

The Effect of Cyber Security on Citizens' Adoption of e-Commerce Services: The Case of Vhembe District in Limpopo Province of South Africa

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DECLARATION

I, Netshirando Vusani hereby declare that this dissertation entitled: “The Effect of Cyber Security on Citizens’ Adoption of e-Commerce Services: The Case of Vhembe District in Limpopo Province of South Africa” is my own original work and is prepared in partial fulfilment of the requirements of the degree of Masters in Business Information Systems at the University of Venda and no part of this dissertation was presented for another degree or diploma in this Institution or anywhere else. All the information material sources used in this paper are fully acknowledged and referenced.

Researcher’s Signature _____ **Date** _____

Researcher’s Name _____

DEDICATION

To my mother, Elelwani Eunice Netshirando for her guidance, encouragement and support towards my education with the few she had, and always being there for me.

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Firstly, I would like to thank, God the Almighty for giving me strength and wisdom to complete this mini-dissertation. I will also like to give my sincere gratitude to my main supervisor, Prof. A. Kadyamatimba and co-supervisor, Dr. W. Munyoka for their support and guidance throughout this period. If it was not for their support and guidance it was not going to be easy for me to complete this study. Thank You so much, may God bless you.

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ABSTRACT

Today, information and communication technologies (ICT) have become an integral part of humans lives more especially in business, be it those in developed or developing countries. The evolution of ICT's has also led to the introduction of e-Commerce services. Both the public and private sectors, develop these technologies with customer satisfaction in mind. Out of all the efforts by businesses and ICT experts, e-commerce systems continue to fail because of low user acceptance and user attitude, especially in developing nations. Security issues are known to be of top most concern for online shoppers. A survey was administered to 161 respondents, to find out how cyber security affects consumer's intentions and actual use of e-commerce systems. The study encompasses both users of e-commerce systems and non-users of e-commerce systems across Vhembe district of Limpopo Province in South Africa. A quantitative research approach was used. The findings revealed that perceived security was the main concern for non-users of e-commerce intentions to use e-commerce systems because of lack of information and lack of trust on e-commerce systems. The study also revealed that users of e-commerce systems are still concerned about security, even though they intend to continue using e-commerce systems. For the success of e-commerce in rural communities, government needs to join hands with retailers and SME's to start awareness campaigns that will clarify how e-commerce systems work and eradicate negative perception on e-commerce systems.

Keywords: *e-commerce, adoption, intention, perceived security, perceived trust, perceived privacy.*

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LIST OF ABBREVIATIONS / ACRONYMS.

ICT	Information Communication Technology
E-Commerce	Electronic Commerce
TAM	Technology Acceptance Model
KMO	Kaiser-Meyer-Olkin
SPSS	Statistical Package for the Social Sciences
ISP	Internet Service Provider

CHAPTER 1: INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

Today, information and communication technologies (ICTs) have become an integral part of humans lives more especially in business, be it those in developed or developing countries. Moreover, ICTs are playing a leading role in transforming the retail industry; for instance, by trying to meet the needs of customers and offer convenient and efficient online services to individuals via online shopping, e-banking, e-government, e-health and e-learning services (Mekovec & Hutinski, 2012). The evolution of ICTs has also led to the introduction of e-Commerce services. Since the introduction of e-commerce more than a decade ago, millions of e-commerce transactions have been completed from all over the world (Yoon & Occe~na, 2015). E-commerce is defined as the buying and selling of products or services over electronic systems (Kingston, 2001). There is a wide variety of commercial activities that retailers conduct via e-commerce, including electronic funds transfer, supply chain management, online transaction processing, electronic data interchange (EDI) and automated data collection systems (O'Raghallaigh, 2010). Today, when developing and refining their business strategies, ICT is an integral aspect that businesses consider most. Organizations are investing heavily in information technology more especially in e-commerce systems. Both public and private sector develop these technological infrastructures with the aim of customer satisfaction in mind (Kim, Chung & Lee, 2011). Out of all the efforts by businesses and ICT experts, on-line systems continue to fail because of low user acceptance for several reasons, especially in developing nations (Moosa, 2011). Several studies focusing on factors that affect customers' adoption or rejection of online systems were done and established that privacy, security and trust are some of the major factors with huge impact (Corbitta, Thanasankita & Yib, 2003; Kim, Chung & Lee, 2011; Yoon & Occe~na, 2015).

According to Meskaran, Ismail and Shanmugam (2013), security issues are known to be of topmost concern for online shoppers, where seven out of ten shoppers are willing to spend more via online if the online systems were to offer robust safety to personal information and transactions. However, users perceive that security on e-commerce services is very significant in influencing their personal decisions for adopting or and rejecting e-commerce services. The study by Meskaran et al. (2013) indicates that besides these challenges, authentication, fraud, and perceived risk of loss are also known to be major concerns for consumers to perceive online

shopping as being riskier than the offline mode. Similarly, most clients in developing countries feel that offline purchase provides them with the satisfaction of physical purchase where a customer can see, feel and touch the products prior to the purchase made (Kim et al., 2011). Gupta and Dubey (2016) describe e-commerce security as the protection of e-commerce assets from unauthorized access, destruction, alteration, or use. Hence, there is a need for the business world to establish secure online systems that convince customers to buy online and protect these systems against any attempt to gain unauthorized access.

1.2 Background of the study

Although, e-commerce services offer a lot of benefits, they are also characterized by anonymity, uncertainty, lack of control and potential opportunism from cyber attackers (Thaw, Mahmood & Dominic, 2009). The success of electronic commerce, therefore, significantly depends on the provision of robust security and privacy for its consumers' sensitive personal data and transactions. Consumers' lack of acceptance of electronic commerce is not merely due to the concern of security and privacy of their personal data, but also lack trust and reliability of ICT systems and lack of knowledge in advancement in security features in cyberspace (Tsiakis, 2012). In a study conducted by Mustafa, Abu Hassan, and Abd Aziz, (2016), it was established that e-businesses have been generally growing globally and consumers are opting for online business which is considerably fast and convenient compared to the brick-and-mortar. With such advantages, the Internet has rapidly become the main mode of communication and of conducting business conveniently even in developing countries. The Internet is a public network consisting of thousands of private computer networks connected. Private computer networks system normally owned by retailers, governments or wealthy individuals are exposed to potential threats from anywhere on the public network. Protection against these threats requires businesses to have stringent security policies and measures in place. Customers' perceptions on the security and privacy of e-commerce systems play a significant role in the adoption and use of such systems (Kaur, Kaur, Pathak & Kaur, 2015).

Finklea and Theohary (2015) suggest that high-speed Internet communication is not only facilitating the growth of legitimate business; but also bolstering criminals' abilities to operate in an environment where they are able to broaden their pool of potential targets and are rapidly exploiting their victims. They further indicate that the Internet has opened a whole new virtual heaven for all people, good and bad, clever and naive to enter and interact in the cyberspace with a lot of diverse cultures. People use the Internet for different purposes, some are there to deliberately attempt to breach private ICT systems and gain access over them, usually with the goal of theft, disruption, damage, or performing other unlawful actions. The Internet and e-commerce might have become part and parcel of every individual's daily lives in the world, but it is also one of the most dangerous aspects of one's life as there are wide loopholes for privacy protection and the possibility of cyber-crimes (Leena, 2011). Information Systems Audit and Control Association (ISACA& RSA) on the State of Cybersecurity survey in 2015, found that there was an increase in security breaches on ICT systems, rising to 66 percent per year since 2009 (ISACA, RSA 2015). Similarly, the survey for 2014 reported that the total number of security

incidents detected by respondents grew to 42.8 million around the world, up 48 percent from 2013 (ISACA, 2014).

A study that was conducted by Symantec in 2015 indicates that less than half of organizations in the UK have seen their cybersecurity budgets rise gradually due to new threat emerging that calls for new measures (Symantec, 2015). Investing in cybersecurity can be considered good only if the money that is being spent in acquiring skilled security experts, new security tools, developing security frameworks and policy and conducting a study on customers' perception on security in e-commerce system lead to positive perceptions and acceptance. Outsourcing security services alone are not enough in securing the e-commerce systems, organizations need to acquire and provide necessary knowledge and information to both their employees and their customers on how they can avoid security breaches whilst on the internet. E-commerce systems may be well built with all security features and security experts in place, but consumers' perception on security, perceived risk, perceived trust and perceived privacy plays a significant role in the success of new technology.

Consumers and retailers' lack of knowledge and information about ICT systems vulnerabilities have a significant impact on bolstering cybersecurity as a lot of individuals, company employees and consumers constantly tricked unknowingly and ending up giving out confidential information and access to the unknowns using different techniques such as phishing.

1.3 Problem Statement

There is no doubt today that virtual environments such as e-commerce have introduced new levels of efficiency, connectivity, and productivity to businesses. However, along with these undisputed benefits has come an equally real and serious threat that each year results in hundreds of millions of dollars and rands in measurable and intangible losses to businesses and consumers due to the aggressive invasions by criminals into consumers and business' virtual environments (Singleton, 2013). The online retailing environment is said to be faced by security and privacy risks (Ling et.al, 2011). Cybersecurity professionals' worldwide face an ever-evolving threat landscape that many feel they are ill-equipped to manage. Data breaches at corporations, educational institutions, and government agencies continue to erode public confidence in the state of cybersecurity (Alta, 2017). However, it is found that government and private institutions continue to invest more to make e-commerce a more secured environment. SAICA (2015) identifies consumers' attitude such as perceived security, perceived trust and perceived privacy as major factors that affect consumers' adoption of e-commerce systems. With all the efforts by cybersecurity, the problem statements for this study waters down to:

What effect does cybersecurity have on users' and non-users' decisions to adopt and use e-commerce systems in the Vhembe District of Limpopo Province in South Africa?

1.4 The Aim of the Study

The aim of this study is to find out how cybersecurity is affecting citizens' decisions to accept and use e-commerce services in Vhembe district of Limpopo province, South Africa.

1.5 Research Objectives

The study is intended to realise these objectives:

- To identify how cybersecurity is affecting citizens' decisions to adopt and use e-commerce systems in Vhembe District.
- To find out how consumers' perception on privacy influences consumers' behavior towards the intention to use e-commerce systems.
- To assess how customers' perception of trust influence their behavior towards the intention to adopt e-commerce.
- To find out how awareness in e-commerce systems influence customers' behavior towards the intention to adopt e-commerce.

1.6 Research Hypothesis

The following are the hypothesis of the study:

- H₁₀: Consumers' perceived security does not influence their behavior towards the intention to adopt e-commerce.
- H₁₁: Consumers' perceived security influence their behavior towards the intention to adopt e-commerce.
- H₂₀: Perceived privacy on e-commerce does not influence consumers' behavior towards the intention
- H₂₁: Perceived privacy on e-commerce influences consumers' behavior towards intention.
- H₃₀: Customers' perception of trust does not influence their behavior towards the intention to adopt e-commerce.

- H₃₁: Customers' perception of trust influences their behavior intention to adopt e-commerce.
- H₄₀: Awareness does not influence customers' behavior intention to adopt e-commerce.
- H₄₁: Awareness influence customers' behavior towards the intention to adopt e-commerce.
- H₅₀: Consumers' perceived security influences their use of e-commerce systems.
- H₅₁: Consumers' perceived security does not influence their use of e-commerce systems.
- H₆₀: Customers' perception of trust does not influence their use of e-commerce systems.
- H₆₁: Customers' perception of trust influences their use of e-commerce systems.
- H₇₀: Perceived privacy does not influence customers' use behavior of e-commerce systems.
- H₇₁: Perceived privacy does not influence customers' use behavior of e-commerce systems.
- H₈₀: Behavior intention does not influence customers' use behavior of e-commerce systems.
- H₈₁: Behavior intention influence customers' use behavior of e-commerce systems.

1.7 The significance of the study

The issue of cybersecurity does not only concern retailers but also consumers. It is essential to conduct research on the effects of cybersecurity on citizens' intentions to adopt and use e-commerce systems, specifically on rural communities like Vhembe district as the results will benefit all stakeholders:

1.7.1 Consumers

Consumers' acceptance of ICT products or services is very important to the developers. The study is significant to consumers' decisions to accept e-commerce systems as it will explain challenges which are generally encountered by e-commerce system users and establish possible ways to overcome such pitfalls. It will also outline the benefits of using e-commerce service when compared to traditional brick- and- mortar business and how to stimulate its adoption by citizens.

1.7.2 Retailers

The study is significant to retailers in understanding how critical cybersecurity is influencing users' decisions to adopt and use e-commerce systems. By providing statistical information about the current state of user acceptance and use of e-commerce systems in rural communities within the Vhembe District, retailers will be in a better position to secure e-commerce systems and build users' confidence on the systems leading to greater adoption and use.

1.8 Research Scope

The study focuses on the effects of cyber security on citizens when adopting e-commerce systems in the case of Vhembe District in Limpopo Province of South Africa. Vhembe District is highly characterized by rural communities. However, e-commerce services were predominantly adopted in urban areas; but recently citizens in rural areas are gradually adopting and using e-commerce services as a result of the proliferation of internet services. Therefore, this study is confined to the Vhembe District in the Limpopo Province of South Africa.

1.9 Terms and Definitions

- Cyber-crime is any illegal activity that uses a computer as its primary means of commission and theft.
- Cybersecurity is an act of protecting electronic data and information on storage and transmission against attacks and intrusion on the network.
- E-commerce describes the buying, selling, and exchanging of products, services, and information via computer networks, primarily the Internet.

1.10 Outline of the Research Project.

This research project is composed of five major chapters as explained below:

Chapter One outlines the background information about the study, problem statement, study objectives and hypothesis. Chapter 2 provides a background to e-commerce, e-commerce adoption, factors affecting citizens' perceptions of e-commerce adoption. It will also outline the usage of e-commerce systems around the globe and consumers' intention to use such systems. Chapter 3 focuses on the design and methodology of the study. The chapter explains procedures (target population, sampling technique, sample size and the methods adopted in collecting data) and adopted in achieving the research objectives and test research hypothesis. The chapter also focused on methods that will be applied to analyzing the collected data and ethical considerations for the study. Chapter 4 focuses on analyzing and interpreting the study findings on how

cybersecurity affects consumer's adoption to e-commerce service. The study was carried out on both e-commerce non-users and e-commerce users. Chapter 5 gives a brief discussion about the study findings, recommendations and future research.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter provides a background to e-commerce, e-commerce adoption, as well as factors affecting citizens' perceptions of e-commerce adoption. It will also outline the usage of e-commerce systems around the globe and consumers' intention to use such systems.

2.2. E-commerce service

The Internet has become an essential tool for businesses as a method of trading between organizations, among organizations and consumers, and even between consumers. With Internet, organizations (both public and private) have found a new efficient and effective way to do business with their stakeholders (Yoon, Occe~na, 2015). According to Katiba, Thyagarajan, and Seetharaman (2003), the incorporation of the Internet into businesses has transformed the traditional way of trading, from marketing model to payment method. Besides its primary role as a communication medium, the Internet has been used as a market space where buyers and sellers exchange information, goods, and services without the hindrance of time and geographical constraints. Lee and Ahn (2001) refer to e-commerce as doing business electronically. However, The World Trade Organization (2013) offer a slightly deeper explanation of e-commerce as they define it as the sale or purchase of goods or services conducted over computer networks by methods specifically designed for receiving or placing of orders. Shia, Chen, Ramdansyah, and Wang (2015) define e-commerce as buying or ordering goods via the Internet for a consumer's personal or household's consumption, regardless of whether the invoice for payment arrives later or the goods are paid immediately via electronic banking, credit card, and electronic payment or similar. Looking at both three definitions, they all involve exchanging of products or services between two parties.

E-commerce systems are the breakthrough to retailers as according to Al-Smadi (2012), e-commerce services such as e-banking offer opportunities to create services and processes that demand few internal resources, and therefore, lower cost, wider availability, and possibility to reach out to more customers. However, the introduction of e-commerce systems is not only a breakthrough to retailers but customers too as Al-Smadi et al. (2012) further suggest that an e-banking service allows customers easier access to their finances and manage them without delays. Sakrar (2008) in his study noted the significant increase in the number of businesses today that use the Internet as a fundamental tool to conduct their business and closely communicate with their potential customers. This supported the findings by Brown and Muchira

(2004) who stated that most organizations were emphasizing the use of technology helping them getting closer to consumers and building ongoing relationships with them.

According to Johar and Awalluddin (2011), the adoption of e-commerce has received much attention from all angles. The continuous invasion by the Internet to human lives and business is the reason why electronic commerce is receiving more attention today. As information and communication technologies are ever evolving, both government and private entities are becoming increasingly dependent on computerized information systems to carry out their daily operations (Wilshusen, 2012). However, computer technology does not only bring greater benefits. But it also brings ever greater threats by the very nature of the opportunities it presents. It is also a focal point for cybercrime, industrial espionage, and cyber attacks. Therefore, protecting it is of paramount priority (ACS, 2016).

2.3. Adoption of e-commerce services.

Since its introduction, the World Wide Web technology has become a center for promoting modern society. It is possibly to offer quicker service than any other technology before it (such as the car or the telephone). The Web technology has begun to impose on everyday life for the clear majority of citizens globally in a very short space of time. Driven by the increase in the number of Internet users and advances on web technologies, almost every business organization has its own website (El-fitouri, 2015). According to AlGhamdi, Nguyen, and Jones (2013), throughout the world, governments support and encourage e-commerce development, and the advent of this new technology has brought with it a whole new industry, language and potentially new ways in which society, government and business operate (Kingston, 2001). With the number of Internet users increasing, companies are taking advantage of the opportunity that comes with these advances on mobile connectivity. According to Shemshad, Lashgarara, Mirdami and Najaf Abadi (2015), today, the arrival of electronic commerce has created the new opportunities for firms to compensate for weaknesses such as the inability to access new markets. However, Almeida de Almeida, Avila and Boncanoska (2007) argue that although these web technologies are designed to improve commercial transactions and the free-flowing, painless and secure transactions have not yet been achieved.

According to AlGhamdi, Nguyen, and Jones (2013), globally, conducted studies were more focused on gaining a better understanding of the strengths and challenges of e-commerce with less focus on consumer's perception on this technology. This was supported by Sarkar (2008) who argues that little is known about consumer perception and attitudes towards e-commerce adoption. In a study done by Almousa (2013), it was pointed out that security, trust, and privacy

are major concerns towards the adoption of online shopping by citizens. However, he further argues that even though e-commerce has become a familiar mode of trading in developed countries, it is much different in developing countries where it is still considered an innovation. To attain a successful level of e-commerce development, consumers and retailers in developing countries need to attain some initial levels of trust in e-commerce, of ICT infrastructure, and legal and regulatory frameworks (Almeida de Almeida, Avila & Boncanoska, 2007).

2.4. Factors affecting consumer's adoption to e-commerce services

The increase in the use of the Internet as a Business to Consumers (B2C) commercial tool has raised the huge interest in understanding the key issues facing this relationship (Corbitt, Thanasankit and Yi, 2003). The relationship between consumers and retailers over the Internet is totally different from the brick and mortar environment. There are several factors that affect this relationship. Studies have pointed out that perceived risk, trust, security, privacy, perceived ease of use and perceived usefulness as major factors affecting the relationship between consumers and retailers of e-commerce services. Most of these findings were confirmed and tested using the Technology Acceptance Model (TAM) by Davis and other models.

Mekovec and Hutinski (2012) indicated that consumers mostly hesitate to use e-commerce systems offered via the Internet due to their suspicions regarding the level of protection and privacy offered when performing online transactions. This concurs with Mahmood, Dominic, and Thaw (2009) who suggest that consumers' lack of acceptance in electronic commerce adoption today is not merely due to the concern on security and privacy of their personal data, but also lack of trust and reliability of Web vendors. According to Kim, Ferrin, and Rao (2008), trust is a prerequisite for successful commerce because consumers are hesitant to make purchases unless they trust the seller. Meskaran (2015) also found that security, privacy, and trust play a significant role in the adoption of e-commerce. Furthermore, Meskaran (2015) pointed out that, the popularity of e-commerce is significantly tempered with concerns over perceived trust and perceived security in online purchasing. Similarly, lack of trust and security issues were identified as major factors concerning online users which led to customers shunning away from participating in online purchasing.

Retailers who are already using the Internet, consider the lack of network security to be the primary problem, followed by slow and unstable connections (Almeida de Almeida, Avila & Boncanoska, 2007). Yu, Zhang, Southren, and Joiner (2001) indicate that despite the potential rewards of conducting business on the internet, major corporations have been slow to embrace this technology. One major concern in adoption to e-commerce is the potential loss of assets and

privacy due to breaches in the security of commercial transactions and corporate computer systems. This was supported by the study conducted by Gupta and Dubey (2016) who posit that e-commerce systems gain bad reputation because of the security threats; hence companies are so determined to improve the online security to gain users' trust back. In the same study, Gupta and Dubey showed that privacy, security, and trust are major concerns for electronic commerce. According to CMS Connected (2017), safety had been the biggest roadblock to online sales growth, but lately, many countries jointly enforce product safety in online commerce. U.S., European and Chinese regulators have held five such meetings since 2008 to watch online sales more closely and encourage manufacturers to do more to design safety standards into products.

2.5. Cyber attacks

Over the past several years, experts and policymakers have expressed increasing concerns about protecting ICT systems from cyber attacks. Cyberattack is a deliberate attempt by unauthorized persons to access ICT systems, usually with the goal of theft, disruption, damage, or other unlawful actions. Many experts expect the number and severity of cyber attacks to increase over the next several years (Fischer, 2016). Security is one of the major determinants on the adoption of e-commerce systems, hence governments and retailers are taking different measures to prevent these attacks against their systems (Reddy & Reddy, 2014). This means that organizations do consider security as a major issue to their online business. According to Fischer (2006), this act of protecting ICT systems and their contents has come to be known as cybersecurity. Cybersecurity affects consumer's decision to adopt e-commerce services. This was supported by HM Government (2015). Consumer's perception of security increases when retailers improve security on their Web systems. A study done by PAC (2015) shows that data location and data transmission are often considered as important issues in cybersecurity, as it underpins data privacy. The important issue on e-commerce services is protecting data and information on storage systems and on securing transactions. Today, more than 60 percent of total commercial transactions are done online, and because of this high number of transactions on the internet robust security is essential for transparent and best transactions. Hence, cybersecurity has become a major factor in determining the acceptance of e-commerce systems by citizens. Cybersecurity plays a major role in the success of e-commerce implementation (Kornkaew, 2012). Securing transmitted information and storage systems has become one of the biggest challenges in the present day. One cannot guarantee that retailers Web systems are 100% out of reach by hackers.

2.6. Consumer's Perception on Security, Trust, and Privacy on E-commerce services.

Meskaran, Ismail and Shanmugam (2013) identify security issues as one major customer concern on e-commerce as it has been cited in many online purchasing studies. It is agreed that security is not only a technical challenge but also includes human and organizational aspects (AlGhamdi, Nguyen, Nguyen, and Drew, 2012; Damghanian, Zarei, and Kojuri, 2016). This means that even when the best technical approaches and solutions are used, without considering the human aspects such as perception on e-commerce, then these technical solutions may not be enough. This also means organizational abilities alone are not enough. Human attitude and perception towards the adoption of technology as suggested by Meskaran, et al. (2013) are key factors for consideration. According to Wright (2016), perception is an understanding of the world constructed from information obtained by means of the senses. Meskaran et al defined security perception as the degree to which person believes that the online vendor or website is secure.

The secureness of transaction is the key issue when developing e-commerce systems as it is the most considered issue when transferring important personal details. Damghanian, Zarei, and Kojuri (2016) indicate that consumer's perception of online website security is one of the main factors affecting the acceptance of e-commerce service such as online banking by consumers. Damghanian et al. (2016) went on to suggest that, while using e-commerce, consumers worry about factors such as hackers' access to their personal information, lack of required accuracy, and having old security systems. Therefore, the higher the perceived security by consumers, the more the consumers' tendency for utilizing electronic bank services.

Furthermore, Lallmahamood (2007) reported that privacy concerns were found to be another major barrier to Internet shopping development. Phelps (2000) added that information privacy is regarded as one of the utmost securities concerns in adoption and use of e-commerce systems. Thaw and Mahmood (2009), backed up this by indicating that the construct of perceived privacy manifests itself primarily through perceived security. Mashhour and Zakarya (2015) conclude that there is a relationship among trust, security, and privacy. Perception of privacy and perception of security are factors that affect consumers' trust in electronic commerce, thus, are important in the acceptance of e-services (Mekovec and Hutinski, 2012). The same study by Mekovec and Hutinski (2012) also identifies a significant positive relationship between perceived security and perceived privacy.

Perceived privacy is defined as the consumers' ability to control the dissemination of information provided during the online transactions and the ability to control the presence of other people in the environment during the online transaction (Ling et al., 2011). According to Tsai and Yen

(2010), security on a website is strongly related to online purchase intention and as such, online vendor who is perceived to offer secure services is presumed to be more trusted and capable of attracting larger numbers of online customers. According to Yoon and Ockena (2015), trust is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party”. Trust has a crucial influence on consumer activities and thereby on e-commerce success (Corbitta, Thanasankita & Yib, 2003). Many researchers agree that consumers’ perceived risks are a strong antecedent of trust because the need for trust arises only in a risky situation (Pennanen, 2006; Ling et al., 2011).

Moreover, Yoon and Ockena (2015) establish a positive relationship between perceived risk and trust in online retailing. The same study found that the decrease in perceived environmental risks or by raising the security of websites leads to an increase in consumers’ online trust. For that reason, the concept of consumer-perceived risk is important in when studying trust of citizens on online systems. Thus, in line with this notion, which indicates that perceived risks are a prerequisite to trust, the effect of privacy and security on risk perception might also have an influence on consumer trust in e-commerce (Pennanen, Kaapu and Paakki, 2006). Among the current models for predicting technology adoption, this study adopted TAM in understanding how perceived security and other factors such as perceived trust and perceived privacy affect the adoption and usage of e-commerce services.

2.7. Consumer intention to adopt e-commerce service.

According to AlGhamdi, Nguyen, Nguyen, and Drew (2012), one of the main factors that deters consumers to adopt e-commerce service is lack of trust due to security/privacy concerns. Many studies have proved that security in e-commerce service does play a significant role in the adoption or rejection of online shopping. Although the adoption of e-commerce globally found to be on the rise, consumers’ perception of security still appears to be negative. The adoption rate of e-commerce services is hugely affected by the impact of security as many consumers are still reluctant to participate in online shopping. In the study conducted by Jarupunphol and Mitchell (2001), it was found that many consumers currently unwilling to use e-commerce service as they fear compromising their financial information and personal information when submitted to e-commerce websites. Changchit (2006) indicated that there is a disparity between the number of consumers who visit a site and the number of actual purchases being made. This shows that even though people visit online shopping sites they are not making the actual purchase. The decision to pay for products or services online depends heavily on how much consumers trust the e-

commerce services, its secureness. Gupta and Dubey (2016) pointed out that privacy concerns as a critical reason why people do not go on and make purchases online and why people always provide false information online. Consumers fear the loss of their financial data, and online retailers fear the financial losses associated with any resulting bad publicity and break-ins. There are several critical social and organizational issues with security. Security and privacy are big concerns that prevent customers from shopping online.

Cybersecurity can enhance the reputation of any retailer and open new commercial opportunities (HM Government, 2015). Online retailers with good cybersecurity will always reduce fear and lack of trust in security and privacy on their e-commerce services systems. To retain customer's trust in e-commerce systems, proper planning should be done to stay protected against possible security threats. To build a secure e-commerce application, following five security features must be included: Authentication, Integrity, Non-repudiation, Access control and Availability (Singh, 2014). Security issue will always come to haunt consumers' minds in decisions to adopt e-commerce service at any given time.

2.8. Theoretical Framework

Built on the Theory of Reasoned Action (TRA), Davis (1986) as cited in Mesquita (2010), established the Technology Acceptance Model (TAM), which focuses more precisely with the forecast of the acceptance of an information system (Persuad & Azhar, 2012). The main purpose of this model is mainly to envisage the acceptance of a tool. This model as shown in Figure 2-1 indicates that the adequacy of an information system is influenced by two major aspects: the perceived usefulness as well as the perceived ease of use.

However, basing on this model instead of using variables like the perceived usefulness and perceived ease of use, the researcher will integrate into the model variables such as perceived privacy, security, and trust. The TAM proposes that the usage of an information system is influenced by the behavioral intent. However, on the other side, the behavioral intent is also influenced by the individual's attitude towards the acceptance of the system and by the person's perception of its utility. Mesquita (2010) stated that the person's attitude is not the only determinant of a system, but is also well centered on the influence which it may have on the person's performance.

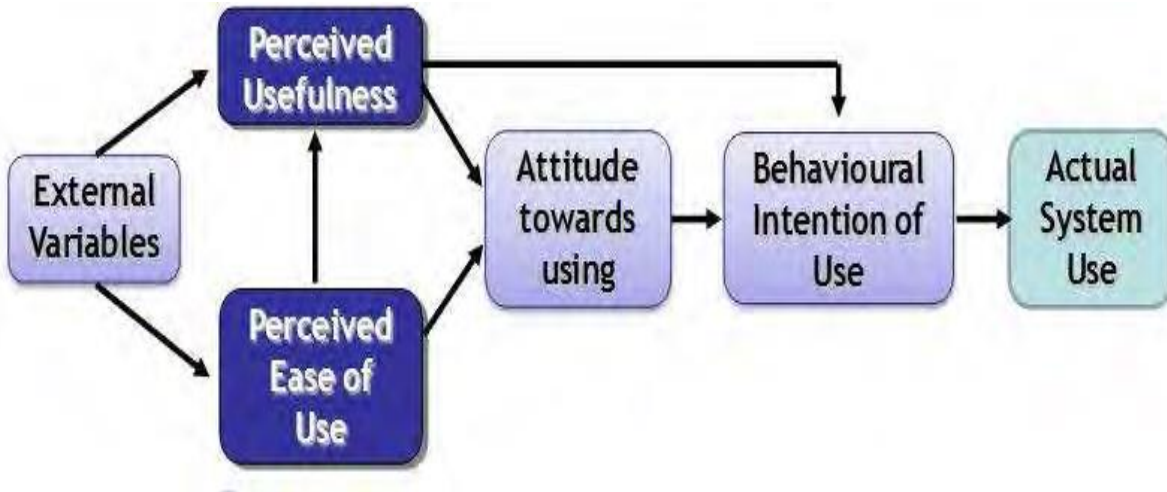


Figure 2-1 : Technology Acceptance Model. (Source: Ajzen, 1991)

According to Owa, Ukoha and Emecheta 2012), e-commerce has increased the global reach of small and medium scale enterprises. Its acceptance as an IT infrastructure depends on the users' conscious assessment of the influencing constructs as depicted in Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and Technology-Organization-Environment (T-O-E) model. According to Dadayan and Ferro (2005), the interaction between people and technology is a complex phenomenon as it involves rational as well as emotional factors. According to Featherman and Pavlou (2002), the TAM has been utilized in many online contexts to gauge user perceptions of system use, and the probability of adopting an online system. TAM has been extended to include subjective norms to explain perceived usefulness and usage intentions in terms of social influence and rational instrumental processes (Zhou, Dai, & Zhang, 2007). According to Geitz and Hubona (1997), Davis' representation of TAM has evolved over time, and it asserts that the influence of external variables upon user behavior is mediated through user beliefs and attitudes. Smith (2008) suggested that external variables represent characteristics of the system, such as the overall design and features of the system, individual variables (the user's computer skills, capabilities and abilities, user's knowledge, beliefs, and attitude toward computers).

Bojang, Medvedev, Spasov and Matvevnina (2017) indicated that not all customers are willing to give up their personal information online, and many are shying away from electronic commerce as a result. He went on to support what other researchers found out that privacy and security were found to be the biggest barrier to the growth. Furthermore, Thaw, Mahmood and Dominic (2009), pointed out that lack of acceptance in electronic commerce adoption today is not merely due to the concern on security and privacy of their personal data, but also lack of trust and

reliability, as consumers' trust in online transactions is crucial for the continuous growth and development of electronic commerce.

2.9. Conceptual Framework.

On the study conducted by Porter and Donthu (2006), it was found that personal characteristics such as age, education, income, and race are associated differentially with certain beliefs about the Internet and consumer attitudes towards the use of the Internet. Several scholars indicated that consumer's comfort level, feeling of security and their attitudes towards e-commerce services are correlated with the customers' age, annual salary, and level of education (Robieh, 2005; Poon, 2008; Chen & Barnes, 2007; Jalal, Marzooq & Nabi, 2011). Based on the Conceptual Framework for the Study Based on the TAM model in Figure 2-1, the researcher proposed a conceptual framework for this study as shown in Figure 2-2.

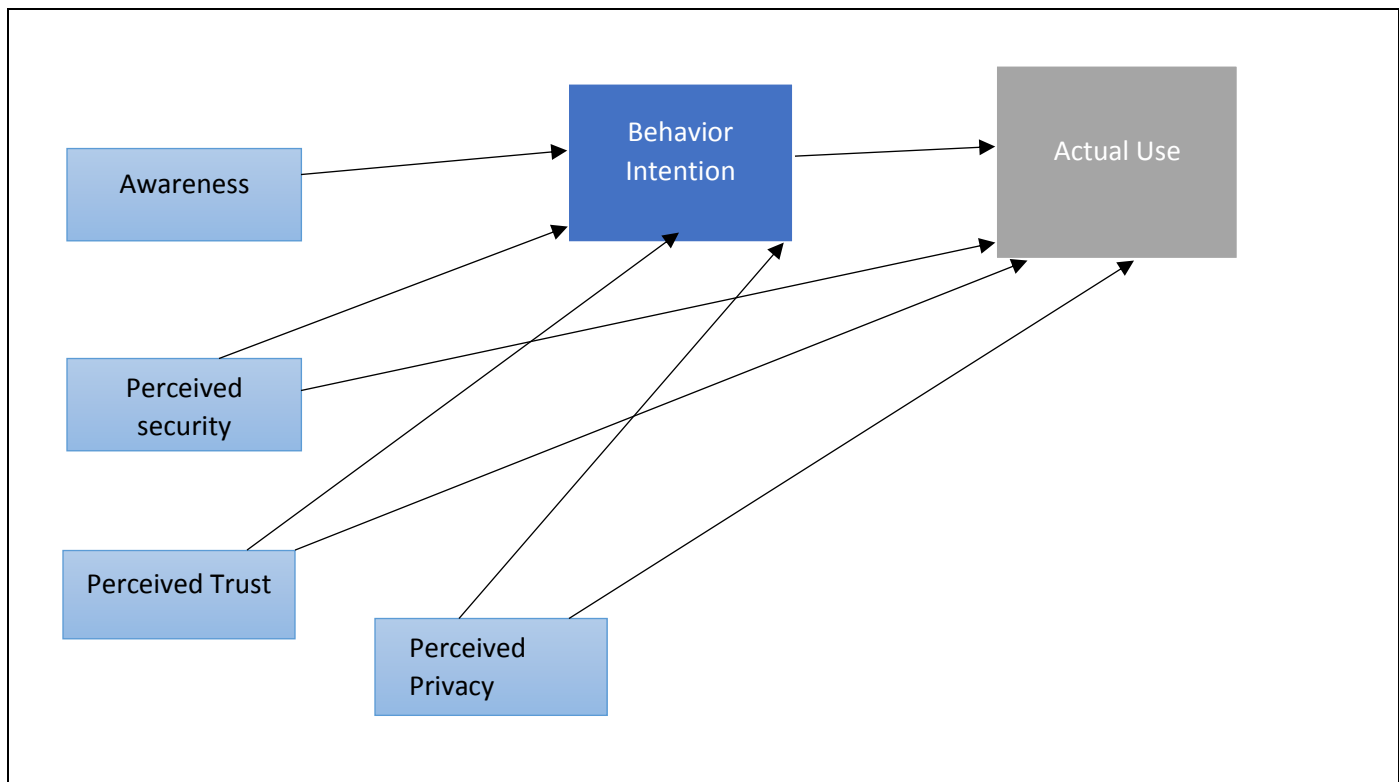


Figure 2-2 : Proposed Model Conceptual Framework.

The present study examines the effects of perceived security, perceived trust and perceived privacy on users' intention to adopt and use e-commerce services. In this study, the variables perceived security, perceived trust, and perceived privacy are moderated by three external variables, which are age, level of education and prior experience. In their study, Hubona and Geitz (1997) indicated that external variables are also an important consideration with respect to the

process of adopting e-commerce systems. The fact that breaches on Internet security are reported with great frequency means that there is a danger that potential users will be reluctant to engage in e-commerce because of fears about security (Jarupunphol & Mitchell, 2001).

According to Vega (2015), guaranteeing protection in an online transaction and personal information from cyber-attacks or other similar threats, not only increases trust but also attracts new traditional consumers to the electronic commerce environment. Wright (2016) found that consumers with more experience in the internet and online shopping have less concern about security than those with less experience. In his study, Wright (2016), found out that when consumers have a high perception of security risk their intention to purchase will be lower. According to Yu, Zhang, Southern, and Joiner (2001), factors such as gender, educational background, e-commerce experience, income, and age affect consumer's attitude towards safety and security on e-commerce systems. According to Pelau and Bena (2010), younger people are more likely to make transactions online and their perceptions of risk are very low. However, Lignell and Annamari (2014) stated that while older online shoppers search for significantly fewer products than their younger counterparts, they purchase as much as younger consumers.

As uncertainties exist in transactions over the Internet, many researchers have stated that trust is also a critical factor influencing the successful proliferation of e-commerce (Pilik & Juříčková, 2016). According to Yoon and Occeña (2015), age should be considered as a significant factor that can influence or moderate trust in e-commerce and it is very meaningful to empirically test that role in e-commerce. Porter and Donthu (2006) found that age, education, income, and race are associated differentially with beliefs about the internet services and that these beliefs influence a consumer's attitude toward and use of the Internet. The present study adopted TAM in testing how perceived security is affecting citizen's decision to adopt and use e-commerce services at Vhembe District. Moreover, the TAM is suitable for this study as it permits the incorporation of a new variable that is relevant to this and due to its focus on adoption and utilization of systems-the focus of this study. The current study proposed the model that incorporate three constructs (perceived security, perceived trust and perceived privacy) measured by external variables (age, education and prior experience) to TAM model to determine their effects on consumer's adoption of e-commerce service in Vhembe district of Limpopo province.

2.10. Usage of e-commerce service around the globe.

According to Alyoubi (2015), the rapid growth of Internet usage around the world gave rise to the concept and practice of electronic commerce which has become a common phenomenon in the world today. To survive in a highly competitive global economy, businesses must be adaptive to

new technological developments (Gurung, Luo & Raja, 2011). The adoption of e-commerce depends on different characteristics of the local environment, both infrastructural and socioeconomic. This has created a significant level of variation in the acceptance and growth of e-commerce in different regions of the world. The growing number of Internet users around the world has provided the drive and the opportunities for global and regional e-commerce (Panagariya, 2000; Samarajiva, 2001; Goldstein & O'Connor, 2001).

Although seemingly true in developed countries, research in developing countries fails to support this idea (Paré, 2002; Humphrey, 2003). According to Ma'aruf and Abdulkadir (2012), E-commerce is rapidly growing in developed countries, given the availability of e-commerce infrastructure. The steady growth of e-commerce in developed countries is the result of vast improvements in telecommunication services. Rahayu and Day (2017) argued that the adoption of e-commerce by SMEs in a developing country is still at a low level. Developing countries have fallen behind in the early stages of technology acquisition and use because of inefficient use of related knowledge, lack of investment within firms to acquire technology, lack of promotion policies and awareness that develop these technological areas (Almeida de Almeda, Avila & Boncanoska, 2007). According to World Trade Organization report (2013), mobile phones are the most popular ICTs in developing countries and one which is progressing very rapidly in Africa and Asia, particularly in India. Mobile phones are increasingly playing a larger role in the expansion of e-commerce in developing countries, especially among users without terminal connections.

Developing countries are still far behind with technological infrastructures, more especially in rural areas. According to Tibb, Ondiek, Kingori, and Mazwanu (2015), there are disparities in e-commerce adoption among various community members across the globe. Therefore, one could conclude that countries throughout the world are at different stages of adoption of e-commerce as illustrated in Figure 2-3. The adoption rate is influenced by local conditions and consumer's characteristics and perceptions. According to Alyoubi (2015), most developing countries are still far from experiencing this reality due to many factors which act as obstacles for e-commerce to flourish.

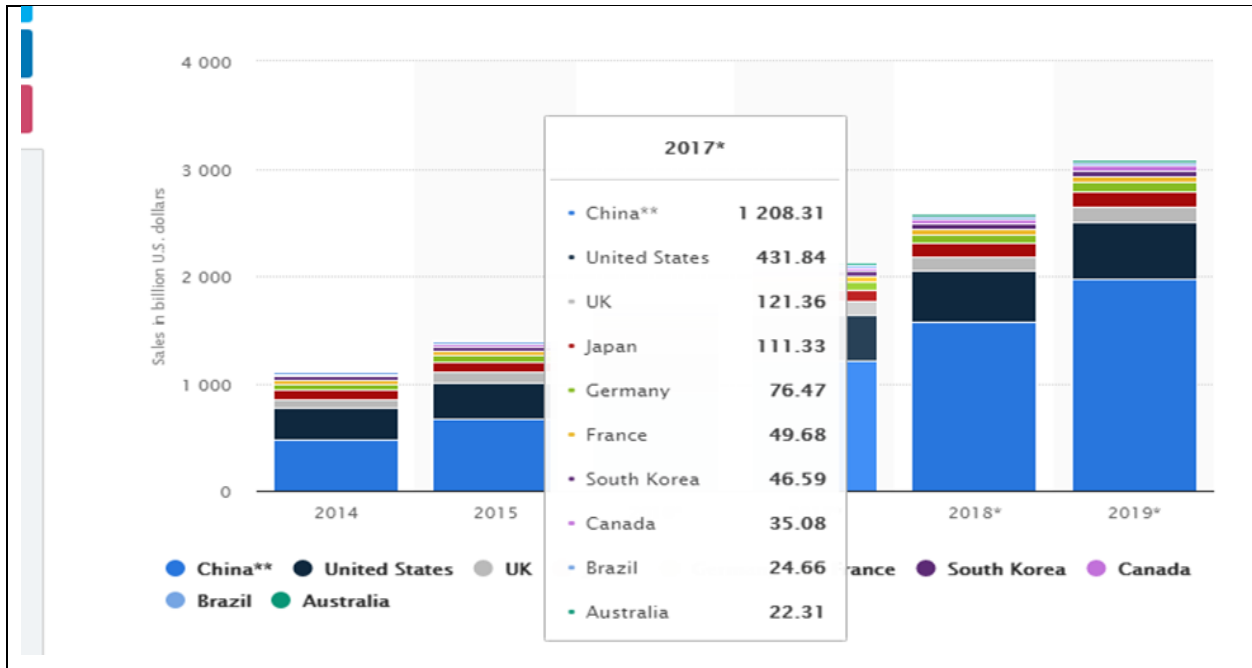


Figure 2-3 : e-commerce adoption rate. (Source: CMS Connected (2017)).

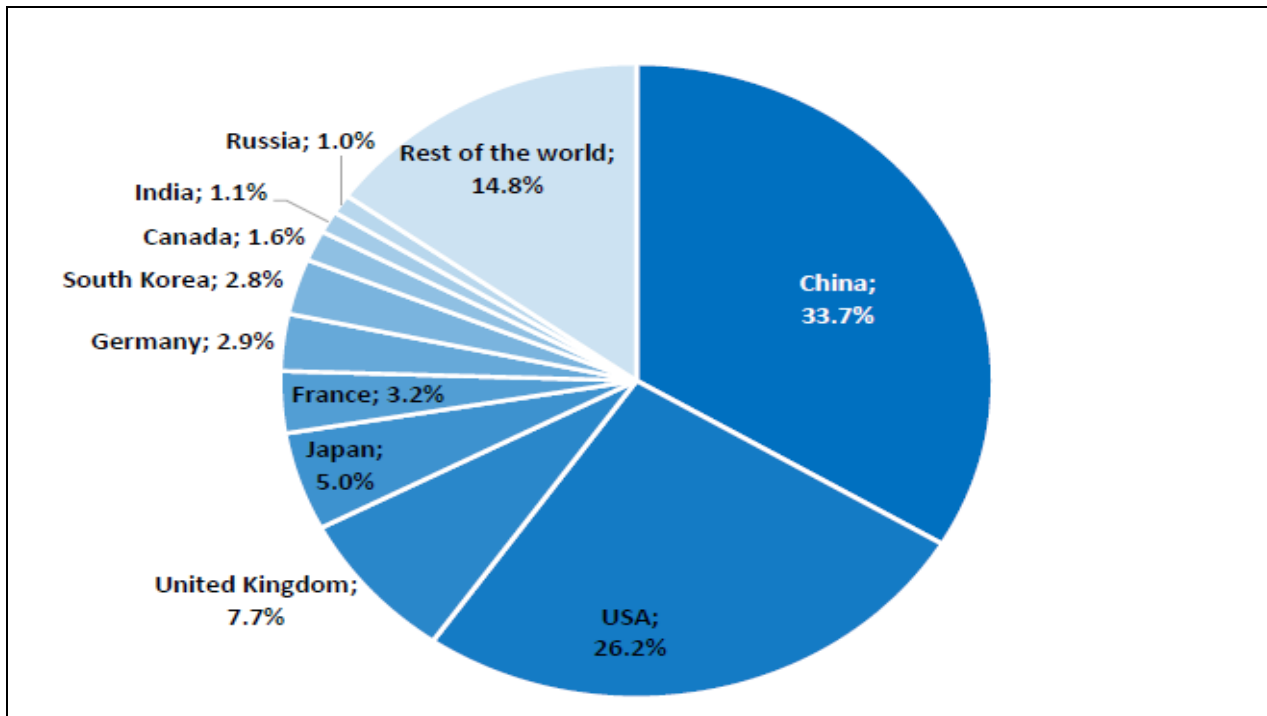


Figure 2-4 : use of e-commerce. (Source: Statistica (2017)).

Figures 2-3 and 2-4 support the findings of previous studies, that e-commerce adoption rate is much higher in the developed countries than in the developing countries. Figure 2-4 shows that

South Africa is classified under the rest of the world and outside the top ten countries with high rate of adoption and use of e-commerce systems. According to the study conducted by Khalil (2014), Europe, represents the largest share with about 79% of the global e-Commerce revenue, with over 875 million consumers shopping online. African and Middle Eastern regions, on the other hand, have the smallest share with about 3% of the global E-Commerce revenue. Suggesting a huge difference between uses of e-commerce between developed and developing countries.

2.11. Summary

The purpose of this chapter was to provide an in-depth overview of e-commerce services. With the increase in the use of Internet and mobile connectivity, the chapter also sought to establish the factors that contribute towards the adoption or rejection of the online shopping by citizens. It also helps the researcher to understand how e-commerce adoption rate in the developed world differs from the adoption rate in developing countries. The focus was to help the researcher to find out the relationship between the external variables on TAM and how they are moderated by consumer's personal characteristics such as consumer's age, level of education and prior experience on e-commerce.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter focuses on the design and methodology of the study. According to Rajasekar, Philominathan, and Chinnathambi (2013), research methodology is the study of methods by which knowledge is gained. Its aim is to give the work plan of research. The chapter explains procedures (target population, sampling technique, sample size and the methods adopted in collecting data) in achieving the research objectives and test research hypothesis. The chapter also focuses on methods that were applied to analyze the collected data and ethical considerations for the study.

3.2. Research design

According to Migwi (2012), research design is the logic or master plan of research that throws light on how the study is to be conducted. It shows how all the major parts of the research study—the samples or groups, measures, treatments or programs, work together to address the research questions. A research design is not just a work plan, it consists of details of what must be done to complete the project. The work plan will flow from the project's research design. Without attending to these research design matters at the beginning, the conclusions drawn will normally be weak and unconvincing and fail to answer the research question or hypothesis (Bryant, 2017). The study adopted a descriptive research design, as it attempted to describe how cybersecurity affects citizens' adoption to e-commerce service. Previous studies suggest that cybersecurity is one major factor affecting consumers' decision to adopt e-commerce services. By adopting descriptive research design, the researcher was able to describe how cybersecurity affects people in Vhembe district on the adoption and use of e-commerce service.

3.3. Research methodology

This study employed a quantitative research method. The quantitative approach allowed the researcher to examine the relationships between the variables. The study examined the relationship between cybersecurity and adoption of e-commerce. Consumer's age, level of education and prior experience were also employed as moderators this relationship. Quantitative method is typically used to gather quantitative data, data that can be sorted, classified, or measured (MacDonald & Headlam, 2011). According to Church and Rogers (2006), quantitative research involves the use and analysis of numerical data using statistical techniques, and quantitative researches pose questions of who, what, when, where, how much, how many, and how. It is independent of the researcher and one should get similar results no

matter who carries out the study. According to Tashakkori and Teddlie (2003), the basic building blocks of quantitative research are variables (e.g. gender, level of education and reject to use e-commerce services). In this study, variables such as age and level of education were used to test if they affect citizens' perception (trust, security, and privacy) on e-commerce technology. A quantitative approach allowed the researcher to collect quantitative data in the quest to describe how cybersecurity affects the adoption of e-commerce technology.

According to Sukamolson (2005), quantitative research generally focuses on measuring social reality. The study is aimed at getting a better understanding of the effects of cyber security on the community of Vhembe district in consumers' decision to adopt the service. The researcher designed a questionnaire to collect data from the participants. The questionnaire was comprised of three sections. The first section required participants to provide their demographic information and internet accessibility, and the second section required participants to provide information about usage and adoption of e-commerce service, then the last section was focusing on the user perception on e-commerce service. In total, 200 questionnaires were distributed to citizens on a referral method.

3.4. Target population

According to Cox (2011), the target population for a survey is the entire set of units for which the survey data are to be used to make inferences. Thus, the target population defines those units for which the findings of the survey are meant to generalize (Garson, 2012). Target populations must be specifically defined, and geographic and temporal characteristics of the target population must be described, as well as types of units being included. This study targeted customers in Vhembe district, Limpopo province, South Africa. The focus areas for this study were Thohoyandou, Malamulele, Makhado, Musina and surrounding villages.

3.5. Sampling and sample size

In any research conducted, people, places, and things are studied. However, the opportunity to study the entire population of those people, places, and things is an attempt that most researchers do not have the time and/or money to undertake (Latham, 2007). To reduce the number of resources used, the study population size needs to be subdivided into groups that are representative and contain all the characteristics of the units under study. The process of subgrouping the study population size is sampling. This process covers the method of selection, the sample structure and plans for analyzing and interpreting the results (Langham, 2001).

According to Barreiro and Albandoz (2017), it is convenient in many instances to use samples, but if the researcher wants to get good conclusions from them, he needs to assure that the right choice of sampling method is made. A sample is a “subgroup of a population” (explorable, 2017). The best sample population is the one which is representative in the sense that each sampled unit will represent the characteristics of a known number of units in the population. Two standard categories of the sampling method exist. These two categories are probability sampling and non-probability sampling (Latham, 2007). According to Bird (2009), Probability sampling is typically associated with quantitative research and non-probability sampling is associated with qualitative research. However, a study can adopt both probability and non-probability sampling techniques.

3.5.1. A multi-stage sampling technique

This study adopted a multi-stage sampling technique, where three sampling techniques were employed. According to Chaturvedi (2000), multistage sampling used frequently when a complete list of all members of the population is unknown. The actual number of e-commerce users and non-users of e-commerce in Vhembe district is not yet documented from previous studies. Therefore, adopting multi-stages sampling technique best suited the study as it allowed the researcher to select first the shopping complexes and villages as primary units on simple random. Thereafter on a later stage, the researcher selected secondary units by identifying participants who meet the characteristics required as seeds of first respondents through convenience sampling. To collect enough participants, referral method was used by identifying participants who are e-commerce users and non-e-commerce users.

The following sampling techniques were used on multi-staging sampling.

3.5.2. Selection of study primary units: simple random

A simple random sampling technique was employed to select the primary units of the study which are local complexes and villages around those complexes on the targeted population. Simple random sampling is a probability sampling technique that requires that each member of the population have an equal chance of being selected (Frerichs, 2008.) The study primary units were the areas around Vhembe district, specifically villages, complexes, schools, government offices and malls which were selected randomly across the district. This included Thulamela, Makhado, Musina and the Lim 345.

3.5.3. Selection of secondary units: referral technique.

The secondary units were selected on a convenience sampling and snowball sampling technique where data was collected from the participants. Convenience sampling was used to select the first subject thereafter it expanded to form a snowball. Latham (2007) stated that snowball sampling is used in those rare cases when the population of interest cannot be easily identified. This also was supported by Katz (2006) who indicated that snowball sampling technique often used in hidden inhabitants which were difficult for researchers to access (such as drug users or commercial sex workers) (Katz, 2006). This sampling technique works like chain referral. After observing the initial subject, the researcher asks for assistance from the subject to help identify people with a similar characteristics.

The study targeted those who use e-commerce and those who do not use e-commerce services. However, to discover if an individual is an e-commerce user or non-users of -e-commerce is not an easy task. As the results, the study sampling was complex and difficult to establish because there were no actual figure of e-commerce users and non-e-commerce documented. Again, there were no previous studies related to the current study. As a result, the researcher relied more on networks and referral on the targeted area. Referral technique was appropriate for this study as it helped the researcher in identifying both e-commerce users and non-users. This study adopted the exponential non-discriminative snowballing sampling as illustrated in Figure 3.1. Adopting exponential non-discriminative snowballing helped the researcher to collect enough participants in the study.

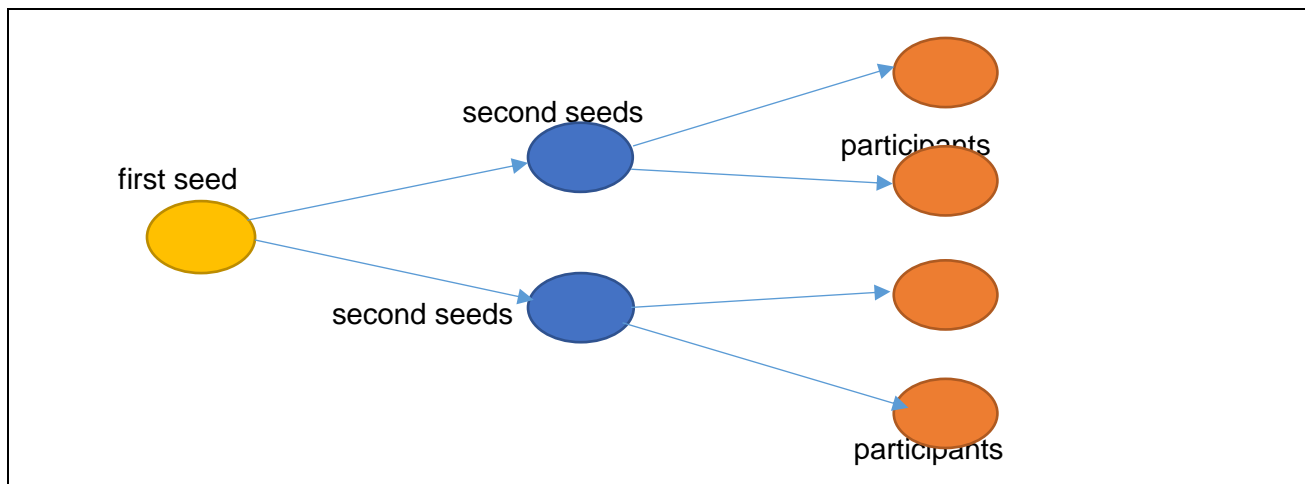


Figure 3-1 Exponential Non-Discriminative

With the exponential non-discriminative snowball sampling, the first participant recruited to the sample group provides multiple referrals. Each new referral is explored until primary data from enough samples are collected. Adopting this sampling method, helped the researcher to distribute more questionnaire quickly to participants as it offers multiple referrals across the targeted population.

3.6. Sample Size

According to Langham (2001), calculating the most appropriate sample size is an important step in the research process. According to Hall (2016), the quality of the sample and, to an extent, of the survey itself depends on the quality of the sampling frame. Selecting a sampling frame that is of high quality and appropriate both to the population being studied and to the data collection method is a key step in a study. However, it is not always easy to draw a sample size as it depends on the kind of study one is undertaking. The study population is considered hidden, as there is no clear figure of the population on non-users of e-commerce and users of e-commerce services. The study adopted Cochran's formula because the population of e-commerce users and non-users of e-commerce is unknown. This formula allowed the researcher to assume on this variability with a 95% confidence level and 6% error margin.

Cochran for unknown population

$$n_0 = Z^2 pq / e^2$$

Where n_0 is the sample size, z^2 is the abscissa of the normal curve that cuts off an area α at the tails ($1 - \alpha$ equals the desired confidence level, e.g., 95%) 1, e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is $1-p$ (Israel, 1992).

The researcher assumed the population size as unknown. The study adopts the formula developed by Cochran (1963:75) to calculate the sample size for an unknown population with the estimated proportion of the population ($p=.5$) at a 95% confidence level and $\pm 5\%$ level of precision. Using the above Cochran formula and dealing with an unknown population size, a minimum number (n_0) of 200 participants were involved in this study.

3.7. Data Collection

Data collection refers to the process by which the researcher collects the information needed to answer the research questions or problems (Awaisu, 2013). The study used a questionnaire for data collection. Using questionnaires as a data collection instrument allowed the researcher to

collect a large amount of data in a short space of time. The questionnaire was subdivided into sections where respondents were asked to give their demographic information such as gender and age. However, they were not expected to disclose their names or ID numbers. Section B asked participants about adoption to e-commerce, if they buy a product online or not. The last section (C) covered participants' perception of e-commerce.

3.7.1. Questionnaire

A questionnaire is a data collection instrument that consists of a series of questions and other prompts for gathering information from respondents (Abawi, 2013). According to Bird (2009), a questionnaire is a well-established tool within social science research for acquiring information on participant social characteristics, present and past behavior, standards of behavior or attitudes and their beliefs and reasons for action with respect to the topic under investigation. The questionnaire composed by both open and close-ended questions. According to Evaluation Brief, (2008), questionnaires are helpful in gathering information that is unique to individuals, such as attitudes or knowledge, and are helpful in maintaining participants' privacy because participants' responses can be anonymous or confidential. The questionnaire is ideal tool for many of those engaged in quantitative research and best suited this study as it often provides a cheap and effective way of collecting data in a structured and manageable form. It is used when collecting data from a big sample size. The researchers designed the questionnaire composed of three sections. Section A required demographic information and internet adoption from the participants. Section B focused on the adoption of e-commerce service, and the last section was focusing on consumer perception on e-commerce service. The questionnaire constituted questions that helped the researcher to test the study hypothesis and comprised of close-ended questions in relation to research objectives and the study hypothesis. Two hundred questionnaires were distributed on a snowball method.

3.7.2. Pilot Study

A pilot study allows the researcher to identify the errors and undesirable trends that might be in the questionnaire, and it helps better the design of the questionnaire (Mathiyazhagan & Nandan, 2010). See Appendix D for the Questionnaire. A pilot study is a small investigation to test the feasibility of instruments and procedures and to collect information prior to a larger study (Hertzog, 2008). The questionnaire shall be pilot tested before it is finally distributed. A pilot test was carried out to 10 e-commerce users and 5 non-e-commerce users at Thohoyandou and Sibasa. The 15 distributed questionnaires provided some valuable feedback that assisted the researcher to realise some omitted valuable questions, and adjustments were made.

3.8. Data Quality Control

Reliability and Validity are important concepts in research as they are used for enhancing the accuracy of the assessment and evaluation of research work (Adefioye, 2017). According to Golafshani (2003), quantitative research strives to present valid and reliable research finding. Reliability refers to the consistency of a measure. A questionnaire or test is considered reliable if the same result is obtained repeatedly when the questionnaire is re-administered or tested. Reliability can be estimated in two-way Test/Retest Test and Internal Consistency. Test/ Retest Test is the more conservative method to estimate reliability. Simply put, the idea behind test/retest is that you should get the same score on test 1 as you do on test 2. Reliability analysis will be tested using the Cronbach's Alpha in measuring the reliability of my construct variable in my questionnaire.

According to Hammersley (1987), validity represents the extent to which an instrument measures the property it is intended to measure. Validity is defined as the extent to which a concept is accurately measured in a quantitative study. According to Twycross and Heale (2015), there are several measures of validity that provide evidence of the quality of a study. Internal and external validity relates to the overall study design. Internal validity relates to the extent to which the design of a research study is a good test of the hypothesis or is appropriate for the research questions. External validity, meanwhile, relates to whether research findings can be generalized beyond the immediate study sample and setting. Explanatory factors analysis will be used to test validity (KMO test).

3.9. Data Analysis

Analysis of data is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Quantitative research makes use of questionnaires, surveys, and experiments to gather data that is revised and tabulated in numbers, which allows the data to be characterized using statistical analysis. The study adopted a quantitative approach using descriptive statistics (results are to be presented in a numeric form, in the form of graphs, pie chart, and cross-tables). For this study, the IBM Statistical Package for the Social Sciences (SPSS) for statistical analysis due to its strength in performing all the statistical analysis required for testing the hypothesis for this study.

3.10. Ethical Considerations

Knowing what constitutes ethical research is important for all people who conduct research projects or use and apply the results from research findings. All researchers should be familiar

with the basic ethical principles and have up-to-date knowledge about policies and procedures designed to ensure the safety of research subjects and to prevent sloppy and irresponsible research (University of Minnesota, 2003). The research process can create tension between the aim of generalizing the findings and the rights to privacy of participants. Ethics pertains to doing well and avoiding harm. Harm can be prevented or reduced through the application of appropriate ethical principles (Orb, Eisenhauer & Wynaden, 2000). This study was guided by the ethical clearance letter (see Appendix D) issued by the Univen Higher Degrees Committee and all respondents were issued with consent letters (see Appendix C) that stipulate that this research was purely academic without financial implications or payment for participating. Moreover, the longer consent letter will clearly specify that participants are free to withdraw whenever they feel that they can no longer continue with the survey.

3.11. Summary

This chapter outlined the research methodology which involves the data collection and analysis methods and techniques. The study targeted online consumers in Vhembe district of Limpopo and the sample was drawn from selected complexes and other surrounding villages across the district. Two sampling techniques were used to draw up a sample; simple random was used to select the primary units of the study and snowball was used in a secondary unit's selection. Data was collected by means of a self-administered questionnaire composed of three sections and 30 questions. SPSS was used to analyze the data of this study. A pilot test was conducted to test the questionnaire and administered to 10 online consumers around Sibasa and Thohoyandou. Validity and reliability of the instrument were also outlined in this chapter.

CHAPTER 4: ANALYSIS AND INTERPRETATION

4.1. Introduction

The chapter focuses on analyzing and interpreting the study findings on how cybersecurity affects consumer's adoption to e-commerce service. The study was carried out on both e-commerce non-users and e-commerce users. In the research study, a total number of 200 questionnaires were distributed to consumers who live within Vhembe district of Limpopo province, of which 161 questionnaires were adequate. Out of 161, 73 questionnaires were completed by e-commerce users and 88 were completed by non-users through the referral method of collecting data. Out of 200 questionnaires distributed, 21 were incomplete and there we considered inadequate and 18 were not returned. Data were analyzed using SPSS version 26 in which the closed-ended questions were assigned numbers. The results were shown through the output in the form of cross tables, correlation, and graphs. The results are presented in two sections. Section A presents the results for non-users of e-commerce and section B presents results for e-commerce users.

4.2. Section A: Non-users of E-commerce

4.2.1. Reliability Analysis

This study used the Cronbach's Alpha (Dunning and Parsian, 2009) to measure the reliability of the constructs of the survey instrument. The Cronbach Alpha output of 0.754 in Table 4.1 shows that tool is reliable as it is greater than 0.7 variance which is acceptable for a new instrument (Parsian & Dunning, 2009). This proves that the question on each construct was consistent as indicated by total item statistics (see Table F.1 in annexure F)

Table 4.1 Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.754	12

4.3. Construct Validity

Construct validity refers to the degree to which the items on an instrument relate to the relevant theoretical construct (Kane 2001; DeVon et al. 2007). Construct validity is a quantitative value rather than a qualitative distinction between 'valid' and 'invalid'. The factor analysis was conducted to test the validity between multiple variables to test the relationship between security perception construct, trust, privacy, intention to use and actual use.

4.3.1. Correlation Matrix of non-users of e-commerce.

The sample size for factor analysis was 88 for non-e-commerce users collected around Vhembe district on a snowball technique. The correlation matrix in Table F.2 in annexure F shows how each of the 13-e-commerce security, trust and privacy perceptions items associates with 12 others.

4.3.2. Table 4-2: KMO and Bartlett's Tests for non-users of e-commerce.

Table 4.2: KMO and Bartlett's Tests for non-users of e-commerce.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.693
Bartlett's Test of Sphericity	Approx. Chi-Square	296.175
	Df	78
	Sig.	.000

For the KMO measure in Table 4.2, it was found that it covered at 0.635 greater than 0.50 and for Bartlett test our significant value is less than 0.5 as we have 0.000, showing that our variables are correlating enough to provide a reasonable factor analysis. Our factor analysis shows a 69.1% total variance (Table 4.3), which means at least 50% of the variance could be explained by common factors and is reasonable. It shows a total of five-factor with Eigenvalue of greater than 1.

Table 4.3: Total Variance for (non-users of e-commerce)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative e %	Total	% of Variance	Cumulative e %	Total	% of Variance	Cumulative e %
1	3.454	26.567	26.567	3.454	26.567	26.567	2.319	17.836	17.836
2	1.690	12.997	39.564	1.690	12.997	39.564	2.070	15.920	33.756
3	1.612	12.403	51.967	1.612	12.403	51.967	1.805	13.883	47.639
4	1.159	8.919	60.886	1.159	8.919	60.886	1.478	11.370	59.009
5	1.077	8.283	69.169	1.077	8.283	69.169	1.321	10.160	69.169
6	.776	5.966	75.136						
7	.736	5.663	80.799						
8	.620	4.766	85.565						
9	.519	3.989	89.554						
10	.424	3.263	92.817						
11	.369	2.838	95.656						
12	.300	2.305	97.961						
13	.265	2.039	100.000						

Extraction Method: Principal Component Analysis.

4.4. Variable Analysis (Non-users of e-commerce)

To make data more representable, the researcher grouped it according to the constructs (Perceived Security, Perceived Trust, Perceived Privacy and the Intention to Use).

4.4.1. Perceived Security.

Passwords and usernames are considered to be the first line of defense on websites accounts on the users' side. They are the basic security measures on websites accounts used to guard against any unauthorized access to one's website account. However, even though there have been advances in security technology, password and username remains a constant aspect and still play a central role in system security (Cazier, Carolina, Medlin & Carolina, 2006). On registration and login, website users are always asked to provide passwords and usernames that meet

specific standards. As the first line of defense on the user side, it is important to understand how consumers perceived them on securing e-commerce systems account, and their effects on their intention to adopt e-commerce service.

Table 4.4: Basic Security Measures * Intend to use e-commerce systems.

		<i>Intend to use ecommerce as soon as possible</i>					<i>Total</i>	
		<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>		
Passwords and user names make online website more secured.	Strongly agree	<i>Count</i>	2	8	8	1	3	22
		<i>% of Total</i>	2.3%	9.1%	9.1%	1.1%	3.4%	25.0%
	Agree	<i>Count</i>	2	10	12	4	1	29
		<i>% of Total</i>	2.3%	11.4%	13.6%	4.5%	1.1%	33.0%
	Neutral	<i>Count</i>	1	8	14	1	2	26
		<i>% of Total</i>	1.1%	9.1%	15.9%	1.1%	2.3%	29.5%
	Disagree	<i>Count</i>	0	4	6	0	1	11
		<i>% of Total</i>	0.0%	4.5%	6.8%	0.0%	1.1%	12.5%
Total		<i>Count</i>	5	30	40	6	7	88
		<i>% of Total</i>	5.7%	34.1%	45.5%	6.8%	8.0%	100.0%

The reluctance to use e-commerce systems is due to consumers suspicions regarding the level of protection offered when performing online transactions (Mekovec and Hutinski, 2012). The results in Table 4.4 show that most of non-users of e-commerce (58.0%) believe in passwords and usernames as basic security measures to protect online accounts. However, 39.8% of the participants showed a positive intention to use e-commerce systems anytime soon, with 13.8% show a negative intention to use e-commerce systems. The results also showed a significant number of non-users (45.5%) of e-commerce who were in doubt about their intent to use the system as soon as possible. This disparity between security perception and the intention to use e-commerce systems suggests that the reluctance to use e-commerce systems might also be determined by other factors. This is in line with the findings by Mahmood, Dominic, and Thaw (2009) who suggest that consumers' lack of acceptance in electronic commerce adoption today is not merely due to the concern on security and privacy of their personal data, but also lack of trust and reliability of Web vendors. As was indicated by Yu, Zhang, Southern, and Joiner (2001), individual characteristic such as gender, educational background, e-commerce experience,

income, and age affect consumer's attitude towards safety and security on e-commerce systems. It was therefore necessary to analyse consumers' age, prior experience on internet and education level as moderator on security perception.

4.4.1.1. Basic Security Measures (Password and Username) and consumers age

Age and education are associated differentially with certain beliefs about the Internet that mediate consumer attitudes toward and, ultimately, use of the Internet (Porter & Donthu, 2006). The results in Table 4.5 show the significant number of participants (58%) who believed that the usernames and password make internet services more secured. We also realised a significant number of participants (29.5%) who were not sure if passwords and usernames are making internet services more secured.

Table 4.5: Age of Participants * Basic Security measures (passwords and usernames)

			<i>Passwords and user names make the online website more secured</i>				Total	
			Strongly agree	Agree	Neutral	Disagree		
Age of Participants	Above 15 years and below 20 year old	Count	6	5	2	2	15	
		% of Total	6.8%	5.7%	2.3%	2.3%	17.0%	
	Above 21 years and below 29 year old	Count	8	16	13	2	39	
		% of Total	9.1%	18.2%	14.8%	2.3%	44.3%	
	Above 30 years and below 39 year old	Count	4	5	4	4	17	
		% of Total	4.5%	5.7%	4.5%	4.5%	19.3%	
	Above 40 years and below 45 year old	Count	3	2	4	3	12	
		% of Total	3.4%	2.3%	4.5%	3.4%	13.6%	
	46 years and above	Count	1	1	3	0	5	
		% of Total	1.1%	1.1%	3.4%	0.0%	5.7%	
	Total		Count	22	29	26	11	88
			% of Total	25.0%	33.0%	29.5%	12.5%	100.0%

The study was dominated by participants between the ages of 21 and 29. Surprisingly, the study found a slight difference in the level of perception on password and username between participants who were below the age 20 and the ones above the age of 45; the results show that most of older people seemed not to be sure if passwords and usernames make Internet services

more secured. The results also indicate that 12.5% of participants have a lower perception on passwords and usernames. We also realized that none of the participants above the age of 45 have a lower perception on passwords and username. The results did not show any significant relationship between non-users of e-commerce age and their perception on password and username.

4.4.1.2. Basic Security Measures (Password and Username) and consumers level of education.

Consumer's comfort level, the feeling of security and their attitudes towards e-commerce services are correlated with the customers' level of education (Jalal, Marzooq & Nabi, 2011). Furthermore, security and privacy were also found to be major sources of dissatisfaction and play an important role in determining the users' acceptance of e-commerce services with respect to different segmentation of age group, education level, and income level. Figure 4.1 shows the distribution between non-users of e-commerce systems' level of education and their perception level on password and username.

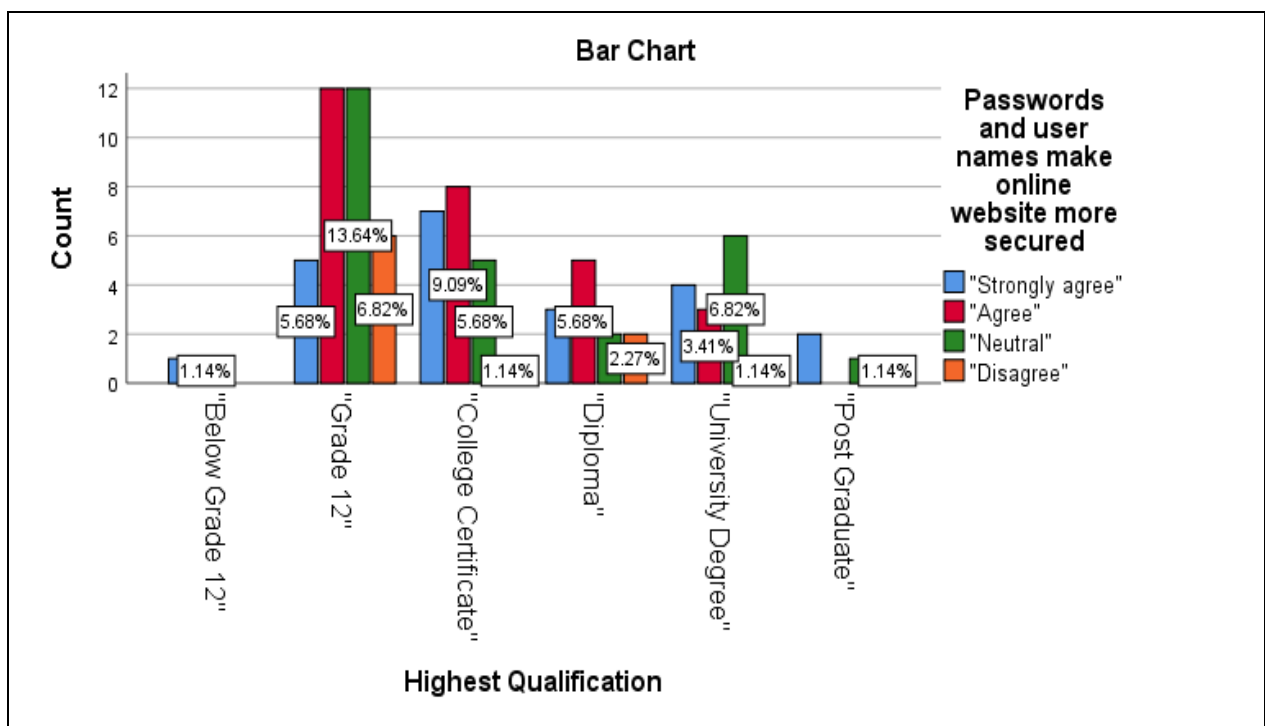


Figure 4-1: Highest Qualification* Password and Username.

The results in Figure 4-1 show that there is no difference in the level of perception between the highest level of education and the lowest level of education. The study was dominated by participants who have completed grade 12. Interestingly, there is little difference between participants who have not yet completed grade 12 and postgraduates on how they perceived basic security measures (passwords and username) higher. Our sample size was consisted of 4 postgraduates' non-user of e-commerce, and 2.3% perceived passwords and usernames high.

4.4.2. ISP's technologies and capabilities

The literature review outlined security as one of the major determinants on the adoption of e-commerce services, hence retailers are taking different measures to prevent attacks against their systems (Reddy & Reddy, 2014). This means that not only consumers are responsible for securing online transactions but also the retailers. However, Kaapu and Tiainen (2009) suggested that consumers' trust to the e-vendors' ability to protect consumers' information is rather low as consumers usually blames the e-vendors for not taking good care of their information. The study target area is largely dominated by rural areas, which is one of the characteristics of a developing country. With the continuous embracing of technology in businesses more especially the Internet, Internet Service Providers are now playing a central role in promoting e-commerce as far as in rural communities. However, we need to understand how the ISP's effort to offer secured online services is affecting consumer's perception on the secureness of these online purchasing systems.

4.4.2.1. Age * Trust in ISP technologies for Online Transactions

In the results on Table 4.6, it was found that most of the non-e-commerce users (62.5%) have a higher perception in ISP's security technologies and capabilities to offer secured services. However, we also realized a significant number of non-users who are not sure about ISP security technologies. This means that a significant number of non-users are not using e-commerce because they are not sure if online websites are well equipped to protect their transaction and personal information. We also realized a slight difference between youth and older people on their level of perception.

Table 4.6: Age * ISP technologies for Online Transactions.

			<i>Participants perception on trusting ISP technologies for Online Transactions</i>					Total	
			Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
Age of Participants	Above 15 years and below 20 year old	Count	1	10	3	1	0	15	
		% of Total	1.1%	11.4%	3.4%	1.1%	0.0%	17.0%	
	Above 21 years and below 29 year old	Count	7	19	12	1	0	39	
		% of Total	8.0%	21.6%	13.6%	1.1%	0.0%	44.3%	
	Above 30 years and below 39 year old	Count	2	3	7	2	3	17	
		% of Total	2.3%	3.4%	8.0%	2.3%	3.4%	19.3%	
	Above 40 years and below 45 year old	Count	2	7	0	3	0	12	
		% of Total	2.3%	8.0%	0.0%	3.4%	0.0%	13.6%	
	46 years and above	Count	3	1	1	0	0	5	
		% of Total	3.4%	1.1%	1.1%	0.0%	0.0%	5.7%	
	Total		Count	15	40	23	7	3	88
			% of Total	17.0%	45.5%	26.1%	8.0%	3.4%	100.0%

Out of 5 participants above the age of 45, four of them have higher perception of ISP's technologies which is equal to or more than the participants between the age of 15 and 20. This means that consumer's age does not have significant impact on perception level on security for non-users of e-commerce.

4.4.2.2. Level of education and Trust in ISP correlation

Table 4.7 presents the correlation between non-users' level of education and their perception on ISP's capabilities. The results in the correlation table shows that there is a weak relationship between the level of education and non-users of e-commerce perception on ISP's technologies in offering secured services. The results show an $R=.050$ and $p>.05$. This means that for non-users, the level of education level plays no significant role in determining their perception of ISP's technologies.

Table 4.7: Level of education and Trust in ISP correlation.

		<i>Highest Qualification</i>	<i>Participants perception on trusting ISP technologies for Online Transactions</i>
Highest Qualification	Pearson Correlation	1	.050
	Sig. (2-tailed)		.646
	N	88	88
Participants perception on trusting ISP technologies for Online Transactions	Pearson Correlation	.050	1
	Sig. (2-tailed)	.646	
	N	88	88

Key: R= Pearson Correlation, P = Sig. (2-tailed).

4.4.3. Perceived Privacy

Kim, Chung and Lee (2010), suggested that most consumers are unwilling to use e-commerce services because they fear to compromise their financial and personal information when submitted to e-commerce websites. Privacy concerns are one of the major critical reasons as to why some people do not go on and make purchases online and the reason why people always provide false information when they are online (Gupta & Dubey, 2016). This supports the findings of Cazier, Carolina Medlin and Carolina (2006) who indicated that not all customers are willing to give up their personal information online, and many are shying away from electronic commerce as a result.

4.4.3.1. Tempering with confidential information * Intention to use e-commerce systems

Table 4.8: Tempering with confidential information* Intention to use e-commerce systems.

		<i>Intend to use ecommerce as soon as possible</i>					Total	
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
Participants perception on tempering with confidential Info	Strongly agree	Count	1	3	5	0	1	10
		% of Total	1.1%	3.4%	5.7%	0.0%	1.1%	11.4%
	Agree	Count	2	6	6	0	2	16
		% of Total	2.3%	6.8%	6.8%	0.0%	2.3%	18.2%
	Neutral	Count	2	14	21	3	2	42
		% of Total	2.3%	15.9%	23.9%	3.4%	2.3%	47.7%
	Disagree	Count	0	4	4	3	2	13
		% of Total	0.0%	4.5%	4.5%	3.4%	2.3%	14.8%
Strongly disagree	Count	0	3	4	0	0	7	
	% of Total	0.0%	3.4%	4.5%	0.0%	0.0%	8.0%	
Total		Count	5	30	40	6	7	88
		% of Total	5.7%	34.1%	45.5%	6.8%	8.0%	100.0%

Table 4.8 shows that non-users of e-commerce systems are not sure if their personal information can be tempered with when conducting online shopping. This also affects their intention to use e-commerce systems any time soon. The results also suggest that about 45% of non-users of e-commerce systems are not sure about what happened to their information. This could indicate that they lack knowledge about e-commerce systems. The results are in line with the findings by Almeida de Almeda, Avila and Boncanoska (2007) who indicated that the adoption of e-commerce systems in developing countries have fallen behind because of lack of investment within firms to acquire technology, lack of promotion policies and awareness that develop these technological areas.

4.4.3.2. Consumers Age * Tempering with confidential Information

Age is an important factor in analyzing privacy concerns since younger age groups tend to have lower privacy concerns than older age groups (Muchira et al., 2004). Table 4.9 presents the non-users of e-commerce age and their perception on tempering with confidential information when purchasing products or services over the internet.

Table 4.9: Age * Tempering with confidential information.

			Participants perception on tempering with confidential Info					Total
			"Strongly agree"	"Agree"	"Neutral"	"Disagree"	"Strongly disagree"	
Age of Participants	above 15 years and below 20 year old	Count	3	2	5	4	1	15
		% of Total	3.4%	2.3%	5.7%	4.5%	1.1%	17.0%
	above 21 years and below 29 year old	Count	3	6	21	6	3	39
		% of Total	3.4%	6.8%	23.9%	6.8%	3.4%	44.3%
	above 30 years and below 39 year old	Count	3	4	7	1	2	17
		% of Total	3.4%	4.5%	8.0%	1.1%	2.3%	19.3%
	above 40 years and below 45 year old	Count	1	3	7	1	0	12
		% of Total	1.1%	3.4%	8.0%	1.1%	0.0%	13.6%
	46 years and above	Count	0	1	2	1	1	5
		% of Total	0.0%	1.1%	2.3%	1.1%	1.1%	5.7%
	Total	Count	10	16	42	13	7	88
		% of Total	11.4%	18.2%	47.7%	14.8%	8.0%	100.0%

The results in Table 4.9 show that most of our participants (47.7%) are not sure about how their information is handled by their e-commerce websites host. We also realised a significant difference between participants' ages on their level of perception. Only 1.1% of the non e-commerce user above the age of forty has a higher perception on their data integrity when hosted by e-commerce websites. However, 5.7% of younger people (between fifteen and twenty) have a higher perception of data integrity. About 23% percent of participants have a lower perception on the integrity of information submitted to websites, hence some are ending up giving incorrect personal information.

4.4.3.3. Level of education* Tempering with confidential Information.

Figure 4.2 indicates the distribution between non-users of e-commerce system level of education and their perception on tempering with confidential information.

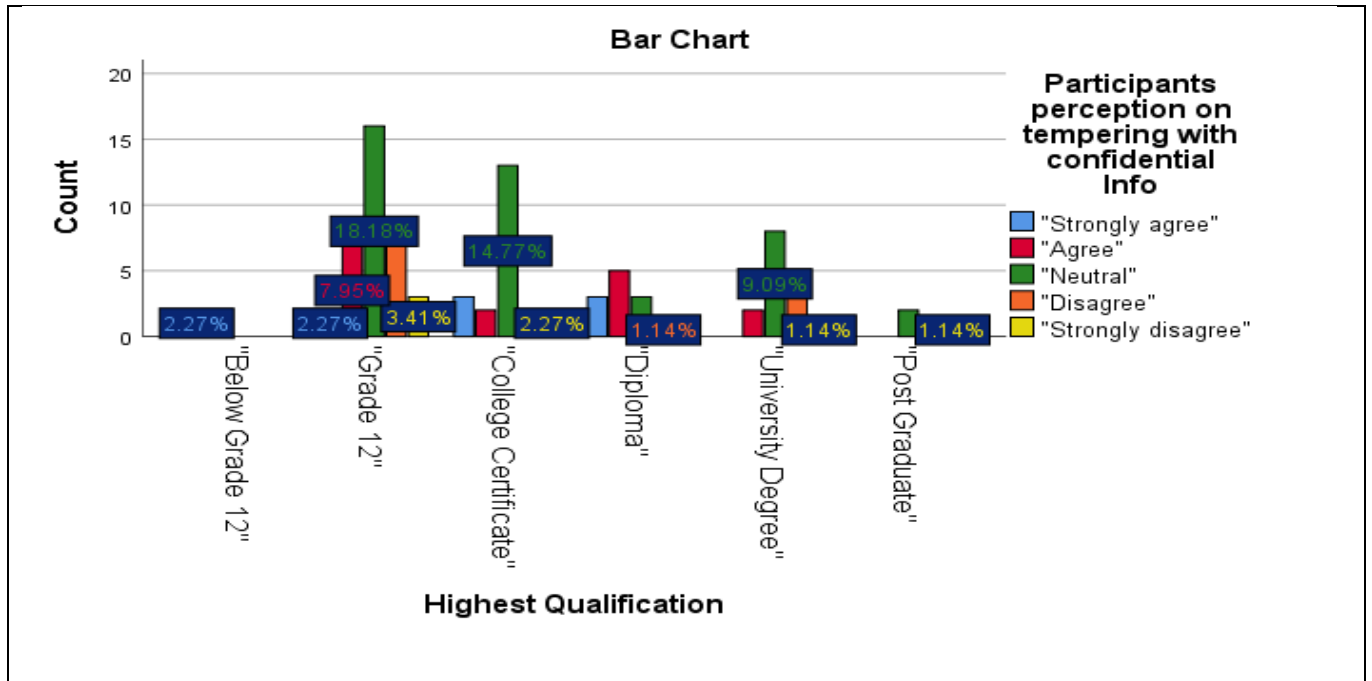


Figure 4-2 : Highest Qualification* Tempering with confidential information

The results in Figure 4.2 show some interesting suggestions as there is a significant difference between level of education and perception on information or data integrity when hosted by e-commerce websites. 30% of the participants have a higher perception on the information integrity and they believe that their information cannot be tempered with whilst on storage. However, all postgraduates believe that information can be tempered with while hosted on websites. Surprisingly, participants with only grade 12 and those below grade 12 (secondary level students) have a higher perception of data integrity. This means that the level of education on non-users of e-commerce has less impact on their privacy perception.

4.4.4. Perceived Trust

Thaw, Mahmood and Dominic (2009), pointed out that lack of acceptance in electronic commerce adoption today is not merely due to the concern on security and privacy of their personal data, but also lack of trust and reliability, as consumers' trust in online transactions is crucial for the continuous growth and development of electronic commerce. If customers believe that the ISP has the required experience, knowledge, and skills to carry out banking operations and

transactions, and consider customers' interest and trust in its business priorities, then their trust will be increased (Damghanian, Zarei & Kojuri, 2016).

4.4.4.1. Independent test.

Table 4.10 and Table 4.11 present the independent test to test the relationship between consumers' perception of e-commerce as a financial risk and their intention to use e-commerce systems. Furthermore Table 4.10 represents the mean difference between consumers who perceive e-commerce as a financial risk and intention to use and those who believed that e-commerce is not a financial risk and the intention to use e-commerce system.

Table 4.10: Perceived trust mean difference of non-users of e-commerce

	<i>Online purchase is a financial risk</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>
Intend to use e-commerce	Agree	3	1.33	.577	.333
	Disagree	30	3.17	1.117	.204

Table 4.11: Independent sample test

		<i>Levene's Test for Equality of Variances</i>		<i>t-test for Equality of Means</i>						
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>Df</i>	<i>Sig. (2-tailed)</i>	<i>Mean Difference</i>	<i>Std. Error Difference</i>	<i>95% Confidence Interval of the Difference</i>	
									<i>Lower</i>	<i>Upper</i>
Intend to use e-commerce	Equal variances assumed	1.209	.280	-2.778	31	.009	-1.833	.660	-3.180	-.487
	Equal variances not assumed			-4.692	3.740	.011	-1.833	.391	-2.949	-.718

Key: R= Sig., p= Sig. (2-tailed).

The independent test in Table 4.11 shows a moderate positive relationship between participants who either have a higher perception of financial risk on e-commerce transactions or low

perception and the intention to use e-commerce. The result shows $R=.280$ and $p<.05$. The independent results are significant, meaning that participants with higher perception of financial risk will have a low intention in the use of e-commerce. This is in line with Mwesigwa (2010) who mentioned that lack of trust has been one of the most significant reasons for customer not adopting online services involving financial exchanges. Previous research suggested that online customers generally stay away from vendors whom they do not trust.

4.4.4.2. Age* Financial risk.

Trust in e-commerce depends on age factor (Yoon, Occe~na.et al, 2015). The system should be able to instill confidence to the user that transmission of funds will be processed with no interception by unauthorized individuals. Table 4.12 presents the cross-table results between consumers' age and perception on financial risk.

Table 4.12: Age* Online purchase is a financial risk.

		<i>Online purchase is not a financial risk</i>					Total	
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
Age of Participants	above 15 years and below 20 year old	Count	2	2	3	4	4	15
		% Total	2.3%	2.3%	3.4%	4.5%	4.5%	17.0%
	above 21 years and below 29 year old	Count	3	1	9	15	11	39
		% Total	3.4%	1.1%	10.2%	17.0%	12.5%	44.3%
	above 30 years and below 39 year old	Count	1	0	6	6	4	17
		% Total	1.1%	0.0%	6.8%	6.8%	4.5%	19.3%
	above 40 years and below 45 year old	Count	1	0	6	4	1	12
		% Total	1.1%	0.0%	6.8%	4.5%	1.1%	13.6%
	46 years and above	Count	0	0	4	1	0	5
		% Total	0.0%	0.0%	4.5%	1.1%	0.0%	5.7%
	Total	Count	7	3	28	30	20	88
		% Total	8.0%	3.4%	31.8%	34.1%	22.7%	100.0%

The results in Table 4-12 show that about 56.7% of participants have a higher perception of online transactions risk. The higher the perception in the financial risk, the lower intention to use or actual use of e-commerce systems. According to Pelau and Bena (2010), younger people are more likely to show more intention to make a transaction on the Internet and their perception of risk is very low. 17% of participants (non-users of e-commerce) are between the ages of 15 and 20. However, the study results show that 9% of youth between the age of 15 and 20 believe that purchasing products online will cause a financial risk. Surprisingly, for the older participants (5.7%), most of them (4.5%) are not sure if shopping online will not cause a financial risk. The study results do not show a significant relationship between consumers' age and perceived trust.

4.4.5. Aware of Online Security Measures.

Several studies acknowledged that adoption of e-commerce systems is determined by the level of awareness that a user has about e-commerce systems and its possible benefits (Hussein & Saad, 2016). The regression analysis was conducted to test if nonusers of e-commerce systems awareness affects their intention to continue purchasing products online.

4.4.5.1. Regression analysis.

Table 4.13 and Table 4.14 present the regression analysis to test if awareness of online shopping and security measures affects their intention to continue purchasing products online.

Table 4.13: Model summary of consumers' awareness on security measures.

<i>Model</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>
1	.293 ^a	.086	.075	.919
a. Predictors: (Constant), Aware of online shopping and security measures				

Table 4.13 indicates that 86% of total variation in intention to use e-commerce as soon as possible is explained by awareness of online shopping and security measures.

Table 4.14: Coefficients (Intention to use e-commerce systems)

Model		Coefficients ^a		Standardized Coefficients	T	Sig.
		Unstandardized Coefficients	Std. Error			
		B		Beta		
1	(Constant)	1.973	.298		6.623	.000
	Aware of online shopping and security measures	.327	.115	.293	2.844	.006

a. Dependent Variable: Intend to use e-commerce as soon as possible

Key: $\beta=B$, $p= Sig.$

Our results in Table 4.14 show a weak relationship between awareness of internet attacks and the intention to use e-commerce services as soon as possible, with $\beta =1973$ and $p<.05$. This means that there is significant amount of evidence which prove that consumers' awareness of online shopping and security measures affects their intention to use e-commerce service sooner.

4.4.5.2. Level of highest qualification and awareness of online security measures.

Figure 4-3 presents the distribution between non-users of e-commerce system level of education and their awareness of e-commerce systems and security measures.

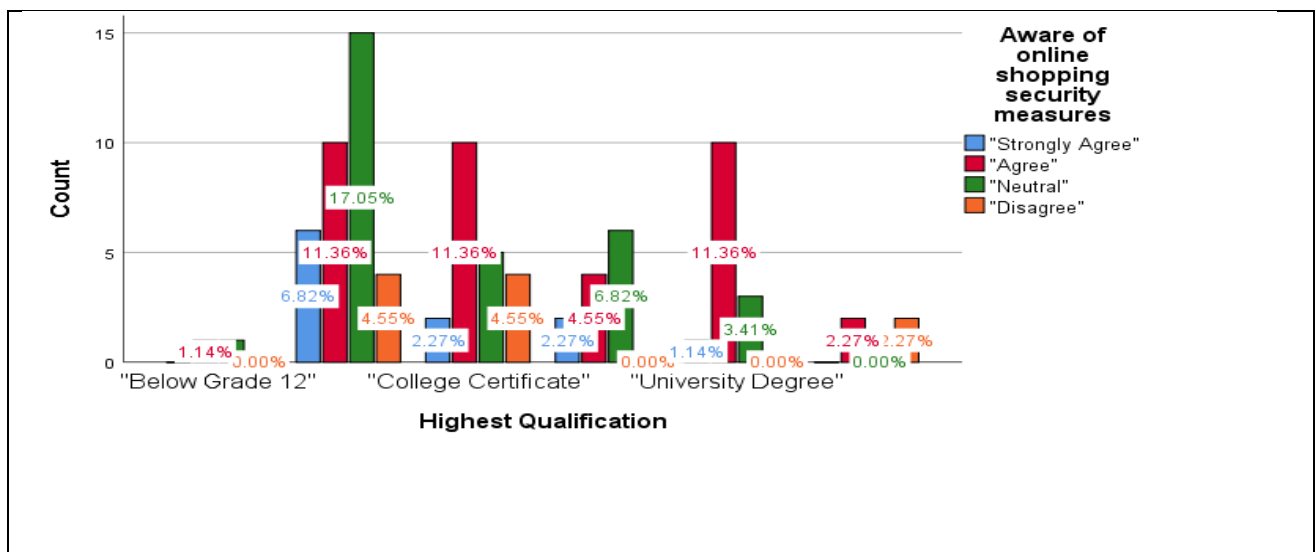


Figure 4-3 : Level of highest qualification and awareness of online security measures

From findings in Figure 4-3, we have realised that most of our participants (42.0%) know about online security measures. The study results show that some postgraduates who are non-users of e-commerce are not aware of available e-commerce systems security measures. From the 4 participants with postgraduate level of study, one of them indicated that they are aware of these security measures. This means that for non-e-commerce users' level of education do determine the awareness of Internet security measures.

4.4.5.3. Reasons for not purchasing

Most of our participants indicated that the reason they are not buying products online is that they are scared to use. This may be in line with what Uwemi and Khan (2016) suggested that the negative attitude on consumers toward e-commerce is because of fear, fraud and online crime. This proves that even though security is one of the main factors in affecting consumers in adopting e-commerce, there are some factors that also play a major role in e-commerce adoption such as privacy, security, and trust that has been established as factors affecting customer's adoption on online purchasing systems. The results in Figure 4-4 also show that perceived usefulness of the e-commerce system is not their main concern affecting their intention to use e-commerce systems. The results show that 12.5% of our participants are not purchasing online because they believe that purchasing online is complex and difficult to do.

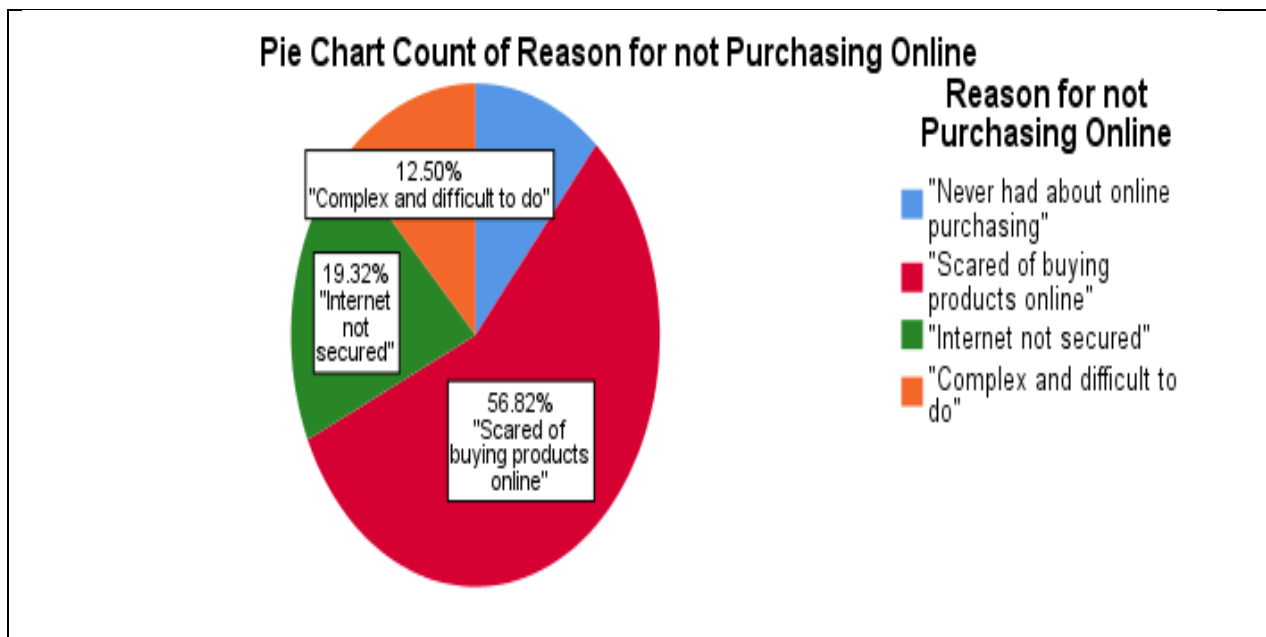


Figure 4-4 : Reason for not purchasing.

4.5. Hypothesis Testing.

Table 4.15 presents correlation between non-users of e-commerce systems' personal characteristics variables and their attitude towards e-commerce system. The correlation results were very significant for hypothesis test.

Table 4.15: Correlation of non-users of e-commerce systems.

		Age	Qualification	Occupation Status	Online purchase is a financial risk	Tempering with confidential info	Intention to use e-commerce	ISP's well equipped to offer secured online service	Participants perception of e-commerce trustworthy
Age	Pearson Correlation	1	.346**	.373**	-.072	-.008	.112	.171	.042
	Sig. (2-tailed)		.001	.000	.508	.941	.301	.112	.701
	N	88	88	88	88	88	88	88	88
Qualification	Pearson Correlation	.346**	1	.285**	.025	.104	.131	.179	.097
	Sig. (2-tailed)	.001		.007	.816	.333	.224	.094	.368
	N	88	88	88	88	88	88	88	88
Occupation Status	Pearson Correlation	.373**	.285**	1	.017	-.137	.058	.022	-.024
	Sig. (2-tailed)	.000	.007		.872	.204	.594	.842	.825
	N	88	88	88	88	88	88	88	88
Online purchase is a financial risk	Pearson Correlation	-.072	.025	.017	1	.072	.128	.236*	.216*
	Sig. (2-tailed)	.508	.816	.872		.502	.236	.027	.043
	N	88	88	88	88	88	88	88	88

Table 4.15(continued)

Participants perception on tempering with confidential Info	Pearson Correlation	-.008	.104	-.137	.072	1	.163	.359**	.480**
	Sig. (2-tailed)	.941	.333	.204	.502		.128	.001	.000
	N	88	88	88	88	88	88	88	88
Intend to continue using e-commerce	Pearson Correlation	.112	.131	.058	.128	.163	1	.242*	.386**
	Sig. (2-tailed)	.301	.224	.594	.236	.128		.023	.000
	N	88	88	88	88	88	88	88	88
ISP's well equipped to offer secured online service	Pearson Correlation	.171	.179	.022	.236*	.359**	.242*	1	.299**
	Sig. (2-tailed)	.112	.094	.842	.027	.001	.023		.005
	N	88	88	88	88	88	88	88	88
Participants perception on e-commerce trustworthy	Pearson Correlation	.042	.097	-.024	.216*	.480**	.386**	.299**	1
	Sig. (2-tailed)	.701	.368	.825	.043	.000	.000	.005	
	N	88	88	88	88	88	88	88	88
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Key: R= Pearson Correlation, P = Sig. (2-tailed).

The following are the study hypothesis tests for non-users of e-commerce systems:

- H_{10} : Consumers' perceived security does not influence their behavior intention to adopt e-commerce.
- H_{11} : Consumers' perceived security influence their behavior intention to adopt e-commerce.

Results: The results in Table 4.15 indicate a positive relationship between consumers perceived security and the intention to use e-commerce services as soon as possible, with $r=.242$ and $p<.05$. This supports the findings by Peiris, Kulkarni and Mawatha (2015) who indicated that, one reason for consumers' reluctance to use e-commerce systems is their concern about security risks in view of the increasing number of security vulnerabilities and poor security measures to protect personal information. There is no significant amount of evidence to accept the null hypothesis. Therefore, Null **hypothesis rejected**.

- *H₂₀: Perceived privacy on e-commerce does not influence consumers' behavior intention*
- *H₂₁: Perceived privacy on e-commerce influences consumers' behavior intention.*

Results: The results in table 4.15 show a positive relationship between consumers perceived privacy and the intention to use e-commerce services as soon as possible, with $r=.163$ and $p>.05$. This means that there is no significant amount of evidence to prove that consumers' perceived privacy influences their intention to use e-commerce systems. **Null hypothesis accepted.**

- *H₃₀: Customers' perception of trust does not influence their behavior intention to adopt e-commerce.*
- *H₃₁: Customers' perception of trust influences their behavior intention to adopt e-commerce.*

Results: The results in table 4.15 show a strong relationship between consumers perception on trust and the intention to use e-commerce services as soon as possible, with $r=.386$ and $p<.05$. This means that consumers' perception of trust strongly influences their behavior intention to adopt e-commerce systems. This is in line with Meskaran et al. (2015) who suggested that people mostly avoid online purchasing because they cannot trust the online environment and they feel that security is not guaranteed during online purchasing. Therefore, **Null hypothesis is rejected**

- *H₄₀: Awareness does not influence customers' behavior intention to adopt e-commerce.*
- *H₄₁: Awareness influence customers' behavior intention to adopt e-commerce.*

Results: The results in table 4.14 show a weak relationship between aware of internet attacks and the intention to use e-commerce services as soon as possible, with $r=.000$ and $p<.05$. This means that there is a significant amount of evidence to prove that consumers' awareness affects their intention to use e-commerce service sooner. **Null hypothesis rejected.**

4.6. Section B: E-commerce users.

Section B covers the analysis and interpretation of results obtained from users of e-commerce systems.

Table 4.16 presents the correlation between the study variable for users of e-commerce systems for study reliability test.

Table 4.16: Correlation Matrix for users of e-commerce systems

	Experience on Online Purchase	Awareness of Internet Attacks	Online websites are secured	Online Security awareness	Comfortability when buying online	Security Polices are more satisfying	Transaction free from interception	Trusting ISP technologies for Online Transactions	e-commerce trustworthy	Tempering with confidential Info	Relevance data collected by online Web	Usage of their personal Infor	Control of their personal Infor
Experience on Online Purchase	1.000	.129	-.150	-.109	-.022	.042	-.041	.103	.106	.132	.163	.063	.132
Awareness on Internet Attacks	.129	1.000	.025	-.471	.146	.032	.208	-.015	.228	.199	.106	-.077	.281
Online web sites are secured	-.150	.025	1.000	-.036	-.142	-.006	-.138	-.091	-.205	-.102	-.094	.333	-.039
Online Security awareness	-.109	-.471	-.036	1.000	.163	.166	.117	.131	-.016	-.047	-.089	-.123	-.214
Comfortability when buying online	-.022	.146	-.142	.163	1.000	.648	.611	.233	.369	.404	.275	-.309	.320
Security Polices are more satisfying	.042	.032	-.006	.166	.648	1.000	.624	.120	.342	.448	.422	-.239	.323
Transaction free from interception	-.041	.208	-.138	.117	.611	.624	1.000	.192	.535	.457	.303	-.422	.433
Trusting ISP technologies for online Transactions	.103	-.015	-.091	.131	.233	.120	.192	1.000	.488	.351	.392	-.084	.214

Table 4.16(continued)

E-commerce trustworthy	.106	.228	-	-	.369	.342	.535	.488	1.000	.376	.277	-.030	.345
			.205	.016									
Tempering with confidential Info	.132	.199	-	-	.404	.448	.457	.351	.376	1.00	.718	-.133	.630
			.102	.047						0			
Relevance data collected by online Web	.163	.106	-	-	.275	.422	.303	.392	.277	.718	1.000	-.110	.529
			.094	.089									
Usage of their personal Infor	.063	-	.333	-	-	-.239	-.422	-	-.030	-	-.110	1.000	-.110
		.077		.123	.309			.084		.133			
Control of their personal Infor	.132	.281	-	-	.320	.323	.433	.214	.345	.630	.529	-.110	1.000
			.039	.214									

4.6.1. KMO and Bartlett's Test

Table 4.17: KMO and Bartlett's Test for users of e-commerce.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.705
Bartlett's Test of Sphericity	Approx. Chi-Square	330.027
	df	78
	Sig.	.000

In table 4.17, KMO got a value of 0.705 which is greater than 0.5 which is better, for statistical significance we have got it covered in the analysis as we have a value of .000 value less than .001.

4.6.2. Total Variance Explained (users of e-commerce)

Our factor analysis shows a 64.8% total variance (see Table F.4, annexure F), which means at least 50% of the variance could be explained by common factors and is reasonable. It shows a total of five-factor with Eigenvalue of greater than 1.

4.7. Variables Analysis (users of e-commerce)

4.7.1. Use of internet

Table 4.18: Frequency (for social media)

		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	"No"	19	26.0	26.0	26.0
	"Yes"	54	74.0	74.0	100.0
	Total	73	100.0	100.0	

From the findings in Table 4.18, we realised that most of e-commerce systems users (74%) are using the internet for social media interactions, this is because there is a high rate in the distribution of smartphones.

Table 4.19: Frequency (for downloading)

		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	"No"	35	47.9	47.9	47.9
	"Yes"	38	52.1	52.1	100.0
	Total	73	100.0	100.0	

However, the findings from Table 4.19 suggest a slightly low percentage (52.1%) on using internet for downloading apps, music and games as compared to use of internet for social media.

Table 4.20: Frequency (emailing)

		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	"No"	23	31.5	31.5	31.5
	"Yes"	50	68.5	68.5	100.0
	Total	73	100.0	100.0	

Furthermore, the findings in Table 4.20 suggest that 68.5% of users of e-commerce systems also use the internet for e-mailing.

4.7.2. Perceived Security

Perceived Security is the degree at which consumers believe that e-commerce systems are secured (Meskaran et al., 2013). Consumer's perception of security determines the level of

comfortability when purchasing products online. Consumer's comfortability on e-commerce is determined by their perception of the systems. According to Meskaran, Ismail and Shanmugam (2013), security issue is one customer's major concern on using e-commerce as it involves technical challenges as well as human and organizational aspects too. This means that even when the best technical approaches and solutions are used by a company, without considering the perception of customers on a secured website, then these technical solutions may be irrelevant. Many researchers (Robieh, 2005; Poon, 2008; Chen & Barnes, 2007; Jalal, Marzooq & Nabi, 2011) indicated that the consumer's comfort level, feeling of security and their attitudes towards e-commerce services are correlated with the customers' age, annual salary, and level of education.

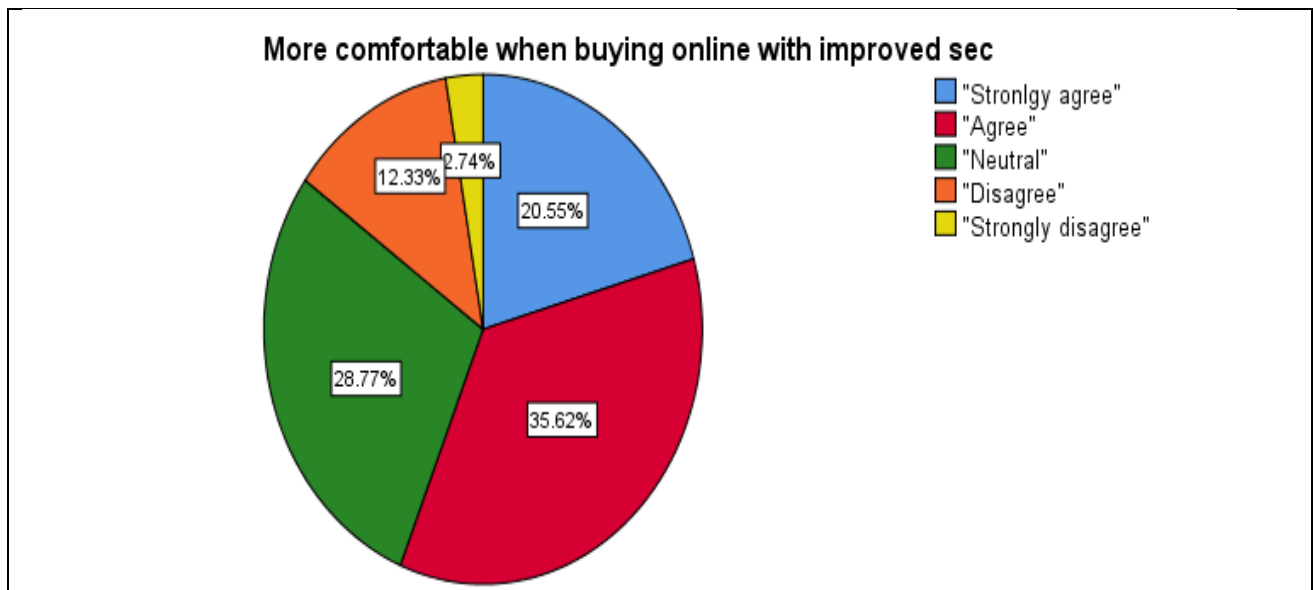


Figure 4-5 : Consumers Comfortability Level

Consumers' perception of security is determined by how confident and comfortable the user is when processing an online purchase. Consumers who are less comfortable when making an online purchase are bound to terminate their purchasing process before completion. The findings of this study in figure 4-5 show that 56.24% (deduced from strongly agree and agree) of our participants are comfortable when purchasing products online, whilst 15.07% indicate discomfort when buying a product online.

4.7.2.1. Comfortability when purchasing online and intention to continue using e-commerce

Table 4.21: Comfortability * Participants to continue purchasing online.

			Participants to continue purchasing online					Total	
			Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
More comfortable when buying online with improved sec	Strongly agree	Count	9	6	0	0	0	15	
		% of Total	12.3%	8.2%	0.0%	0.0%	0.0%	20.5%	
	Agree	Count	6	16	4	0	0	26	
		% of Total	8.2%	21.9%	5.5%	0.0%	0.0%	35.6%	
	Neutral	Count	5	10	4	0	2	21	
		% of Total	6.8%	13.7%	5.5%	0.0%	2.7%	28.8%	
	Disagree	Count	1	2	2	4	0	9	
		% of Total	1.4%	2.7%	2.7%	5.5%	0.0%	12.3%	
	Strongly disagree	Count	0	1	0	0	1	2	
		% of Total	0.0%	1.4%	0.0%	0.0%	1.4%	2.7%	
	Total		Count	21	35	10	4	3	73
			% of Total	28.8%	47.9%	13.7%	5.5%	4.1%	100.0%

The results in Table 4.21 show that most consumers (56.1%, deduced from agree and strongly agree) are comfortable with purchasing product online because of improved security and 69% agreed that they intend to continue purchasing online. We also realised that 50.6% of consumers intends to continue purchasing online as they are more comfortable when making an online purchase and this means that about 18% of our participants who still intend to continue purchasing products online even if they are not comfortable. This means there are some benefits that come with purchasing products online such as lower cost and options. Our results show that security has some positive effect in the adoption of e-commerce services, however, the gap between consumers who intend to continue purchasing products online because of available security

measures and those who agreed that they intend to continue purchasing shows that there are some other factors that may influence users to continue purchasing.

4.7.2.2. Organizational aspects: Consumer perception on ISPs

According to Tsai and Yen (2010), security on a website is strongly related to online purchase intentions and as such, an online vendor who is perceived as secured is presumed to be more trusted and capable to attract larger numbers of online customers. Businesses with good cybersecurity will always reduce fear and lack of trust in security and privacy on their e-commerce services systems (Singh, 2014). Therefore, consumers who perceived security, and trust are more likely to have a positive intention to use e-commerce service. However, according to Uwemi and Khan (2016), it is not only a consumer's perception of security, privacy and trust as technological infrastructure may affect consumer's intention to use or actual use. As indicated by Tsai and Yen (2010), it is the duty of an organization to get participants believes that they have the right technological infrastructure to offer a secured online purchasing.

Table 4.22: ISP's well equipped * continue purchasing online.

			<i>Participants to continue purchasing online</i>					Total	
			"Strongly agree"	"Agree"	"Neutral"	"Disagree"	"Strongly disagree"		
ISP's well equipped to offer secured online service	"Strongly agree"	Count	5	5	0	0	0	10	
		% Total	6.8%	6.8%	0.0%	0.0%	0.0%	13.7%	
	"Agree"	Count	6	16	4	0	0	26	
		% Total	8.2%	21.9%	5.5%	0.0%	0.0%	35.6%	
	"Neutral"	Count	7	12	4	4	2	29	
		% Total	9.6%	16.4%	5.5%	5.5%	2.7%	39.7%	
	"Disagree"	Count	3	2	2	0	1	8	
		% Total	4.1%	2.7%	2.7%	0.0%	1.4%	11.0%	
	Total		Count	21	35	10	4	3	73
			% Total	28.8%	47.9%	13.7%	5.5%	4.1%	100.0%

The results in Table 4.22 show that e-commerce systems users perceived ISP's to be well equipped to offer secured online shopping purchases. The results show that (49.3%) agreed that ISPs are well equipped to offer secured online purchase and 39.7% indicate that they are not sure

if ISPs are well equipped to offer secure online purchase. However, most of e-commerce users (76.7%) intend to continue purchasing products online. Surprisingly, this is true whilst only 49.3% of participants perceived online websites (ISP's) as well equipped. This means that some of e-commerce users are willing to continue purchasing products and services online even though they still fear losing their money and confidential information.

4.7.2.2.1. Purchasing experience- perception on ISP's technologies and ability to offer secured service.

Table 4.23 presents the cross tabulation between consumers prior experience on e-commerce systems and perception on ISP's capabilities.

Table 4.23: Experience on Internet Use * ISP's well equipped.

			<i>ISP's well equipped to offer secured online service</i>				Total
			"Strongly agree"	"Agree"	"Neutral"	"Disagree"	
Prior experience on Internet Use	"Between 1 and 6 months"	Count	0	1	0	0	1
		% of Total	0.0%	1.4%	0.0%	0.0%	1.4%
	"Between 6 and 1 year"	Count	1	0	1	0	2
		% of Total	1.4%	0.0%	1.4%	0.0%	2.7%
	"More than a year"	Count	9	25	28	8	70
		% of Total	12.3%	34.2%	38.4%	11.0%	95.9%
Total		Count	10	26	29	8	73
		% of Total	13.7%	35.6%	39.7%	11.0%	100.0%

The study was dominated by consumers with more than 2 years' experience, making (95.9%) of the sample size. The results in Table 4.23 show that 46.5% perceived ISPs technologies higher, and 11% have a lower perception on ISP's technologies. The results also indicate that 39.7% are not sure about the ISPs abilities. Consumers who are less experienced in online purchases are more concerned compared to those more experienced (Wright, 2016). The results, however, do not clearly support what Wright suggested as we failed to realise the significant amount of percentage with lower perception on ISP's abilities and infrastructure. Purchasing experience can

be acquired through several purchases the buyer has processed, number of days, months or years the user has been purchasing products online. We also realised that almost half (49.3%) of our participants believed that online service providers have the necessary tools and technology to offer a secured purchasing service.

4.7.2.2.2. Age of Participants * ISP's well equipped to offer secured online service.

Table 4.24: Age of Participants * ISP's well equipped to offer secured online service.

			<i>ISP's well equipped to offer secured online service</i>				Total	
			"Strongly agree"	"Agree"	"Neutral"	"Disagree"		
Age of Participants	"above 15 years and below 20 year old"	Count	0	0	2	1	3	
		% of Total	0.0%	0.0%	2.7%	1.4%	4.1%	
	"above 21 years and below 29 year old"	Count	6	17	18	6	47	
		% of Total	8.2%	23.3%	24.7%	8.2%	64.4%	
	"above 30 years and below 39 year old"	Count	2	5	9	1	17	
		% of Total	2.7%	6.8%	12.3%	1.4%	23.3%	
	"above 40 years and below 45 year old"	Count	1	1	0	0	2	
		% of Total	1.4%	1.4%	0.0%	0.0%	2.7%	
	"46 years and above"	Count	1	3	0	0	4	
		% of Total	1.4%	4.1%	0.0%	0.0%	5.5%	
	Total		Count	10	26	29	8	73
			% of Total	13.7%	35.6%	39.7%	11.0%	100.0%

The results in table 4.24 show that most participants are not sure if ISP's are well equipped to offer secured service. 39.7% indicated that they are not sure and chose to remain neutral. This might be because of lack of enough information about available technologies and how they operate. This supports the findings by Ramanyika and Mashenene (2014), who indicated that lack of education and training deny users from acquiring the required competencies and confidence in

using e-commerce. However, we also realised that a significant number of participants with higher perception (35.6%) and 13.7% on the ability of ISP's to provide a secured service. Interestingly, we realised a difference in consumers' ages and their perception of ISP's abilities. Consumers between the age of 15 and 20 have a lower perception of ISP technologies and abilities, completely different to consumers above the age of 45. This suggests a positive relationship between consumers' ages and perception on ISP's abilities and their technologies, hence the younger the age, the lower perception on ISP's abilities and their technologies.

4.7.2.2.3. Level of education

Findings of this study in Figure 4-6 show that people holding a grade 12 certificate have a higher perception of ISP's abilities (15.1%). However, we realised that there is no significant difference between people holding college certificates and diplomas. Participants below grade 12 are neutral in terms of ISP's abilities. Looking at the results, there is no clear evidence to support if different age level determines their perception of ISP's abilities to offer a secure purchasing service.

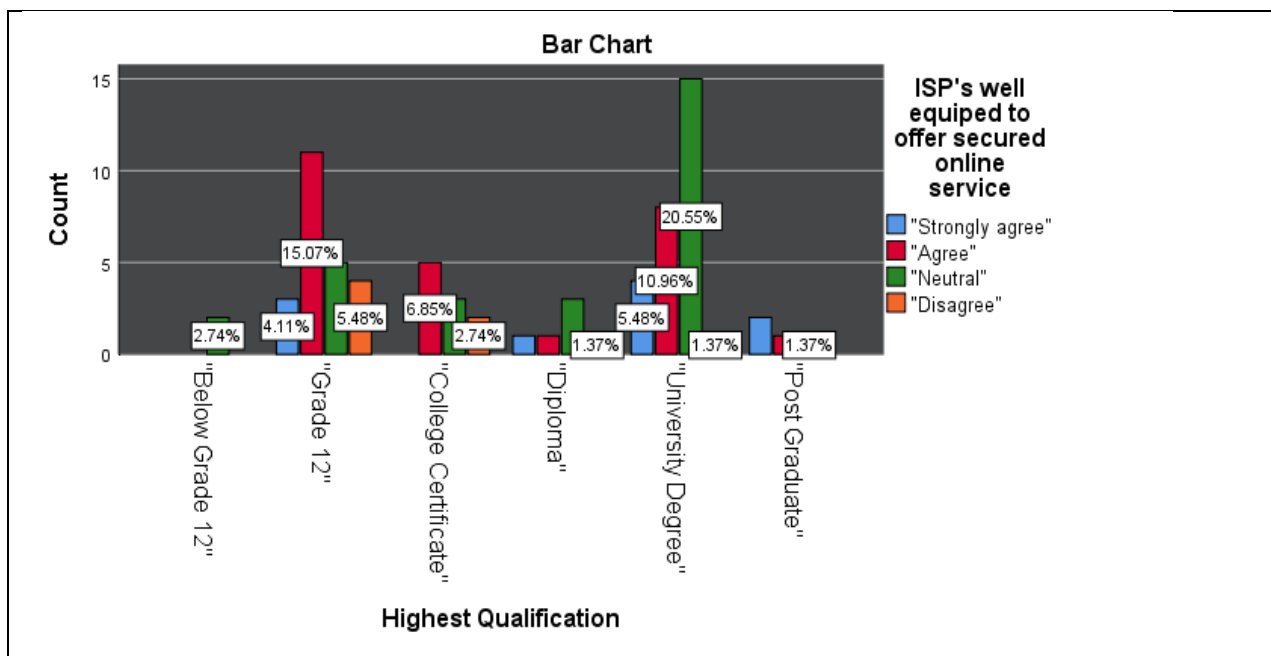


Figure 4-6 : Education*ISP's well equipped.

4.7.2.3. Passwords and usernames make the online website more secured

Passwords and usernames are compulsory security measures that most online websites ask their first users to have. Strong passwords and usernames protect users against unauthorized access to their accounts. This is the first security stop on the e-commerce user's side. Most consumers try to have tricky passwords and usernames as possible. Exploiting ill-chosen and poorly-protected passwords is one of the most common attacks on system security used by hackers (Cazier, Carolina, Medlin and Carolina, 2006).

4.7.2.3.1. Consumer's age on the use of passwords and username

Table 4.25: Age * Passwords and usernames make the online website more.

			<i>Passwords and usernames make the online website more secured</i>					<i>Total</i>	
			Strongly agree	Agree	Neutral	Disagree	Strongly Disagree		
Age of Participants	above 15 years and below 20 year old	Count	1	1	0	0	1	3	
		%Total	1.4%	1.4%	0.0%	0.0%	1.4%	4.1%	
	above 21 years and below 29 year old	Count	14	20	9	3	1	47	
		%Total	19.2%	27.4%	12.3%	4.1%	1.4%	64.4%	
	above 30 years and below 39 year old	Count	8	7	1	1	0	17	
		%Total	11.0%	9.6%	1.4%	1.4%	0.0%	23.3%	
	above 40 years and below 45 year old	Count	1	1	0	0	0	2	
		%Total	1.4%	1.4%	0.0%	0.0%	0.0%	2.7%	
	46 years and above	Count	0	4	0	0	0	4	
		%Total	0.0%	5.5%	0.0%	0.0%	0.0%	5.5%	
	Total		Count	24	33	10	4	2	73
			%Total	32.9%	45.2%	13.7%	5.5%	2.7%	100.0%

The results in Table 4.25 show that 45.2% of e-commerce users agree that the use of passwords and usernames makes online purchase more secured, with 32.9% strongly agreeing. This makes the total of 73.1% of our sample size. We realised that our sample is mostly dominated by youth as most of our participants are between the age of 20 and 30 years. This might mean that people

who are using e-commerce as a method of purchasing products or services are youth. Surprisingly, all participants above the age of 46 believed that the use of passwords and usernames are making the online purchase more secured. This means that consumer's age is not a factor in the level of perception on the impact of passwords and usernames. People who perceived passwords and usernames higher are more comfortable with online purchasing systems and they will continue to buy products online.

4.7.2.3.2. : Highest Qualification * Passwords and usernames make the online website more

Table 4.26: Highest Qualification * Passwords and user names make the online website more

			<i>Passwords and usernames make the online website more secured</i>					Total	
			Strongly agree	Agree	Neutral	Disagree	Strongly Disagree		
Highest Qualification	Below Grade 12	Count	0	1	1	0	0	2	
		%Total	0.0%	1.4%	1.4%	0.0%	0.0%	2.7%	
	Grade 12	Count	10	10	2	0	1	23	
		%Total	13.7%	13.7%	2.7%	0.0%	1.4%	31.5%	
	College Certificate	Count	2	6	0	2	0	10	
		%Total	2.7%	8.2%	0.0%	2.7%	0.0%	13.7%	
	Diploma	Count	2	3	1	0	0	6	
		%Total	2.7%	4.1%	1.4%	0.0%	0.0%	8.2%	
	University Degree	Count	9	11	5	2	1	28	
		%Total	12.3%	15.1%	6.8%	2.7%	1.4%	38.4%	
	"Post Graduate"	Count	1	2	1	0	0	4	
		%Total	1.4%	2.7%	1.4%	0.0%	0.0%	5.5%	
	Total		Count	24	33	10	4	2	73
			%Total	32.9%	45.2%	13.7%	5.5%	2.7%	100.0%

Findings in Table 4.26 show that the study was dominated by people who hold a university degree or currently registered for a university degree. There is a slightly different between participants with grade 12 and the ones holding a degree, with 31.5% and 38.4% respectively. However, one notable similarity is the level of perception on passwords and usernames between participants

with no grade 12 and the postgraduates, they all have a lower perception on password and usernames. This means that the level of education does not affect user perception of basic security measures (passwords and usernames).

4.7.2.3.3. Consumer's experience –Passwords and usernames

Table 4.27: Consumer prior experience* Password and usernames.

			Passwords and usernames make the online website more secured					Total
			Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	
Participants experience on Online Purchase	2018	Count	7	9	3	0	0	19
		% of Total	9.6%	12.3%	4.1%	0.0%	0.0%	26.0%
	2017	Count	9	10	3	0	0	22
		% of Total	12.3%	13.7%	4.1%	0.0%	0.0%	30.1%
	More than 2 years	Count	8	14	4	4	2	32
		% of Total	11.0%	19.2%	5.5%	5.5%	2.7%	43.8%
Total		Count	24	33	10	4	2	73
		% of Total	32.9%	45.2%	13.7%	5.5%	2.7%	100.0%

The use of e-commerce systems is influenced most strongly by convenience perceived, risk, security and prior internet knowledge. Table 4.27 shows that the study was dominated by consumers with more experience in purchasing products online, constituting 43.8% of the sample size. In terms of the level of perception on passwords and usernames, we realised a slight difference between consumers who recently started purchasing a product online and those ones who have been purchasing product before. Even though we had a slight difference between consumers who are more experienced with consumers who started purchasing online in 2018 and 2017, we don't see any significant difference on the level of experience in purchasing online. Again, we realised the significant relationship between age, level of education and prior experience.

4.7.3. Perceived Privacy

Table 4.28: Tempering with confidential Info * Participants to continue purchasing online

			<i>Participants to continue purchasing online</i>					Total	
			Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
Tempering with confidential Info	Strongly agree	Count	6	6	1	0	1	14	
		% of Total	8.2%	8.2%	1.4%	0.0%	1.4%	19.2%	
	Agree	Count	7	11	3	3	0	24	
		% of Total	9.6%	15.1%	4.1%	4.1%	0.0%	32.9%	
	Neutral	Count	8	14	3	1	1	27	
		% of Total	11.0%	19.2%	4.1%	1.4%	1.4%	37.0%	
	Disagree	Count	0	2	1	0	1	4	
		% of Total	0.0%	2.7%	1.4%	0.0%	1.4%	5.5%	
	Strongly disagree	Count	0	2	2	0	0	4	
		% of Total	0.0%	2.7%	2.7%	0.0%	0.0%	5.5%	
	Total		Count	21	35	10	4	3	73
			% of Total	28.8%	47.9%	13.7%	5.5%	4.1%	100.0%
			Total						

Information privacy is regarded as one of the utmost security concerns in adoption and use of e-commerce systems (Phelps, 2000). The results in table 4.28 show that most (52.1%) of the participants believe that their information when conducting online shopping will not be tampered with. However, 37.0% are not sure about how their information is handled by their ISP's. This is understandable as the study targeted Vhembe District in Limpopo, which is mostly dominated by rural villages. One major factor holding back the adoption of e-commerce in developing countries is the lack of information. Most of Africans countries have not really known the essence of e-commerce and even consumers are hesitant in giving out their personal information because of online fraud.

4.7.3.1. Highest Qualification * Participants perception on tempering with confidential Info.

Many customers have genuine fears about providing their private information to an unknown body over the internet, and they don't know the way their information will be handled (Uwemi & Khan, 2016). The results in Table 4.29 show that 52.1% of people who purchase products online believe that their personal information cannot be tampered with on transmission or on storage. However, there is a significant number of participants who remain doubtful whether their information can be accessed by unauthorized individuals. Consumers who believe that their information can be tampered with, they will find it hard to continue purchasing products online. We also realised that participants holding grade 12 certificate perceived e-commerce systems as less privacy risk than university graduates. This suggests that users of e-commerce level of education has less impact on perceived privacy on e-commerce systems.

Table 4.29: Highest Qualification * Participants perception on tempering with confidential Information.

			<i>Participants perception on tempering with confidential Info</i>					Total	
			Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
Highest Qualification	Below Grade 12	Count	0	0	2	0	0	2	
		% Total	0.0%	0.0%	2.7%	0.0%	0.0%	2.7%	
	Grade 12	Count	3	9	9	2	0	23	
		% Total	4.1%	12.3%	12.3%	2.7%	0.0%	31.5%	
	"College Certificate"	Count	1	3	4	0	2	10	
		% Total	1.4%	4.1%	5.5%	0.0%	2.7%	13.7%	
	Diploma	Count	1	3	1	1	0	6	
		% Total	1.4%	4.1%	1.4%	1.4%	0.0%	8.2%	
	University Degree	Count	8	8	10	1	1	28	
		% Total	11.0%	11.0%	13.7%	1.4%	1.4%	38.4%	
	Post Graduate	Count	1	1	1	0	1	4	
		% Total	1.4%	1.4%	1.4%	0.0%	1.4%	5.5%	
	Total		Count	14	24	27	4	4	73
			% Total	19.2%	32.9%	37.0%	5.5%	5.5%	100.0%

4.8. Perceived Trust.

E-commerce systems gain bad reputation because of the security threats; hence companies are very determined to improve the online security to gain users' trust back (Gupta and Dubey, 2016). According to Kim, Ferrin, and Rao (2008), trust is a prerequisite for successful commerce because consumers are hesitant to make purchases unless they trust the seller. The study results in Table 4.30 show that e-commerce users (53.4%) believed that products and services purchased online are trustworthy, with 9.6% believing that online products and services are not trustworthy. Interestingly, 9.6% of e-commerce users indicated that they will not continue purchasing products online, the same number of participants who perceive online products as not trustworthy. Bad

reputation may be driven by negative previous experience on e-commerce systems. Furthermore, we realized the huge amount of e-commerce user who intend to continue purchase products and service online.

Table 4.30: Participants perception on e-commerce trustworthy * Participants to continue purchasing online.

			<i>Participants to continue purchasing online</i>					Total	
			Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
E-commerce trustworthy	Strongly agree	Count	7	0	2	1	0	10	
		% of Total	9.6%	0.0%	2.7%	1.4%	0.0%	13.7%	
	Agree	Count	3	23	3	0	0	29	
		% of Total	4.1%	31.5%	4.1%	0.0%	0.0%	39.7%	
	Neutral	Count	8	10	5	3	1	27	
		% of Total	11.0%	13.7%	6.8%	4.1%	1.4%	37.0%	
	Disagree	Count	2	1	0	0	1	4	
		% of Total	2.7%	1.4%	0.0%	0.0%	1.4%	5.5%	
	Strongly Disagree	Count	1	1	0	0	1	3	
		% of Total	1.4%	1.4%	0.0%	0.0%	1.4%	4.1%	
	Total		Count	21	35	10	4	3	73
			% of Total	28.8%	47.9%	13.7%	5.5%	4.1%	100.0%

4.8.1. Continue to use e-commerce.

4.8.1.1. Age of Participants * Participants to continue purchasing online

The findings of a study done by Tatnall and Lepa (2003) showed that older people adopt the Internet at a rapid rate, but their use of the Internet for electronic commerce (e-commerce) activities remains quite low, forming just 1% of the total of adult Internet shoppers. Findings of this study in Table 4.31 concurs as they show that there is high intention (75.75%) to continue purchasing products or services online. However, youth between the ages of 20 and 29, are the

ones who show more intention to continue using the e-commerce service, constituting 32.9%. The reason why most youth are found to be using e-commerce might be internet access through their mobile phone. The study findings are in-line with Tatnall and Lepa's (2003) results in that older people seem reluctant to continue with online purchases.

Table 4.31: Age * Continue purchase online.

			<i>Participants to continue purchasing online</i>					Total
			Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
Age	above 15 years and below 20 year old	Count	1	1	0	0	1	3
		% of Total	1.4%	1.4%	0.0%	0.0%	1.4%	4.1%
	above 21 years and below 29 year old	Count	12	24	7	3	1	47
		% of Total	16.4%	32.9%	9.6%	4.1%	1.4%	64.4%
	above 30 years and below 39 year old	Count	7	6	2	1	1	17
		% of Total	9.6%	8.2%	2.7%	1.4%	1.4%	23.3%
	above 40 years and below 45 year old	Count	1	1	0	0	0	2
		% of Total	1.4%	1.4%	0.0%	0.0%	0.0%	2.7%
46 years and above	Count	0	3	1	0	0	4	
	% of Total	0.0%	4.1%	1.4%	0.0%	0.0%	5.5%	
Total	Count	21	35	10	4	3	73	
	% of Total	28.8%	47.9%	13.7%	5.5%	4.1%	100.0%	

4.8.1.2. Regression analysis

A regression analysis was conducted to test if consumers experience in using the internet affects their intention to continue purchasing products online.

Table 4.32: Model Summary (Prior experience).

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.081 ^a	.007	-.007	1.014

a. Predictors: (Constant), Participants Experience on Internet Use

Our model summary (Table 4.32) indicates that 7% of total variation in intention to use e-commerce as soon as possible is explained by their experience in using the internet.

Table 4.33: Coefficients (Behavioral Use).

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.223	1.668		1.932	.057
	Participants experience on Internet Use	-.289	.422	-.081	-.685	.495

a. Dependent Variable: Participants to continue purchasing online

Our coefficient results in Table 4.33 show a weak relationship between consumers experience in using the internet and the intention to continue purchasing products online, with $\beta=3.223$ and $p>.05$. This means that there is no significant amount of evidence to support that consumers' awareness of internet attacks affect their intention to use e-commerce service sooner.

4.8.2. Correlation Table (users of e-commerce).

Table 4.34: Correlation Table (users of e-commerce systems)

		Correlations							
		Continue purchasing online	Control of personal Information	Tempering with confidential Info	e-commerce systems trustworthy	Transaction free from hackers	ISP's well equipped	Passwords and user names make online website more	Consumer comfortability
Continue purchasing online	Pearson Correlation	1	.020	.175	.207	.458**	.271*	.552**	.510**
	Sig. (2-tailed)		.865	.138	.079	.000	.020	.000	.000
	N	73	73	73	73	73	73	73	73
Control on personal Information	Pearson Correlation	.020	1	.630**	.345**	.433**	.300**	.199	.320**
	Sig. (2-tailed)	.865		.000	.003	.000	.010	.092	.006
	N	73	73	73	73	73	73	73	73
Tempering with confidential Information	Pearson Correlation	.175	.630**	1	.376**	.457**	.402**	.288*	.404**
	Sig. (2-tailed)	.138	.000		.001	.000	.000	.013	.000
	N	73	73	73	73	73	73	73	73
e-commerce systems trustworthy	Pearson Correlation	.207	.345**	.376**	1	.535**	.300**	.151	.369**
	Sig. (2-tailed)	.079	.003	.001		.000	.010	.201	.001
	N	73	73	73	73	73	73	73	73

Table 4-34(continued)

Transaction free from hackers	Pearson Correlation	.458**	.433**	.457**	.535**	1	.511**	.268*	.611**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.022	.000
	N	73	73	73	73	73	73	73	73
ISP's well equipped	Pearson Correlation	.271*	.300**	.402**	.300**	.511**	1	.346**	.426**
	Sig. (2-tailed)	.020	.010	.000	.010	.000		.003	.000
	N	73	73	73	73	73	73	73	73
Passwords and user names make online website more secured	Pearson Correlation	.552**	.199	.288*	.151	.268*	.346**	1	.564**
	Sig. (2-tailed)	.000	.092	.013	.201	.022	.003		.000
	N	73	73	73	73	73	73	73	73
Consumer comfortability	Pearson Correlation	.510**	.320**	.404**	.369**	.611**	.426**	.564**	1
	Sig. (2-tailed)	.000	.006	.000	.001	.000	.000	.000	
	N	73	73	73	73	73	73	73	73
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Table 4.35: Correlation Table (intention to use and actual use of e-commerce systems).

Table 4.35 presents the correlation results between consumers' intention to use e-commerce systems and continuing to use e-commerce.

Correlations			
		Intend to use e-commerce as soon as possible	Participants to continue purchasing online
Intend to use e-commerce as soon as possible	Pearson Correlation	1	.471**
	Sig. (2-tailed)		.000
	N	143	143
Participants to continue purchasing online	Pearson Correlation	.471**	1
	Sig. (2-tailed)	.000	
	N	143	143
**. Correlation is significant at the 0.01 level (2-tailed).			

4.8.3. Hypothesis Test.

- H_{5_0} : Consumer's perceived security affects consumer's actual use of e-commerce services
- H_{5_1} : Consumer's perceived security does not affect consumer's actual use of e-commerce services

Results: Security on a website is strongly related to online purchase intention. The correlation in Table 4.39 concurs with the finding by Tsai and Yen at al., 2010 by showing a positive strong relationship between consumer's security perceptions and actual usage. This means that users of e-commerce are more concerned about security than other factors. The results show an $r = .510$ and $p < .01$, therefore we do not have enough evidence to reject the null hypothesis. **Null hypothesis accepted.**

- H_{6_0} : Customers perception of trust does not influence their use behavior on e-commerce systems.
- H_{6_1} : Customers perception of trust does not influence their use behavior on e-commerce systems

Results: Our correlation Table 4.39 shows a positive moderate relationship between consumer's perception of trust and use behavior on e-commerce systems. The findings are in line with the findings of Eid (2011) who suggested that regardless of how much an online customer trusts an e-commerce website, this will not affect his or her intention to keep doing business with that e-commerce service (Eid, 2011). This means that users of e-commerce systems will continue to use the services even though their level of perception on trust is high. The results show an $r = .207$ and $p > .05$, therefore we do not have enough evidence to reject the null hypothesis. **Null hypothesis accepted**

- H_{7_0} : Perceived privacy does not influence customers use behavior on e-commerce systems.
- H_{7_1} : Perceived privacy influence customers use behavior on e-commerce systems.

Results: The correlation Table 4.39 shows a weak relationship between the consumer's perceptions on the use behavior of e-commerce systems. However, the study findings do not support the previous research findings that suggesting that consumers are concerned

about what companies do with the information they collect and the accuracy of the information they use (Brown and Muchira et al, 2004) The results show an $r = .175$ and $p > .05$, therefore we do not have enough evidence to reject the null hypothesis. **Null hypothesis accepted.**

- H₈₀: Behavior Intention does not influence customers use behavior of e-commerce systems.
 - H₈₁: Behavior Intention influences customers use behavior of e-commerce systems.
- Results: The correlation Table 4.40 shows a strong positive relationship between consumers' behavior se and the use behavior of e-commerce systems. The results show an $r = .471$ and $p < .05$, therefore we do not have enough evidence to accept the null hypothesis. **Null hypothesis rejected.**

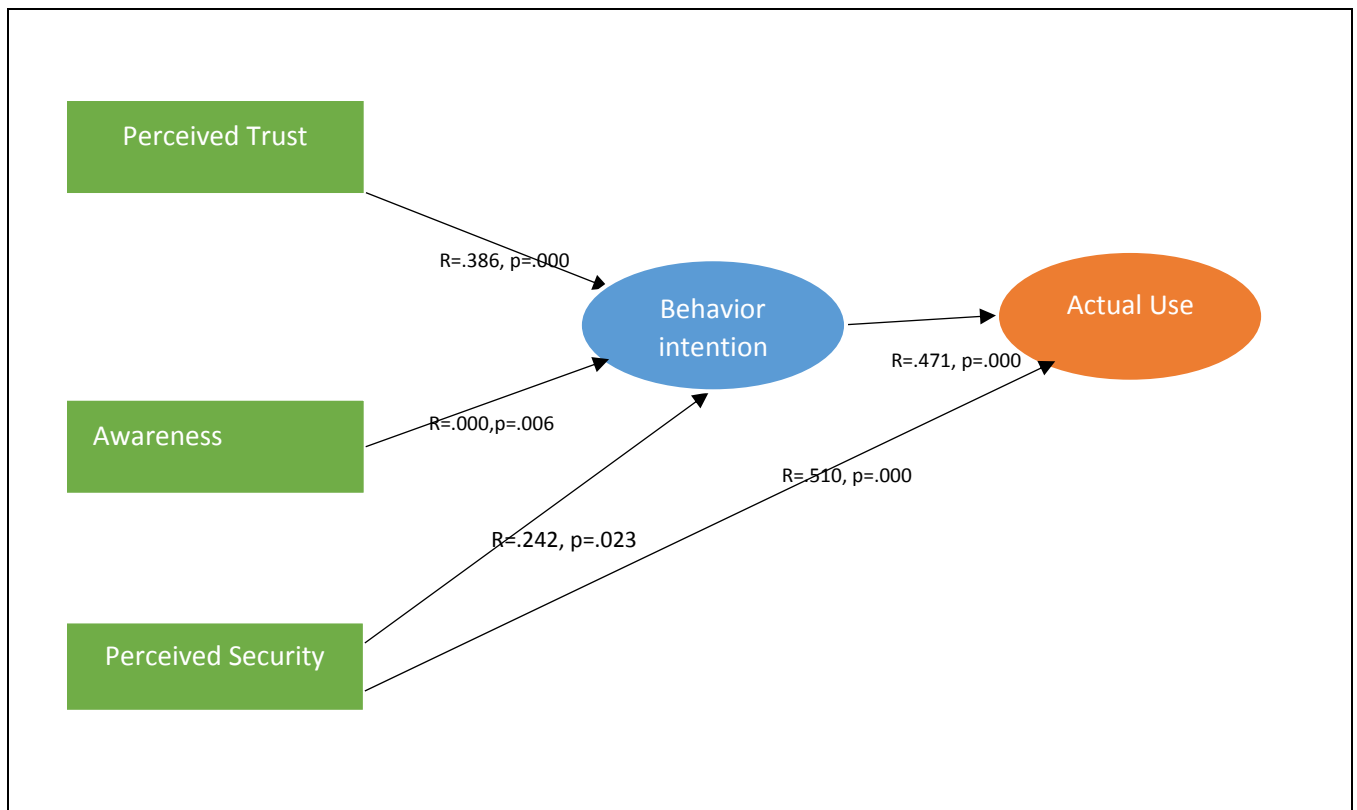


Figure 4-7 : The final research model.

The final research model represents the constructs which were significantly correlating with two original TAM constructs, the behavior intention to use and actual use. Figure 4-7 show that

perceived trust, perceived security and awareness were all positively correlating with behavior intention to use e-commerce system. Furthermore, it shows that perceived security also positively correlates with actual use of e-commerce systems. Lastly, it also shows a positive correlation between behavior intention to use and the actual use of e-commerce systems.

4.9. Chapter Summary.

The chapter focused on the analysis and interpretation of the results. Two hundred questionnaires were distributed and 161 were successfully completed and used for the final data analysis. Data were coded into two different SPSS folders; one for non-users of e-commerce and the other for users of e-commerce. Analysis and interpretation were done separately for both users and non-users of e-commerce. It was found that more people are still reluctant to use e-commerce because of lack of trust and fear of losing their money when conducting online transactions. However, it was also discovered that more than half of e-commerce users still intend to continue purchasing via online as they felt comfortable conducting e-commerce transactions.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1. Introduction

From the past decade, e-commerce has been a future method of trading, however, the rate of adoption is growing at a slower rate, mostly in the developing countries and rural communities. The slower rate on e-commerce adoption has been attributed to different factors such as lack of consumer's trust, perception on security, lack of infrastructure and lack of knowledge. All this has been identified as major factors affecting adoption of e-commerce technology. Both governments and online websites retailers are continuing investing more in e-commerce technologies on a quest to make it a success, trustworthy and secure method of trading. The home affairs and transport are examples of few government departments in South Africa already offering services on web technologies. Even though the idea was to reduce overcrowding government offices, the impact and benefits of these online systems have not yet been recognized because consumers' attitudes towards e-commerce systems. This impacts on slower rate of ecommerce adoption.

The main objective of the study was to understand how cybersecurity is affecting the adoption of e-commerce service. From the collected data, it was established that consumers are still finding it difficult to adopt e-commerce services because of their negative perception mainly on e-commerce secureness, trustworthy. However, it was also discovered that a lack of knowledge about e-commerce service also has a huge impact on adoption.

5.2. Non-users of e-commerce

Awareness - the study shows that non-users of e-commerce lack knowledge and awareness on e-commerce systems. E-commerce systems have been around for the past decade but to some in rural communities, it is a relatively new technology. Lack of knowledge and awareness on e-commerce systems negatively affects consumers' intention to adopt new technology. The slower rate of e-commerce systems adoption might be the result of dissemination of information about e-commerce systems, and how it works more especial in rural communities such as Vhembe District.

Security- non-users of e-commerce systems are accustomed to passwords and usernames; however, they are not sure if this basic security measure is enough to protect their online transactions. Most of non-users of e-commerce indicated that they fear buying products online which directly affects their intention to use e-commerce systems. About 45% of participants indicated that they are not sure if e-commerce systems are vulnerable to attacks. There is also a

significant number of people (39.8%) who believed that e-commerce systems are vulnerable to attacks.

Demographic variables such as age, level of education and occupation do not affect consumer's perception of security on e-commerce. It was discovered that people lack information and negative perception on e-commerce systems, hence most people showed no interest in accepting the service.

Trust - non-users of e-commerce systems believed that online shopping is a financial risk. Consumer's perception of trust is a positive correlation with consumer's perception of security. Higher perception on online websites vulnerability negatively affects consumers' perception on trust and the intention to use. Consumers who believe that online websites are vulnerable to attacks also believe that online transactions can be accessed and end up losing their money. Which will have a negative effect on their intention to use e-commerce.

Privacy – non-users of e-commerce systems are not sure about the use of their information by their hosts. This is because of lack of knowledge about e-commerce systems. For this reason, people fear adopting e-commerce. Consumer's perception of privacy is a positive correlation with consumer's perception of trust and a positive correlation to consumer's perception of security. Consumers who perceive e-commerce systems as vulnerable will have a negative perception on both trust and privacy. There is no relationship between consumers' perception of privacy and their intention to use e-commerce systems. However, the relationship between consumers' perception of trust and privacy and perception of security and privacy mean that consumers' perception of privacy only affects behavior intention through trust and security.

5.3. E-commerce users

Previous studies suggest that consumers use behavior of e-commerce systems is determined by different factors. One of the major factors that determine the intention to continue with online purchases is the consumer level of comfort when processing a purchase. Consumer's level of comfortability is determined by their perception of security, trust, and privacy with the system.

Previous studies suggest that demographical factors such as age, level of education and prior experience on purchasing products online affect consumer's perception of e-commerce. However, according to the collected data, level of education and prior experience does not affect consumer's perception of security, trust, and privacy on e-commerce. Consumer's age has a negative correlation on security perception. It was found that older people have a negative

perception of e-commerce security. Even though some older people are adopting e-commerce services, many are still feel not safe and comfortable when processing an online purchase.

Security- e-commerce adopters, perceived e-commerce systems secured. Most of e-commerce users are comfortable when making an online purchase. This is totally different from the non-users of e-commerce systems who perceived e-commerce systems as vulnerable to attacks. E-commerce users' level of comfort emanates from positive perception of basic security measures (password and username) and ISP's capabilities to offer secured service. Because of their level of comfort, consumers are interested in continuing with online purchases.

Trust – transmission, and storage of information between the buyer and the seller is a key activity on e-commerce. It is important for every online web site to protect the transactions and their databases against unauthorized access. Consumers who believe that personal information or their financial transactions cannot be tempered while processing a purchase are bound to continue purchasing products or services online. E-commerce users use behavior can only be indirectly affected by their perception of trust through security perception as there is no direct influence between user behavior and perception of trust. To support this, there is a positive correlation between consumer's perception of trust and their perception of security. When consumers believe that e-commerce systems are secured it increases their perception trust.

Privacy- e-commerce users are less concerned that their information is used for other purposes. Previous studies have found that consumers are afraid to give their correct information when creating online accounts as they fear to be defrauded by their host or attacked by hackers. There is a negative correlation between consumer's perceptions of security, trust an intention to continue using online purchases. When consumers believe that their information can be used for different purpose, their intention to use will be low.

5.4. Recommendations

For the success of e-commerce in rural communities, the gap between e-commerce users and non-users' needs to be breached. Most of the people in rural communities do not use e-commerce systems as a method of trading, hence they do not understand how e-commerce systems operate. They are still reluctant to purchase products online as many are not sure if their money and personal information will be safe when conducting online transactions, and some does not even know about the existence of the service. E-commerce has been in existence for years now but fewer people show little interest in it as they fear losing money. However, e-commerce users perceived e-commerce systems as secured and is different to non-users of e-commerce systems

who perceived it as not secured and untrustworthy. For the success of e-commerce service in the rural area, the government needs to join hands with retailers and SME's to start awareness campaigns that will clarify how e-commerce systems work and eradicate negative perception on e-commerce systems.

5.5. Future Research

This research focuses on the individuals' perception of security on e-commerce service in Vhembe district. There is a need to do further study over a wide range of factors affecting consumers' adoption of e-commerce systems in rural communities across South Africa to gain a broader picture.

5.6. Limitations of the Study

The study's scope is confined to the Vhembe district, which is characterized by generally slow Internet speed, low disposable income for citizens and low ICT aptitude amongst most rural dwellers. More importantly, the participants' population size was unknown and that makes it difficult to draw up a sample size and creating the balance between users and non-users of e-commerce systems. Furthermore, some of the participants were not willing to participate on the study – as some felt that it was not necessary for them to take part in the study, making it difficult to acquire a huge number of respondents.

5.7. Summary

The chapter focused on the discussion of the findings. It outlined how users of e-commerce and non-users of e-commerce systems are affected by cyber security. It also outlined the recommendations and suggestions on further research. Lastly, it outlined the research limitations.

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ANNEXTURE A: Estimated Budget for the Research.

Item	Description	Amount	Motivation
<p>Assistance</p> <hr/> <p>Data Collection (15 days)</p> <hr/> <p>Data Analysis (15 days)</p> <hr/> <p>Data collection R150/ day</p> <p>Data analysis R150/ day</p>	<p>This are the individual who will help researcher in collecting data, and analysis of data</p>	R4500.00	<p>The researcher will need assistance during the stage data collection stage as there are lot of participants required</p>
<p>Consumables</p> <p>Stationary</p> <p>Highlighter 4pk (R29.00)</p> <hr/> <p>Pen Ballpoint X4(30.00)</p> <p>Copy paper 5XSingle pk. X 2(R600)</p> <hr/> <p>Book Bag (R34.99)</p> <hr/> <p>Staples pins /pk x 5 (R150.00)</p> <hr/> <p>Vodacom data bundles and airtime (R3500.00)</p>	<p>This are the things that the researcher need when going over researcher paper and when travelling.</p>	R4344.94	<p>The researcher need all these consumables to carry out the study. They will help out when going over the research papers and caring all useful documents</p>
<p>Travelling Expenses (<i>Researcher and assistant</i>)</p> <hr/> <p>Thohoyandou to Makhado @ R 6.70 /km X 68.4km. X 3 trips. X 2</p> <hr/> <p>Thohoyandou to Malamulele @ R 6.70/km X 41.6km. X 3 trips. X 2</p>	<p>This are required trips to be travelled to get to the targeted population</p>	R15011.56	<p>The study requires the researcher to travel to the four-selected area around Vhembe District.</p>

Thohoyandou to Musina R 6.70/km X 138.9km. X 3 trips. X 2			
Subsistence Stapler (R400.00) USB (R200.00)	Storage of useful files and attaching hard copies.	R600.00	The researcher need all this mentioned substance to complete the study. For storage of data(backup)
Printing Printing of final proposal @R3 X 28 Printing of questionnaire (R84.00) 400 Copies, 6 pages each @R3/page (R7200) Printing of final dissertation @R3 X 130 pages(R90.00)	Hard copies that need to be submitted to the supervisor and, the questionnaire to be distributed	R7674.00	Printing is very important as the are lot of questionnaire and copies to be printed and distributed to participants
Other Accommodation (Researcher and Assistance Lodge (bed and breakfast). Makhado R 750.00 X 3(2250.00) / person Malamulele R 600.00 X 3(1800.00 /person Musina R 950.00 X 3 (2850.00 /person	Place to stay when the researcher is out collecting data	R13800.00	The researcher need to find a place to stay when collecting data
Total		R45930.50	

ANNEXTURE B: Proposed Work Plan for the Study

ACTIVITIES DATES																				
	2017												2018							
	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Consultation with the supervisor	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Writing proposal	█	█	█	█	█															
Submission of proposal BIS department					█	█														
Proposal presentation and BIS department and School					█	█	█	█	█											
Chapter 2 writing and submission										█	█	█								
Data Collection													█							
Data analysis													█	█						
Interpretation and Result														█	█					
Submission of the Study																█	█			
Correction																	█	█		
Final Submission																				█

ANNEXTURE C: CONSENT LETTER

RESEARCH ETHICS COMMITTEE

UNIVEN Informed Consent

Appendix B

LETTER OF INFORMATION

Title of the Research Study : The effect of cyber security on Citizens' adoption of e-commerce services in Vhembe district of South Africa

Principal Investigator/s/ researcher : *Netshirando Vusani, MCOM (Business Information Systems)*

Co-Investigator/s/supervisor/s : *Prof A. Kadyamatimba / W. Munyoka*

Brief Introduction and Purpose of the Study: Customers are one major key component for the successful business. Today information and communication technologies (ICTs) has become an integral part of human's lives more especially in business, be it those in developed or developing countries. However, technology does not only bring greater benefits, it also brings ever greater threats: by the very nature of the opportunities it presents, it is a focal point for cybercrime, industrial espionage, and cyberattacks. The aim of this study is to find out how cyber security is affecting citizens decisions to adopt and use e-commerce services in Vhembe District.

Outline of the Procedures: Participants are expected to complete the questionnaire distributed by the researcher which will take 10-15 minutes to complete. The participants will be selected in random in and around shopping complexes in the selected targeted area.

Risks or Discomforts to the Participant: There are no risks to the participants, however the researcher will explain to the participants should they feel discomfort when completing the questionnaire they are free to discontinue.

Benefits: There are no benefits to the participants and the researcher.

Reason/s why the Participant May Be Withdrawn from the Study: Participants are free to withdraw from participating, and they will not face any consequences for their withdrawal. It is the choice of the participants to withdraw from participating from the study, the researcher will not force the participants to respond or complete to questionnaire

Remuneration : No

Costs of the Study : No

Confidentiality : The participants will not be asked to give their names when responding to the questionnaire

Research-related Injury : No

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher (0768462226.), my supervisor: *Prof A. Kadyamatimba* (015 9628707) or the University Research Ethics Committee Secretariat on 015 962 9058. Complaints can be reported to the Director: Research and Innovation, Prof GE Ekosse on 015 962 8313 or Georges Ivo.Ekosse@univen.ac.za

ANNEXTURE D: SURVEY QUESTIONNAIRE

Good Day! My name is Netshirando Vusani, and I am a Masters Student at the University of Venda. I am conducting a research on the effects of cyber security on ecommerce adoption. As you are a citizen of Vhembe District I am inviting you to participate in this research by completing the questions below. The questionnaire will require approximately 15 minutes to complete. There are no compensation for responding. Please answer all questions as honest as possible.

Section: A. Demographic Information.

Please answer the following questions by putting a cross (×) in the relevant block.

1. Gender

Male

Female

2. Age

15-20

21-29

30-39

40-45

46-above

3. Which of the following best represent the highest level of education that you have completed.

Below grade 12 Grade 12

College Certificate Diploma

University Degree Post Graduate.

4. Which of the following best describes your employment situations

Student Full time employed

Unemployed Self-employed.

5. Do you have access to the internet?

Yes No

6. How do you access the internet? (Choose all that apply)

Mobile phone

Laptop/ Modem

Home/ Workplace Network

7. What do you use the internet for? Choose all that apply.

Social Media (Facebook, WhatsApp and others)

Downloading apps, music and games

Sending and receiving e-mails

Other (specify.....)

8. How long have you been using the internet?

Less than a month

Between 1 and 6 month

6 to 12 months

More than a year

Section B: Adoption. Please answer the following questions by putting a cross (×) in the relevant block.

Adoption

9. Do you buy products and services online? Yes No

10. If your answer in Question 9 is **yes**, when was your first purchase on the internet?

2018 2017 More than 2 years ago.

11. If your answer at 8 is no, why you're not buying product online?

never had about buying product online

scared of buying product online

Internet is not secured

Complex and difficult to do

12. Do you know about online attacks? Yes No

13. How concerned are you about security when you want to buy products online?

Not at all concerned little concerned somewhat concerned Very concerned

14. Have you or someone you know ever suffer an internet attack? Yes No

SECTION C: consumer's perception.

To what extent do you agree with each of the following statements? Please indicate your answer by placing a cross (×) in the appropriate column.

15. Perceived cyber-security issues

Key: SA-strongly agree; A-agree; N-neutral; D-disagree; SD-strongly disagree.	SA	A	N	D	SD
(a). Internet and online websites are vulnerable to attacks.					
(b). I am aware of security measures in place to protect my online transactions.					
(c). Security measures such as strong passwords and user name makes online shopping more secured.					
(d). I am more comfortable shopping online because of improved security measures such as passwords and username.					
(e). I am satisfied with online websites security policies, and I trust them.					
(f). Internets Service Providers (ISP)'s have enough resources to offer secured services to internet users.					
(g). Purchasing on the Web site will not cause financial risk.					

(h). When I make a purchase online, I am sure that my transactions won't be intercepted by hackers.					
(h). I believe that purchasing from anonymous online retailer is more dangerous than purchasing from the one you know.					
(j). I believe that the existing internet security measures are enough to keep my transactions secured.					

16. Perceived Trust issues

Key: SA-strongly agree; A-agree; N-neutral; D-disagree; SD-strongly disagree.	SA	A	N	D	SD
(a). I believe that most online websites have the necessary technologies to carry out the on-line transaction.					
(b). I think products or services purchased on e-commerce will be trustworthy.					
(c). I believe that my confidential information will not be tampered with.					

17. Perceived Privacy issues

Key: SA-strongly agree; A-agree; N-neutral; D-disagree; SD-strongly disagree.	SA	A	N	D	SD
(a). Online web site only collects user's personal data that are necessary for its activity.					
(b). I am concerned that my personal information will be used for other purposes					
(c). I believe that I have total control of my information					

18. Behavioral intention

Key: SA-strongly agree; A-agree; N-neutral; D-disagree; SD-strongly disagree.	SA	A	N	D	SD
(a). I intend to use e-commerce as soon as possible.					

(b).I intend to continue using online shopping in the future.					
(c).I will regularly use online shopping in the future					

19. Actual Use Construct?

Key: SA-strongly agree; A-agree; N-neutral; D-disagree; SD-strongly disagree.	SA	A	N	D	SD
(a). I make online purchase frequently					
(b). Overall, I have made many online purchases.					
(c). I will continue buying product and services online in the future.					

Thank you for taking your time to participate on this survey!!!

ANNEXTURE E: Research Ethics Letter

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:

Mr V Netshirando

Student No:

11574897

PROJECT TITLE: **The effects of cybersecurity on
citizen' adoption of E-Commerce service in
Vhembe District of Limpopo.**

PROJECT NO: SMS/18/BIS/04/1806

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof A. Kadyamatimba	University of Venda	Supervisor
Mr W Munyoka	University of Venda	Co - Supervisor
Mr V Netshirando	University of Venda	Investigator – Student

ISSUED BY:

UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: June 2018

Decision by Ethical Clearance Committee Granted

Signature of Chairperson of the Committee:

Name of the Chairperson of the Committee: Senior Prof. **G.E. Ekosse**



University of Venda

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"A quality driven financially sustainable, rural-based Comprehensive University"

ANNEXTURE F: SPSS TABLES.

Table F.1: Item-Total Statistics for non-users of e-commerce).

	<i>Scale Mean if Item Deleted</i>	<i>Scale Variance if Item Deleted</i>	<i>Corrected Item- Total Correlation</i>	<i>Cronbach's Alpha if Item Deleted</i>
Online web sites vulnerability	30.63	37.914	.116	.765
Aware of online shopping security measures	30.38	34.880	.420	.735
Passwords and usernames make the online website more secured	30.51	35.389	.313	.746
ISP's well equipped to offer secured online service	30.12	33.466	.478	.727
Online purchase is a financial risk	29.20	35.863	.216	.759
Trusting ISP technologies for online transaction	30.50	34.895	.356	.741
Participants perception on e-commerce trustworthy	29.85	32.423	.582	.714
Participants perception on tempering with confidential Info	29.88	34.676	.340	.743
Participants perception on control of their personal Information	30.34	34.129	.350	.743
Intend to use ecommerce as soon as possible	30.05	33.924	.472	.728
Intend to continue using e-commerce	29.76	32.804	.490	.725
Intend to use e-commerce regularly	29.90	31.941	.552	.716

Table F.2: Correlation matrix of non-users of e-commerce.

Correlation Matrix ^a															
		Online websites vulnerability	Aware of security measures	Passwords and usernames	ISP's well equipped	E-commerce a financial risk	E-commerce a trustworthy	Trust in ISP technologies	E-commerce trustworthy	Tempering with confidential info	Personal Infor misused	Control of their personal Infor	Intend to use e-commerce	Intend to continue using e-commerce	Intention to use regularly
Correlation	Online web sites vulnerability	1.000	.167	.106	.129	-.092	.145	-.014	-.024	.349	.142	-.087	-.027	-.026	

Aware of security measures	.167	1.000	.402	.171	.174	.335	.246	-.013	.078	.155	.293	.256	.241
Logon Credentials secure website	.106	.402	1.000	.103	-.090	.178	.375	.218	-.022	.206	.023	.170	.090
ISP's well equipped	.129	.171	.103	1.000	.236	.206	.299	.359	-.042	.302	.294	.242	.307
E-commerce a financial risk	-.092	.174	-.090	.236	1.000	.162	.216	.072	-.145	.042	.194	.128	.243
Trust in ISP technologies trustworthy	.145	.335	.178	.206	.162	1.000	.347	-.021	-.048	.046	.261	.117	.226
Ecommerce trustworthy	-.014	.246	.375	.299	.216	.347	1.000	.480	-.249	.277	.237	.386	.333
Tempering with confidential Info	-.024	-.013	.218	.359	.072	-.021	.480	1.000	-.256	.526	.080	.163	.132
Personal Infor misused	.349	.078	-.022	-.042	-.145	-.048	-.249	-.256	1.000	-.159	-.116	.066	-.143
Control of their personal Infor	.142	.155	.206	.302	.042	.046	.277	.526	-.159	1.000	.108	.083	.197
Intend to use ecommerce	-.087	.293	.023	.294	.194	.261	.237	.080	-.116	.108	1.000	.527	.620
Intend to continue using e-commerce	-.027	.256	.170	.242	.128	.117	.386	.163	.066	.083	.527	1.000	.637
Intend to use ecommerce regularly	-.026	.241	.090	.307	.243	.226	.333	.132	-.143	.197	.620	.637	1.000

Table F.3: Rotated Component Matrix (non-users of e-commerce)

	<i>Component</i>				
	1	2	3	4	5
Online web sites vulnerability	-.118	.169	.167	.801	.059
Aware of online shopping security measures	.239	-.033	.710	.200	.150
Passwords and user names make online website more secured	.017	.247	.767	-.021	-.343
ISP's well equipped to offer secured online service	.280	.547	.018	.223	.430
Online purchase is a financial risk	.134	.050	.021	-.153	.778
Participants perception on trusting ISP technologies for online Transactions	.084	-.064	.609	.062	.496
Participants perception on e-commerce trustworthy	.259	.479	.511	-.265	.128
Participants perception on tempering with confidential Info	.057	.860	.032	-.190	-.048
Participants perception on used of their personal Infor	.043	-.243	-.046	.774	-.188

Participants perception on control of their personal Infor	.044	.784	.084	.076	.005
Intend to use ecommerce as soon as possible	.796	.015	.100	-.065	.219
Intend to continue using e-commerce	.861	.104	.148	.029	-.105
Intend to use ecommerce regularly	.834	.140	.100	-.059	.169
Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 6 iterations.					

Table F.4: Total Variance for (users of e-commerce)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.101	31.543	31.543	4.101	31.543	31.543	2.743	21.101	21.101
2	1.792	13.782	45.325	1.792	13.782	45.325	2.695	20.734	41.835
3	1.317	10.134	55.459	1.317	10.134	55.459	1.678	12.907	54.742
4	1.223	9.410	64.869	1.223	9.410	64.869	1.317	10.127	64.869
5	.987	7.594	72.463						
6	.876	6.739	79.202						
7	.647	4.980	84.182						
8	.518	3.986	88.167						
9	.449	3.457	91.624						
10	.412	3.173	94.797						
11	.261	2.005	96.802						
12	.212	1.629	98.430						
13	.204	1.570	100.000						
Extraction Method: Principal Component Analysis.									

Table F.5: Rotated Component Matrix (users of e-commerce).

	Component			
	1	2	3	4
Participants Experience on Online Purchase	-.311	.414	.181	-.316
Awareness on Internet Attacks	.155	.064	.820	-.065
Online web sites are secured	-.026	-.116	.029	.864
Online Security awareness	.223	-.037	-.828	-.049
More comfortable when buying online with improved sec	.780	.230	-.033	-.098
Security Polices are more satisfying	.768	.294	-.076	.103
Financial transaction free from hackers	.824	.250	.087	-.154
Participants perception on trusting ISP technologies for online Transactions	.008	.705	-.271	-.157
Participants perception on e-commerce trustworthy	.314	.565	.068	-.211
Participants perception on tempering with confidential Info	.385	.734	.165	.070
Participants perception on type of data collected by online Web	.228	.766	.096	.078
Participants perception on used of their personal Infor	-.530	.136	-.011	.574
Participants perception on control of their personal Infor	.341	.584	.396	.096
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 8 iterations.				