of the main obstacles to e-commerce is the inability to effectively determine the target audience. Unlike the traditional brick-and-mortar situation, where sellers can have physical contact to learn why visitors do not buy a particular product, the presence of e-commerce allows transactions without presentation as the reason(Becker, Sulikowski, and Zdziebko 2018).

State operator Ethio Telecom launched Tele Birr. It is the largest e-commerce platform in the country, with 20 million subscribers (www.developingtelecoms.com). It is classified under one type of e-commerce business called the exploitation type. In this model, telecom providers are separated to provide payment services to users who use the service. To use the service, customers are only subscribers, so it is important to have bank accounts. When the work is concealed, the customer will receive an account with the sheets, and the wallet is the customer number. Users can invest in several ways: invest in a telecom company or invest with a debit card. Customers can implement transactions such as transferring money to other e-wallets (for mobile subscribers), paying for products and services, withdrawing money from an e-wallet, etc. (Rahayu and Day 2015).

Ethiopia is not making full use of its potential to introduce this new system, compete internationally, and take advantage of its benefits. Also, this technology is not yet fully implemented. Most transactions are done in hard currency, which is creating a great economic challenge (Study 2019). Currently, the adoption of e-commerce is low, and full e-commerce has not been achieved in Ethiopia. In other words, these situations require the researcher to understand them better.

This research made a substantial contribution to the thorough investigation of the major determinants of e-commerce adoption in Ethiopia. Thus, the study has practical significance for government policymakers, sellers, buyers, service providers, and agents involved in or planning to be involved in e-commerce. This study is also useful as it contributes by pointing out the major contributors to e-commerce adoption in Ethiopia, identifying users' perceptions, and determining the priorities of future advancements. The current study aimed to examine and investigate the determinant factors (user friendliness, functionality, perceived risk, consumers' persona, level of e-commerce adoption, and consumers' intention) of e-commerce adoption in Ethiopia.

2. Literature review

E-commerce can be divided into two major categories: Business-to-Business (B2B) and Business-to-Consumer (B2C). B2B e-commerce is the exchange of goods and services between businesses, whereas B2C e-commerce is the exchange of goods and services between businesses and individual customers. The growth of B2B e-commerce has been explosive, and research has shown that it is the fastest-growing segment of e-commerce (Misganaw and Singh 2020).

B2B e-commerce provides many benefits for businesses, such as lower transaction costs, improved supply chain management, and increased efficiency in business processes. The use of B2B e-commerce allows businesses to streamline their buying and selling processes, reduce inventory carrying costs, and increase the speed of transaction processing (Lee, Gan, and Liew 2022). The growth of B2B e-commerce has also led to the development of new business models, such as e-marketplaces, where buyers and sellers can come together to do business in a more efficient and cost-effective way (Misganaw and Singh 2020).

B2C e-commerce, on the other hand, has changed the way consumers shop and purchase goods and services. With the rise of e-commerce, consumers can shop for products and services online, compare prices, and make purchases without leaving their homes. This has led to increased competition, as businesses must adapt to the new online marketplace or risk being left behind (Lee, Gan, and Liew 2022). The growth of B2C e-commerce has led to the development of new business models, such as online marketplaces and auction sites, which have revolutionized the way that goods are bought and sold online (Misganaw and Singh 2020).

E-commerce has also had a major impact on the global economy. According to a report by the United Nations Conference on Trade and Development (UNCTAD), e-commerce has grown at an annual rate of 13% over the past five years and is now worth over $25 trillion worldwide (Estimates and Global 2018) (UNCTAD, 2018). The report also found that e-commerce has the potential to create new opportunities for developing countries by increasing their access to global markets and reducing the costs of trade.

E-commerce is a rapidly growing segment of the business community that has had a major impact on the global economy. It has led to the development of new business models, increased efficiency in business processes, and created new opportunities for businesses and consumers alike. However, e-commerce also presents challenges, such as the issue

of trust, taxation, and the future of jobs and employment. Despite these challenges, e-commerce is likely to continue to grow and evolve in the coming years as businesses and consumers alike continue to embrace the advantages of the online marketplace.

2.1. User Friendliness and E-Commerce Adoption

Previous research has shown that perceived ease of use, which is closely linked to user friendliness, plays a significant role in the adoption of new technologies (Al-otaibi and Al-zahrani, n.d.); (Davis 1989). In the context of mobile payments, perceived ease of use can positively impact users' attitudes towards the technology and their intentions to use it (Shin 2009). A study conducted by Abraho et al. (Ogazi-onyemaechi 2019) in the Philippines found that user friendliness was one of the main factors influencing consumers' adoption of mobile payments.

One aspect of user friendliness is the system's interface, which encompasses the layout, design, and functionality of the technology. The interface is crucial in determining how intuitive and easy-to-use the system is for the user and, therefore, how likely they are to adopt it. A well-designed and user-friendly mobile payment interface should be visually appealing, easy to navigate, and include clear instructions for use (Hossain et al. 2021). In a study conducted by Kim et al.(C. Kim, Mirusmonov, and Lee 2013) participants rated ease of use and interface design as the most important factors in their adoption decision for mobile payments.

Another factor that affects user friendliness is the technology's compatibility with other systems or devices used by the user. For example, if a mobile payments app cannot be used on a certain type of smartphone or if it is not compatible with the user's banking app, it may be perceived as less user-friendly and therefore less likely to be adopted (Rahardja, Sigalingging, and Putra 2023). In a study conducted by Wang et al. (Hossain et al. 2021) in China, compatibility with other systems was found to be a significant factor influencing consumer adoption of mobile payments.

User friendliness also encompasses the level of convenience offered by the technology. Mobile payments should be more convenient than traditional payment methods in order to be adopted by consumers. Such convenience may include the ability to make payments quickly and easily from anywhere at any time, without the need for cash or a card (C. Kim, Mirusmonov, and Lee 2013). In a study conducted by Kim et al. (C. Kim, Mirusmonov, and Lee 2013)participants cited convenience as the most important factor in their decision to use mobile payments.

In terms of security, user friendliness can also play a role in consumers' adoption of mobile payments. Users may perceive a more secure system as less user-friendly, as it may involve additional steps or authentication methods (Sun et al. 2017). Conversely, a system that is perceived as too user-friendly may raise concerns about security (Nor 2013). Balancing security and user-friendliness is thus essential for encouraging the adoption of mobile payments.

Overall, user friendliness plays a critical role in the adoption of mobile payments. The system's interface, compatibility with other systems, convenience, security, education and training, customization, language support, and feedback are all important factors to consider when designing and promoting mobile payment technologies. To increase adoption rates, developers and service providers should prioritize user-friendliness in the design, functionality, and marketing of their systems. Therefore, we suggest that:

Ha_1: user friendliness has a significant positive effect on the adoption of e-commerce.

2.2. Functionality and E-Commerce Adoption

Functionality is "the extent to which a person feels that using a particular system will improve his performance." It has been found that the benefits that explain user acceptance of mobile payments will improve their performance in purchasing products and mobile money (Cudjoe et al. 2015).

Functionality is an essential feature of the e-commerce platform for effective adoption and customer satisfaction (Paulo 2004); (Ranganathan and Ganapathy 2002). It includes the ease of use, security, and trustworthiness of a mobile payment system. A study by Lee and Chung (Lee, Gan, and Liew 2022) found that user perception of ease of use is positively

related to user acceptance of mobile payment systems. This suggests that the more convenient and user-friendly a mobile payment system is, the more likely users are to adopt it.

Thus, functionality is a multifaceted concept that plays a critical role in determining user acceptance of mobile payment systems. Factors such as ease of use, security, trust, integration with other systems, availability of support services, cost-effectiveness, personal innovativeness, and compatibility with user needs and preferences all influence user perceptions of functionality. Developers and service providers must consider these factors when designing and implementing mobile payment systems to ensure that they meet the needs and preferences of their target users and ultimately increase user adoption and acceptance. Therefore, we suggest that:

Ha$_2$: Functionality has a significant positive effect on the adoption of e-commerce.

2.3. Perceived Risk and E-Commerce Adoption

Consumer behavior studies define perceived risk (PR) in terms of the consumer's perception of the uncertainty and potential negative consequences of purchasing a product or service. The degree of risk that consumers perceive and their perceived risk are factors that affect their purchasing decisions (Assistant 2011).

On the other hand, introducing a new technology to a user can provide both benefits and risks, and the person may want to weigh the risks and benefits before choosing to adopt the technology. On the other hand, the introduction of new technology may involve both benefits and risks for the user, and before deciding to adopt the technology, the person may want to weigh the risks and benefits. Interbank payment services shall not be an exception to this general rule. A greater perception of risk will reduce the perceived value of the technology (Horst, Kuttschreuter, and Gutteling 2007). Therefore, we suggest that:

Ha$_3$: Perceived risk has a significant positive effect on the adoption of e-commerce.

2.4. Consumers' Persona and E-Commerce Adoption

Personality and Common beliefs can be linked to the feelings of a person or group members, such as family and friends. In the TPB model, self-efficacy values are positively related to the intention to adopt Internet banking, which is negatively related to perceived risk. Virtue is related to personal values. It also includes the qualifications and characteristics of vendors or organisations to influence and authorise certain areas, including how they provide, serve, and protect products and services from interference from other eyes. Kim et al. (H. Kim, Chan, and Gupta 2007) stated that competence consists of skills, experience, legal institutions, and knowledge influences in the adoption of E-Commerce. Hence, we suggest,

Ha$_4$: Consumers' Persona has a significant positive effect on the adoption of e-commerce.

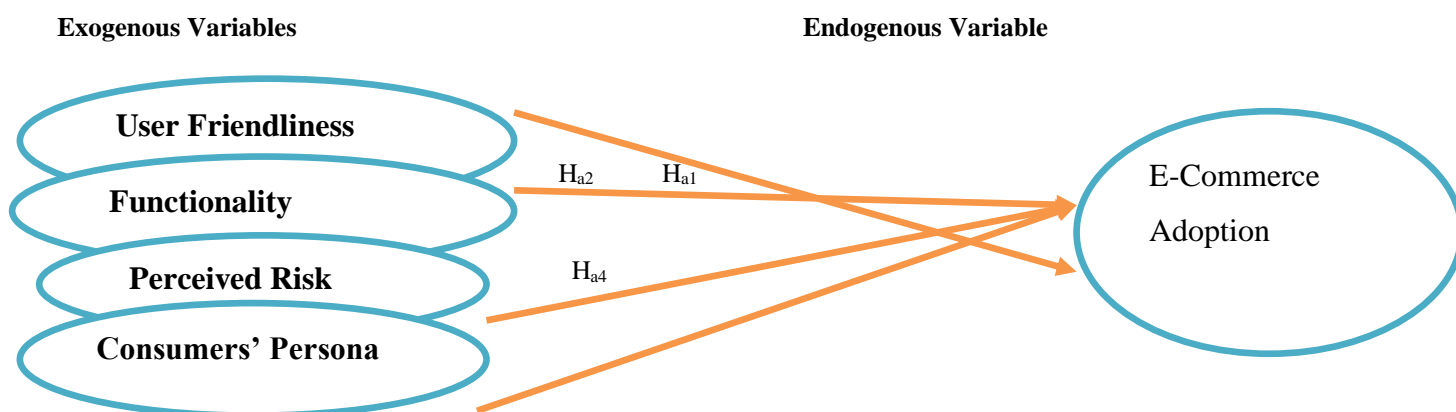Generally, authors developed a conceptual framework of the study in figure1.

Exogenous Variables   **Endogenous Variable**

Figure 1

Hypothesized Conceptual Frame Work of the Study

Source: adapted from Napitupulu & Aditomo (2015)

3. Objective of the study

Objective of the study is to examine *the major determinant factors influencing e-commerce adoption in Telebirr, Addis Ababa.*

4. Methods of the Study

The authors aim to examine determinants of E-Commerce Adoption by gathering information from a sample of respondents with survey questionnaires. Thus, the authors used explanatory and descriptive research design quantitative research choices with a cross-sectional survey strategy.

The population of this study is known Tele Birr sites in Addis Ababa. There are various sampling strategies available for the researcher to use. Some tricks are more precise and easier to apply than others. The researcher must choose a sampling strategy that is reliable and appropriate for the research organization (Saunders, Lewis, and Thornhill, n.d.). The authors considered a total of 400 Tele Birr sites in Addis Ababa. The formula Yamane presented to determine sample size was simplified, and it is still the one that is most frequently used today. This leads us to conclude that the study's sample size should be 200 respondents from the study's target population. To select the sample of respondents, multistage sampling techniques employed. Among Tele Birr sites, Only 200 Tele Birr sites in Addis Ababa were included.

The researchers used close-ended questionnaires. The main database for realizing the research objectives and testing the hypothesis is to be fetched through the index. Different questionnaires (index) were prepared and administered for each of the primary sources. In Tell birr sites, the user friendliness, functionality, perceived risk, consumers' persona and e-commerce adoption with 32 items that are believed to be judged by respondents. The respondents rated the questions on a 5-point scale, with 5 indicating strongly agree (SA), 4 agree (A), 3 neutral (N), 2 disagree (D), and 1 strongly disagree (SD). The reliability of the instrument used for data collection was measured using Cronbach's alpha coefficient. And Zinberg (Relations et al. 2005) suggested that an alpha coefficient equal to or greater than 0.70 indicates that the data is reliable, and therefore it can be concluded that the results from the collected data can reflect all respondents' opinions in the target population.

5. Data used

The researchers delivered 200 questionnaires, and 169 professionals appropriately filled out and responded to the questions, for a return rate of 84.5%. Denis (Davis 1989) states that a response rate of 50% is adequate, 60% is good, and 70% or higher is considered perfect for representing the entire population. Thus, the response rate for this research was above 84.5%, which is ideal for accurately representing the entire population.

6. Data analysis

6.1. Descriptive statistics

User-friendliness related factors

Table 1 shows the descriptive statistics for user-friendliness related factors that affect the adoption of e-commerce in Tele Birr. E-commerce platforms having a user-friendly interface had an average mean score of 3.50, which is in the "high" range, indicating agreement with the statement. A user-friendly interface means that customers can easily navigate through the platform and find what they need, which leads to a positive user experience and increased adoption. However, respondents had a low to neutral agreement with e-commerce websites providing clear product/service information and e-commerce platforms loading quickly and efficiently, with average mean scores of 2.80 and 2.58, respectively. Therefore, e-commerce platforms should ensure that their websites load quickly and provide clear information to enhance user experience and increase adoption. In regarding to navigation through e-commerce websites,"

respondents had a high agreement, with an average mean score of 3.16. Easy navigation leads to a positive user experience, which can increase customer loyalty and repeat usage.

In the same Table 1, respondents had a high agreement with the statement "the checkout process on e-commerce websites is simple and easy to follow," with an average mean score of 3.71. A complicated checkout process can lead to cart abandonment and negatively affect adoption. Similarly, e-commerce websites offer adequate customer service," with an average mean score of 3.12. Adequate customer service can enhance customer satisfaction and loyalty, leading to increased adoption. However, regarding functionality and accessibility, respondents had a low to neutral agreement with the statement "I find e-commerce websites functional and accessible," with an average mean score of 2.93. Therefore, e-commerce platforms should ensure that their websites are functional and accessible to enhance user experience and adoption.

Table 1: user-friendliness related factors

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
E-commerce platforms have a user-friendly interface.	169	2.00	5.00	3.5030	.91368
E-commerce websites provide clear product/service information.	169	1.00	5.00	2.7988	.86313
I find it easy to navigate through e-commerce websites.	169	1.00	5.00	3.1657	.85691
E-commerce platforms load quickly and efficiently.	169	1.00	5.00	2.5799	.87686
The checkout process on e-commerce websites is simple and easy to follow.	169	2.00	5.00	3.7101	.88906
E-commerce websites offer adequate customer service.	169	1.00	5.00	3.1183	.95629
E-commerce websites provide relevant search results for my searches.	169	2.00	5.00	3.9290	1.09964
I find e-commerce websites functional and accessible.	169	1.00	5.00	2.9349	1.09186
Valid N (listwise)	169				

In general, the findings of this research suggest that user-friendliness related factors play a crucial role in the adoption of e-commerce in tele birr. E-commerce platforms must ensure that their websites are user-friendly, load quickly and efficiently, provide clear product/service information, have easy navigation, offer simple and easy checkout processes, provide adequate customer service, offer relevant search results, and are functional and accessible. By addressing these factors, e-commerce platforms can enhance user experience, increase customer satisfaction and loyalty, and ultimately increase adoption.

Functionality related factors

The results for functionality related factors in Table 2 show that respondents generally agree that e-commerce websites provide detailed descriptions of products/services and that the availability of products/services is accurately reflected on websites, with mean scores of 3.85 and 4.1775, respectively. This highlights the importance of having high-quality product descriptions and accurate inventory management to ensure customer satisfaction.

The mean score for the availability of fast and reliable payment systems is relatively lower at 3.574, indicating a need for improvement in this area. Respondents also rated e-commerce platforms' shopping cart system and user-friendly product/service categories as high, with mean scores of 4.5266 and 4.4793, respectively. This suggests that ease of use is an important factor for customers when shopping online. The mean score for offering multiple payment options is relatively lower at 3.6568, indicating a need for more payment method choices.

Finally, respondents rated e-commerce websites' shipping/delivery process and convenient order tracking system as high, with mean scores of 4.0178 and 4.1479, respectively. This further highlights the importance of providing customers with clear and accessible information about the shipping and delivery process.

Table 2: Functionality related factors

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
E-commerce websites have fast and reliable payment systems.	169	1.00	5.00	3.5740	1.03890
E-commerce websites provide detailed descriptions of products/services.	169	2.00	5.00	3.8462	.96362
The availability of products/services is accurately reflected on e-commerce websites.	169	2.00	5.00	4.1775	1.00201
E-commerce platforms have an efficient shopping cart system.	169	2.00	5.00	4.5266	.93900
E-commerce platforms allow for multiple payment options.	169	1.00	5.00	3.6568	.95772
E-commerce websites provide a clear shipping/delivery process.	169	3.00	5.00	4.0178	.78280
E-commerce websites offer user-friendly product/service categories.	169	2.00	5.00	4.4793	1.05271
E-commerce websites provide a convenient order tracking system.	169	2.00	5.00	4.1479	.85670
Valid N (listwise)	169				

Overall, the findings suggest that functionality-related factors play a crucial role in e-commerce adoption, and e-commerce providers should ensure that their platforms offer a fast and reliable payment system, detailed product descriptions, multiple payment options, a convenient checkout process, and a user-friendly interface to ensure customer satisfaction.

Perceived risk related factors

The results from Table 3 show that the respondents had mixed perceptions regarding perceived risk related factors affecting the adoption of e-commerce in Telebirr transactions in Addis Ababa. The mean score for "I am concerned about the safety of personal information on e-commerce websites" was 3.5207 suggesting that some level of concern exists among the respondents. On the other hand, the mean score for "I am hesitant to enter my payment details on e-commerce websites" was 4.2308, indicating that the majority of the respondents agree with this statement. The mean score for "E-commerce platforms assure secure transactions" was relatively low at 2.8284, which may indicate that respondents are not fully convinced about the security measures in place on e-commerce platforms.

The mean score for "I am cautious about the authenticity and quality of products/services purchased through e-commerce" was relatively high at 3.9231, suggesting that there may be concerns about the quality and authenticity of products and services purchased through e-commerce platforms.

In the same Table 3, the mean score for "I am confident about refund and return policies on e-commerce websites" was 4.1598, indicating that the majority of the respondents are comfortable with the refund and return policies on e-commerce platforms. Similarly, the mean score for "E-commerce websites provide transparent information about fees and charges" was high at 4.3432, indicating that the respondents believe that e-commerce platforms are transparent in providing information on fees and charges. While the mean score for "I am confident in the privacy policies of e-commerce websites" was 3.6568, suggesting that there may be some reservations among the respondents regarding the privacy policies of e-commerce platforms. The mean score for "E-commerce platforms have measures to prevent fraud and identity theft" was 3.6391, indicating that the respondents believe that e-commerce platforms have measures in place to prevent fraud and identity theft, although there may be some doubts regarding their effectiveness.

Overall, the findings suggest that there are some perceived risk related factors that are affecting the adoption of e-commerce in Telebirr transactions in Addis Ababa. These factors include concerns about the safety of personal information, security of payment details, authenticity and quality of products/services, and privacy policies. However, the respondents are generally confident in the refund and return policies and transparency of fees and charges on e-commerce platforms.

Table 3: Perceived risk related factors

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I am concerned about the safety of personal information on e-commerce websites.	169	1.00	5.00	3.5207	.91994
I am hesitant to enter my payment details on e-commerce websites.	169	3.00	5.00	4.2308	.60749
E-commerce platforms assure secure transactions.	169	1.00	4.00	2.8284	.93867
I am cautious about the authenticity and quality of products/services purchased through e-commerce.	169	2.00	5.00	3.9231	.95119
I am confident about refund and return policies on e-commerce websites.	169	2.00	5.00	4.1598	.81169

E-commerce websites provide transparent information about fees and charges.	169	2.00	5.00	4.3432	.69047
I am confident in the privacy policies of e-commerce websites.	169	1.00	5.00	3.6568	.95772
E-commerce platforms have measures to prevent fraud and identity theft.	169	2.00	5.00	3.6391	.88970
Valid N (listwise)	169				

Consumers' Persona Related Factors

The research results presented in Table 4 show the mean scores for different consumers' persona related factors. The mean score is a measure of central tendency that represents the average value of responses from the participants. A high mean score indicates that participants strongly agree with the statement, while a low mean score indicates that participants disagree with the statement.

The first factor, "Consumers' reviews and ratings influence my purchase decisions on e-commerce websites," had a mean score of 3.84. This score falls within the "high" range, indicating that participants generally agree that reviews and ratings are important in their purchase decisions on e-commerce websites. The second factor, "E-commerce platforms personalize product/service recommendations based on users' purchasing history," had a mean score of 3.38. This score also falls within the "high" range, indicating that participants generally agree that personalized recommendations are important. The third factor, "E-commerce websites offer a loyalty program to regular customers," had a mean score of 3.25, which falls within the "high" range.

The fourth factor, "E-commerce websites provide recommendations based on consumers' location and interests," had a mean score of 3.31, also falling within the "high" range. The fifth factor, "E-commerce websites offer personalized customer support," had a mean score of 2.99, which falls within the "low" range.The sixth factor, "E-commerce websites provide notifications about exclusive deals and discounts," had a mean score of 3.92, falling within the "very high" range. The seventh factor, "E-commerce websites offer social media integration for sharing ratings and reviews," had a mean score of 4.14, which falls within the "very high" range. The last factor, "E-commerce websites cater to a diverse range of target audiences," had a mean score of 4.33, which falls within the "very high" range.

Overall, the research results presented in Table 4 provide insights into the factors that are important to consumers in the e-commerce context. The results support previous literature in many cases and highlight areas where there may be discrepancies between research findings and consumer preferences. These findings can be useful for e-commerce businesses looking to improve their offerings and provide a better customer experience.

Table 4: Consumers' Persona related factors

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Consumers' reviews and ratings influence my purchase decisions on e-commerce websites.	169	2.00	5.00	3.8402	1.15647
E-commerce platforms personalize product/service recommendations based on users' purchasing history.	169	1.00	5.00	3.3846	.91287

E-commerce websites offer a loyalty program to regular customers.	169	1.00	5.00	3.2485	.89829
E-commerce websites provide recommendations based on consumers' location and interests.	169	1.00	5.00	3.3136	.94610
E-commerce websites offer personalized customer support.	169	1.00	5.00	2.9941	1.07181
E-commerce websites provide notifications about exclusive deals and discounts.	169	2.00	5.00	3.9231	.93223
E-commerce websites offer social media integration for sharing ratings and reviews.	169	3.00	5.00	4.1361	.75542
E-commerce websites cater to a diverse range of target audiences.	169	3.00	5.00	4.3254	.61286
Valid N (listwise)	169				

6.2. Correlation Analysis

Based on the respondents evaluation of the 32 attributes categorized under four major determinants using a five likhert scale ranging from one (i.e. strongly disagree) to five (i.e. strongly agree), the results of each respondents passed through a Pearson correlation analysis in order to determine the relationship and direction between the outcome and predictor variable. Bhattacherjee A. (Bhattacherjee 2012) suggested the five ranges of absolute linear correlation coefficients to describe the strength of variables' relationship; very weak (0.00 - 0.19), weak (0.20 – 0.39), moderate (0.40-0.59), strong (0.60 – 0.79), and very strong (0.80 – 1.00). And the results of the correlation analysis between the determinants is summarized and presented on the Table 5.

The correlation analysis provided insights on the relationships and strengths of the determinants namely ecommerce adoption, user friendliness related factor, functionality related factor, perceived risk related factor, and consumers persona related factor. The results showed significant positive correlation between ecommerce adoption and user friendliness related factor (r=0.638, p<0.01) and functionality related factor (r=0.516, p<0.01). The strength of correlation between ecommerce adoption and user friendliness related factor could be considered very strong based on (Bhattacherjee 2012) classification. Meanwhile, the correlation between ecommerce adoption and perceived risk related factor was not significant (r=-0.090, p>0.05).

These findings imply that businesses should focus on enhancing the user friendliness and functionality of their ecommerce platforms to increase the likelihood of adoption by consumers. This is consistent with the literature review, as several studies have emphasized the importance of usability and ease of use in ecommerce (Sun et al. 2017). Furthermore, these results suggest that perceived risk may not be a major concern among consumers in the context of ecommerce, contrary to the findings of some studies (C. Kim, Mirusmonov, and Lee 2013) .

The correlation analysis also revealed a significant positive correlation between user friendliness related factor and functionality related factor (r=0.342, p<0.01). This suggests that businesses should not only focus on making their websites easy to use, but also ensure that they are equipped with the necessary functions to provide a good user experience. This highlights the importance of balancing usability with functionality in ecommerce platforms.

Moreover, the correlation between user friendliness related factor and consumers persona related factor was also significant (r=0.554, p<0.01), indicating that it is important to consider the characteristics and preferences of the target consumers when designing ecommerce platforms. This corresponds with the findings of studies that have emphasized the significance of personalization and customization in ecommerce (Chen and Dubinsky, 2003; Pearson, 2004).

On the other hand, the correlation between functionality related factor and perceived risk related factor was not significant (r=0.035, p>0.05). This implies that providing more functions may not necessarily reduce consumers' perceived risk in ecommerce. This is consistent with the findings of some studies that have suggested that the presence of security measures may not necessarily improve consumers' trust and confidence in ecommerce (Sun et al. 2017)

Lastly, the correlation between perceived risk related factor and consumers persona related factor was also not significant (r=-0.062, p>0.05), suggesting that consumers' perceived risk may not necessarily be related to their personal characteristics and preferences. However, this finding is contrary to some studies that have reported a significant relationship between these two factors (C. Kim, Mirusmonov, and Lee 2013);(Lee, Gan, and Liew 2022).

Table 5: Correlation between variables

Independent variables	commerce Adoption (1)	User friendliness related factors (2)	Functionality related factors (3)	Perceived risk related factors (4)	Consumers' Persona related factors (5)
Pearson Correlation	1				
Sig. (2-tailed)					
Pearson Correlation	0.638	1			
Sig. (2-tailed)	0.000				
Pearson Correlation	0.516	0.342	1		
Sig. (2-tailed)	0.000	0.000			
Pearson Correlation	-0.90	-0.20	0.035	1	
Sig. (2-tailed)	0.122	0.399	0.325		
Pearson Correlation	0.571	0.554	0.115	-0.062	1
Sig. (2-tailed)	0.000	0.000	0.68	0.000	

Overall, the results of the correlation analysis provide useful insights for businesses in the design and development of their ecommerce platforms. The findings highlight the significance of user friendliness and functionality in increasing ecommerce adoption, and the importance of considering consumers' characteristics and preferences for personalization and customization. However, the study also suggests that perceived risk may not necessarily be a major concern for consumers in ecommerce, and that providing more functions may not necessarily reduce this risk.

6.3. Inferential analysis

6.3.1. Statistical Analysis and test of assumptions

In order to determine the influence of each determinant variable on the level of adoption of e-commerce, a multiple regression analysis was conducted. The analysis was also utilized to determine the relative contribution of each predictor to the total variance by measuring the overall fit. After identifying the statistically significant variables and checking all necessary assumptions, a model was developed. Therefore, an analysis of each assumption required to be fulfilled before conducting a multiple regression analysis.

Linearity assumption

In order for the linearity assumption to be fulfilled, the dependent variable should be a linear function of the independent variable. And this has been checked using Normal probability plots of independent variables with the dependent variable. And this can be checked by looking comparing the results with the linear line and the result is as shown in the Figure 2. The Normal probability plot shows that the independent variable and the dependent variables have a linear relationship; hence the second assumption of multi collinearity can be checked.
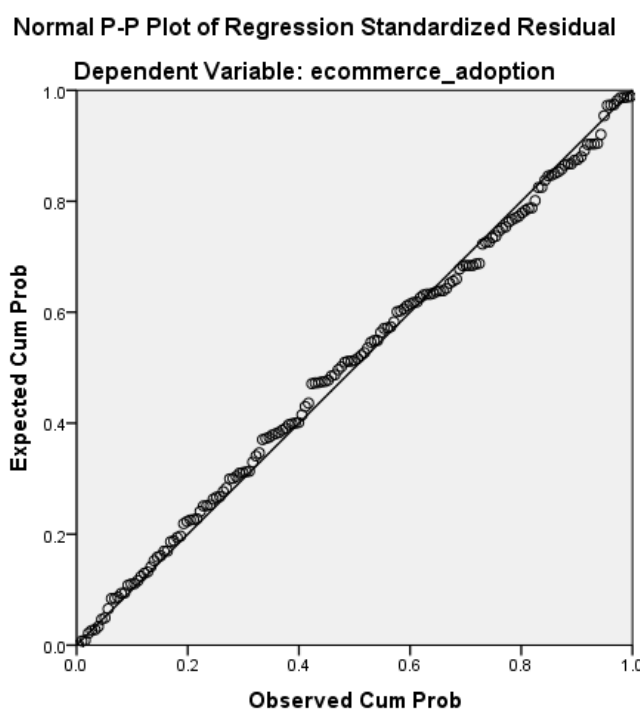
Figure 2: Linearity assumption analysis

Multi-collinearity assumption

In order to determine the individual contribution of each independent variable to the dependent variable and to avoid the combined effect of highly correlated independent variables, using Variance Inflation Factor (VIF), we can detect variables with excessive correlation to prevent wrong conclusion. According to Saunders (Saunders, Lewis, and Thornhill, n.d.), VIF exceeding 5 has a problem with multi-collinearity. Hair (Saunders, Lewis, and Thornhill, n.d.) also suggested that values of tolerance (i.e. tolerance= 1/VIF) below 0.2 indicates problem of multi collinearity.The results of tolerance and VIF from the analysis using SPSS are shown in the Table 6.From the results of multi collinearity analysis above, Variance Inflation Factor (VIF) of the model is 1.31 which is less than 5 and the tolerance is greater than 0.2, therefore multi collinearity is not a problem in this multiple regression model since there is no overlap of variables. Hence the next assumption that is Normality assumption can be checked.

Table 6: Co linearity assumption analysis

Collinearity statistics		
Model	Tolerance	VIF
user friendliness related factor	0.615	1.627
functionality related factor	0.874	1.145
perceived risk related factor	0.994	1.006
and consumers persona related factor	0.685	1.461
Mean VIF	1.31	

Normality assumption

In ideal world the data should be perfectly normal that is, the distribution on both sides of the data to the left and the right of a vertical line around the center of all scores should be the same. Therefore on the bell shaped curve of normality most of the data should be distributed around the center (Saunders, Lewis, and Thornhill, n.d.). The histograms of the data are shown in the Figure 3. Thus, the histogram chart shows that there is no major deviation from the normality bell shaped curve; hence it is a normally distributed data but mathematically we can also measure normality using skewness.

A skewness of 0 implies normal distribution. Skewness between -1 and 1 is acceptable and the more the skewness is near to 0, the more normal the data is. The results obtained from Table 7 shows the analysis on skewness range from -0.501 to 0.039, which are between the acceptable range of -1 to 1. Therefore the data fulfills the assumption of normality. Hence the linear regression model can proceed after checking for homoscedasticity assumption.
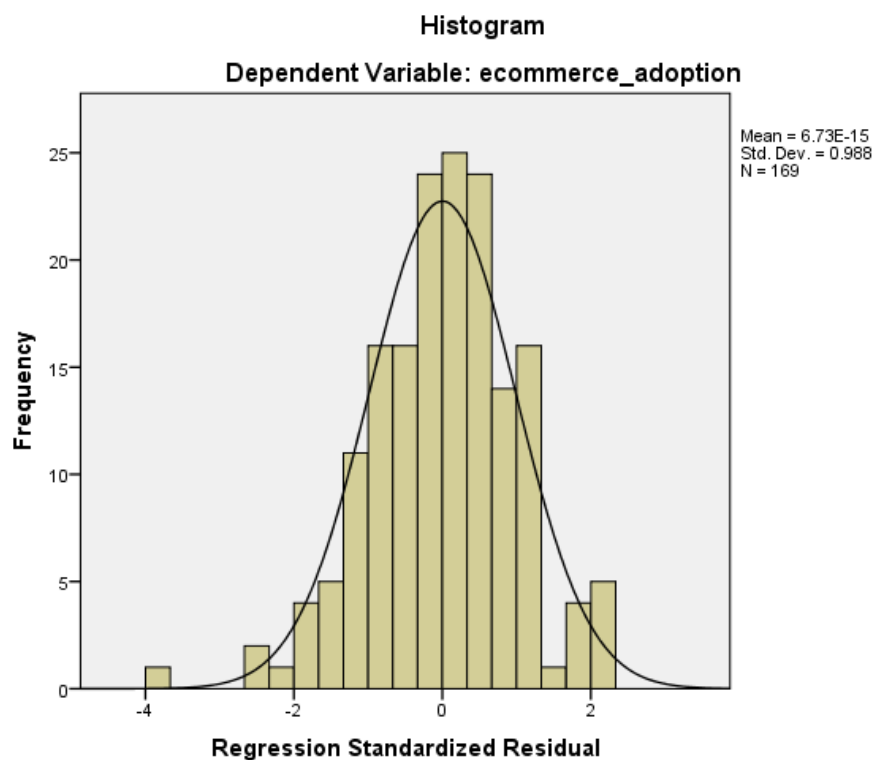
Figure 3: Histogram chart

Homoscedasticity assumption

Homoscedasticity refers to the level of dispersion of errors consistently throughout all the independent variables. This can be checked by visually examining the plot of standardized residuals. If the scatter is not even, fan and butterfly shapes are common patterns for violation. Figure 4 shows a scatter plot of standardized residuals versus the standardized predicted values obtained using SPSS software.
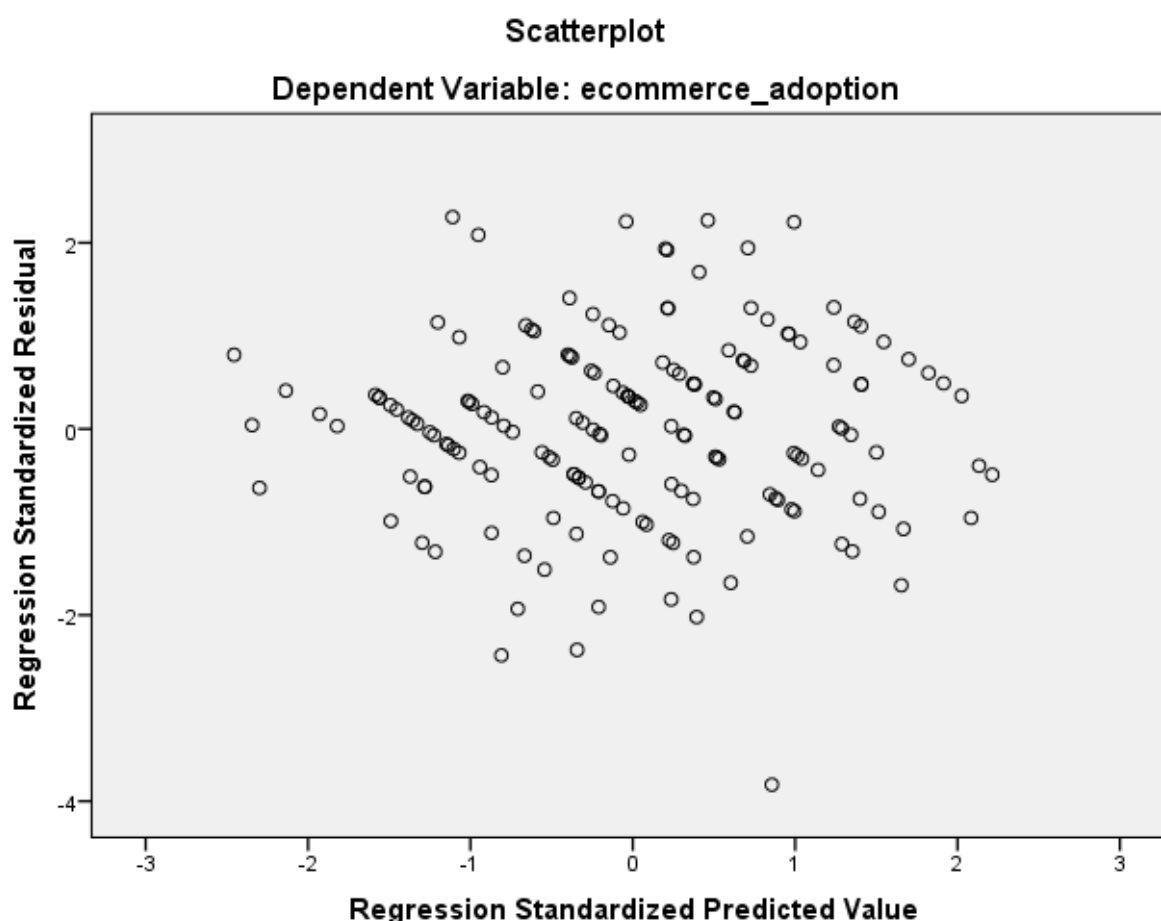

Figure 4: Scatter plot to check homoscedasticity

6.3.2. Regression analysis

A regression analysis measures what proportion of the variations in dependent variable can statistically be explained by the independent variable. The adjusted value of R square tells us how much dependent variables' variance could have been accounted for if the model was from the population rather than only from sample like that of R square (Saunders, Lewis, and Thornhill, n.d.).

The model summary in Table 8 indicates that the regression equation has a good fit with the data. The R-squared value of .599 indicates that roughly 60% of the variance in e-commerce adoption can be explained by the four independent variables included in the model (user friendliness related factors, functionality related factors, perceived risk related factors, and consumers' persona related factors). The adjusted R-squared value (.589) suggests that the model is a good fit and that adding additional variables would not significantly improve the model's performance. The standard error of the estimate (.230096) is a measure of how well the regression line fits the data.

The Durbin-Watson test is a measure of autocorrelation in the residuals (errors). A value of 1.7 indicates that there is no significant autocorrelation in the model's residuals.

Overall, the model suggests that user friendliness, functionality, perceived risk, and consumers' persona are significant predictors of e-commerce adoption. However, further analysis would be necessary to determine the strength of each factor's impact on e-commerce adoption.

Analysis of Variance (ANOVA Test)

Analysis of Variance (ANOVA) tells the level of variability with in a regression model. It can be used as a basis for test of significance. The model is said to be statistically significant if the p-value is less than 0.05 (95% confidence level).

Table 9 demonstrates that the relationship between the dependent variable and the independent variables is statistically significant, as indicated by the p value of 0.000, which is well below the commonly used threshold of 0.05. In addition, the F value of 61.171 further supports the statistical significance of the model. These findings suggest that the independent variables in the model are important predictors of the dependent variable, and that the model can be used to make valid inferences about the relationship between these variables. Overall, these results provide strong evidence for the use of this model in understanding and predicting the behavior of the dependent variable.

Table 8: Model summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.774[a]	.599	.589	.230096	1.700

Regression Model

The results of the regression analysis demonstrated that all four factors, user friendliness related factors, functionality related factors, consumers' persona related factors, and perceived risk related factors significantly contribute to the adoption of e-commerce by customers.

Table 10 revealed that the coefficient for user friendliness related factors was positive and significant ($β1 = 0.229$, $t = 5.021$, $p < 0.001$), indicating that ease of use and convenience of the e-commerce platform can positively influence customer adoption. This result is consistent with previous studies that have found that the usability of the e-commerce platform is an important factor that affects the adoption of customers (Lee, Gan, and Liew 2022); (Ranganathan and Ganapathy 2002). It implies that Ha1 is accepted. The coefficient for functionality related factors was also positive and significant ($β2 = 0.234$, $t = 7.004$, $p < 0.001$), indicating that the functionality of the e-commerce platform is also a critical factor influencing customers' adoption. This result is consistent with earlier research which found that functionality is an essential feature of the e-commerce platform for effective adoption and satisfaction of customers (Pavlou, 2003; Ranganathan & Ganapathy, 2002). Therefore, Ha2 is accepted.

In the same Table 10, the coefficient for perceived risk related factors was negative but not statistically significant ($β3 = -0.063$, $t = -1.517$, $p = 0.131$), indicating that perceived risk may not have a significant influence on customers' adoption of e-commerce. Nevertheless, previous studies have highlighted that risk perception could be a significant barrier to the adoption of e-commerce platforms (Chen, Chen, and Chen 2019). This result is inconsistent with previous studies that found that perceived risks alter customers' adoption decisions (Yan 2009). Therefore, Ha3 is rejected.

Finally, the coefficient for consumers' persona related factors was positive and significant ($β4 = 0.227$, $t = 5.817$, $p < 0.001$). This suggests that personal characteristics such as age, gender, and educational background can significantly influence the adoption of e-commerce by customers. Previous studies have highlighted that personal traits could affect the adoption of e-commerce (Bhatnagar and Sohal 2005); (Paulo 2004). Therefore, Ha4 is accepted.

These findings have significant implications for e-commerce businesses in terms of understanding what factors influence customer adoption of their platforms. The results suggest that e-commerce businesses should focus on improving the usability and functionality of their platforms to attract more customers. Furthermore, the results suggest that businesses should pay attention to personal traits and characteristics of their potential customers and design their platforms accordingly.

Table 9: Analysis of variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
			ANOVA[a]			
1	Regression	12.955	4	3.239	61.171	.000[b]
	Residual	8.683	164	.053		
	Total	21.637	168			

Table 11: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.139	.202		5.648	.000
User friendliness related factor	.229	.046	.317	5.021	.000
Functionality related factor	.234	.033	.371	7.004	.000
Perceived risk related factor	-.063	.042	-.075	-1.517	.131
Consumers Persona related factor	.227	.039	.348	5.817	.000

Over all, the results of the regression analysis confirm that the usability, functionality, and consumers' persona-related factors significantly contribute to the adoption of e-commerce by customers. This study also shows that perceived risk, while not significant, should not be overlooked by e-commerce businesses. The findings provide valuable insights for e-commerce businesses to improve their customer adoption and retention strategies and can contribute to the success of e-commerce platforms in the market.

7. Conclusion

The findings of this study suggest that user-friendliness related factors, functionality related factors, and consumers' persona-related factors play a crucial role in the adoption of e-commerce in Telebirr transactions in Addis Ababa. E-commerce platforms must ensure that their websites are user-friendly, load quickly and efficiently, have easy navigation, offer simple and easy checkout processes, provide adequate customer service, offer relevant search results, and are functional and accessible. By addressing these factors, e-commerce platforms can enhance user experience, increase customer satisfaction and loyalty, and ultimately increase adoption.

Furthermore, this study suggests that personal characteristics such as age, gender, and educational background can significantly influence the adoption of e-commerce by customers. Therefore, e-commerce businesses should pay attention to the personal traits and characteristics of their potential customers and design their platforms accordingly.

Finally, while perceived risk-related factors were not found to be significant predictors of e-commerce adoption, they should not be overlooked by e-commerce businesses. Perceived risks can still influence customers' decisions, and therefore, e-commerce businesses should work towards mitigating these perceived risks to enhance customer trust and increase adoption.

The researchers recommended that improve user-friendliness and functionality: e-commerce businesses should ensure that their platforms are user-friendly and provide a seamless experience for customers. This includes ensuring fast loading times, clear product information, easy navigation, and a simple checkout process. Businesses should leverage data analytics and personalization techniques to offer tailored recommendations and high-quality customer support to their customers. This can help to enhance the customer experience and improve adoption rates. e-commerce businesses should also consider the demographic and socio-economic factors of their target customers to design more effective platforms and address perceived risks related to security and authenticity to protect customer information and ensure the authenticity and quality of products and services offered. This can build trust and confidence in the platform and increase adoption rates.

By implementing these recommendations, Telebirr can further solidify its position as a leading mobile money platform in Addis Ababa, driving the adoption of e-commerce and contributing to the growth of the digital economy in the city.

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