THE ROLE OF E-COMMERCE IN IMPROVING SUPPLY CHAIN: THE CASE OF SELECTED ONLINE RETAIL SHOPS IN ADDIS ABABA

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CERTIFICATE

This is to certify that **Kalehiwot Sirak Yiheyis** has carried out his thesis work on the topic entitled **"THE ROLE OF E-COMMERCE IN IMPROVING SUPPLY CHAIN: THE CASE OF SELECTED ONLINE RETAIL SHOPS IN ADDIS ABABA".** The work is original in nature and is suitable for submission for the award of Master's Degree in Logistics and Supply Chain Management.

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STATEMENT OF DECLARATION

I**, Kalehiwot Sirak Yiheyis** the undersigned, declare that this thesis **"THE ROLE OF E-COMMERCE IN IMPROVING SUPPLY CHAIN: THE CASE OF SELECTED ONLINE RETAIL SHOPS IN ADDIS ABABA"** is my own original work and has not been presented in any other University. All sources of materials used for this thesis have been duly acknowledged.

Declared by

Name: Kalehiwot Sirak Yiheyis

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Date: Jun, 2020

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Kalehiwot Sirak

ABBREVIATIONS AND ACRONYMS

ATM: Automated Teller Machine

B2B: Business-to-Business

B2C: Business-to-Consumer

C2C: Consumer-to-Consumer

E-commerce: Electronic commerce

EDI: Electronic Data Interchange

E- Payments: Electronic Payments

G2B: Government- to- Business

ICT: Information and Communication Technology

IT: Information Technology

O2O: Online- to-Offline

SCM: Supply Chain Management

SC: Supply Chain

TAM: Technological Acceptance Model

LIST OF TABLES

LIST O FIGURES

ABSTRACT

E-commerce solutions in supply chain management have often been approached from various dimensions focusing on the overall role on efficiency, customer service and responsiveness. Application of ecommerce solutions has seen improvements in different ecommerce models like Business to Business, Business to Consumers, Consumers to Consumers, and Government to Business ecommerce models. However, many sectors of the service delivery or retail sectors in developing countries didn't adopt any of the models and this could be attributed to their ineffective and inefficient performance. There exists a research gap on this area of the role of ecommerce application on supply chain performance in list developing countries like Ethiopia. The study employed a descriptive and explanatory research designs. The population comprised of 539 online shops doing business on four selected online retail shop platforms which were 22Bole.com, Qefira.com, Merkatoonline.shop and sholamart.com. Random sampling techniques was applied to choose the respondent for the questionnaire from the population after the selected platform population divided in to the appropriate strata and a proportionate sampling was taken from each to represent all the strata. 230 online shops were found to be the appropriate sample size to match the population size of 539 shops. Descriptive statistics was used to identify the role of ecommerce on supply chain performance and to state other variables. Correlation and Regression analysis approaches were used to investigate the relationships between the variables and the extent to which the independent variables explained supply chain performance. Findings show that there is a significant positive relation between ecommerce application and supply chain performance of the online retail shops. Application of ecommerce found to play significant role in efficiency, responsiveness, flexibility and customer service. Profitability and reliability were not found to be significantly related to the application of ecommerce. Perceived usefulness and perceived ease of use were found to be the triggering factors at higher level for the adoption of ecommerce. Therefore online retail shops and platforms need to invest much more on ecommerce applications to benefit and have better supply chain performance especially in the areas of information flow, material flow and financial flow of the supply chain. The government and other stake holders need to work more on ecommerce development to improve supply chain performances. Finally it is recommended that universities and research institutes to do more detailed researches to assess the status and benefit of ecommerce in many different aspects.

Keywords: *E-commerce, online retails, supply chain, supply chain performance*

Table of contents

CHAPTER ONE

1 Introduction

Almost all businesses face competitions and they need to look for ways to win the requirements of their customers. One of the major technological developments of this time that could provide the means for supply chains to arrive to the customer is e-commerce. The focus of this study is on the role of e-commerce in improving supply chain and it was intended to see how it plays role in the supply chain in cases of selected online retailers.

This chapter consists of background of the study, statement of the problem, objective of the study, research questions, scope of the study, delimitation of the study, limitation of the study, significance of the study, and organization of the study.

1.1 Background of the study

E-commerce is an inevitable reality as the prime promoter of commerce & trade, and become one of the most essential components for current international trade; it greatly changed the ordinary manner of international trade (UNCTAD, 2004).

Technology has motivated business to use it for their day to day operations. It has eased the business process. Today it plays an important role in improving business by helping them shift from traditional ways of operations to new effective ways of working. Businesses today have started working via websites and they are selling or buying via the internet. This type of business transaction is called ecommerce. E-commerce technologies have created innumerable opportunities for businesses to develop and streamline their supply chains (Abdulaziz, 2016).

Competition of this time is across supply chains, not among individual companies. A supply chain is a network of facilities and distribution options for the entire network of companies to work together end to end. For e-commerce business, major requirements are websites and effective Supply Chain Management (SCM) (Anni-Kaisa, Katrina and Veli, 2013).

Until 1991, the Internet had less than 3 million users around the world, and its application to e-commerce was almost nonexistent. By 1999, an estimated 250 million users accessed the Internet and almost 50 million of them made purchases online from e-commerce sites, worth

approximately $ 110 billion (Copell, 2000). It is also evident that as of September 2006, over 1 billion people (or 16.7% of the world population) had access to the Internet. But, in developing countries, usage rates are significantly lower than in developed countries (Guilherme et al., 2007).

The focus of firms involved in a modern supply chain at this time is to rethink, redesign, and rework how businesses and public services operate. Typically, they are working in improvement of productivity, effectiveness, and efficiency, both internally and in the external relationships with clients, customers, suppliers, and business partners to accommodate the demand of this changing environment (Belaynew, 2012).

Rapid growth of internet and advancements of information technology have led to development of globalization. These advancements have removed time and geographical barriers to the organizations which seek business and economic growth. This indicates regardless of time and geographical location business organizations are rapidly growing to satisfy their customer and business objective. For example the retail e-commerce sales ratio from 2014 to 2018 hiked around 200% (Haniska R., 2019).

Electronic commerce is in its infancy stage in Ethiopia and it is rarely used through business. Most Ethiopians do not have credit cards and internet connections are slow, expensive and unreliable. However, the current internet service has shown big improvements as a result of Ethiopia's connection to Secom's underground/sea fiber optic cable through Djibouti (Andrew, 2019). The right ecommerce law would create feasible environment for supply chains to benefit from it. In addition, the government has to make sure of access to and quality of internet services to be improved (Yohanis, 2019).

It is necessary to shift cultural perception on e-commerce through awareness campaigns across the supply chain actors in e-commerce, market-oriented policy and gradual liberalization of the telecom sector are crucial for competitiveness and economic development, only if careful policy choices are made to advance Ethiopia's ecommerce sector (UNIDO, 2018).

Even though there are different evidences about the growth of internet in Ethiopia. There is no enough data which state about e commerce growth and status and its role in supply chains. This

research was about the role of ecommerce in Addis Ababa and it tried to explain how e-commerce has role in supply chains.

1.2 Statement of the problem

Neighboring countries like Kenya and Uganda are intensively using their energy to promote and benefit from e commerce. According to UNCTAD (2019) Kenya is the third country in the e-commerce readiness index in Africa and Uganda is seventh. Kenya has about 9% of the population using e-commerce and in Uganda about 24% of the population is using e-commerce. However 0.03% of the population is using e commerce in Ethiopia (UNIDO, 2018). The country doesn't have e-commerce laws and regulations. All e-commerce related transactions are being governed by the five basic trade laws under the Ethiopian Civil Code which was declared in 1960. Absence of statistical data on e-commerce is one of the major challenges about domestic e-commerce assessment and information in Ethiopia (UNIDO, 2018).

The UNCTAD program on rapid e trade readiness assessments (also known as eT Readiness) launched in 2017 has been designed to contribute to the evidence-to-policy approach. These assessments are conducted by the request from developing countries to help evaluate their e-commerce ecosystems and provide recommendations regarding policies that should be devised to enhance their ability to engage in and benefit from e-commerce but Ethiopia didn't have even submitted request to benefit from such assessment (UNCTAD, 2019). Out of the 22 least developed countries (LDCs) that have been assessed in the past two years, ten are also land locked developing countries (LLDCs): Additional requests from LLDCs were received from Burundi, Mongolia and Zimbabwe. This e-trade readiness assessments describes the opportunities that e-commerce can offer for economic development and provides reach data and recommendations for the application of ecommerce (UNCTAD, 2019).

There are few e-commerce business models and start-ups in Ethiopia which are not fully fledged to exercise the e-commerce process due to the lack of an e-commerce regulatory framework (UNIDO, 2018). Quantification of the Ethiopia's domestic e-commerce markets in terms of their market size, transaction value, sales, customer number and major products were found to be challenging. The major reasons for this problem are the lack of deployment of trained human power in e-commerce companies and the national central statistic agencies who is responsible for

collecting analysis and divulging national information didn't gave appropriate attention to the necessary ecommerce-related information (UNIDO, 2018).

Supply chain in Ethiopia is not highly integrated and there are very lengthy and unnecessary chain members with a very weak link are involved in most supply chains to deliver the product and services for the customer. Therefore high cost and poor quality are the characteristics of products and services of most supply chains (Matiwos, 2015). To assess and explain the role of e-commerce in a supply chain improvement in Addis Ababa and provide some information and data about the current situation are the main objectives of this thesis.

The e-commerce is highly facilitating the trade and economy of developed and developing countries where its application is high. The ecommerce is playing a very important role in modern supply chain by shortening the chain length while increasing accessibility, fast delivery, better warehouse management and greater supply and logistic integration and many more advantages (Anni-Kaisa, Katrina and Veli, 2013).

The research wanted to show the capability of ecommerce to play similar role for poor countries like Ethiopia by selecting few case companies to demonstrate the role of e commerce in the supply chain. Therefore the how ecommerce plays roles in the supply chain was the major problem to be solved in this research. Moreover the research has provided data about ecommerce of the selected online retailers in Addis Ababa. Based on the recommendation given by UNIDO (2018) shifting cultural perception on e-commerce through awareness campaigns across the supply chain actors in e-commerce is one of the most important assignments of the concerned body in the sector. Awareness creation also was one of the issues to be addressed by the research.

1.3 Research question

How e-commerce plays role in improving supply chain responsiveness?

How e-commerce plays role in the flexibility of supply chain?

How e-commerce plays role in improvement of customer service of supply chain?

How e-commerce plays role in improvement of profit in a supply chain?

How e-commerce plays role in reliability of a supply chain?

How e-commerce plays role in efficiency of a supply chain?

1.4 Research objectives

The general objective of this research was about explaining how e-commerce plays role in improving the supply chain.

The specific objectives were:-

To explain how e-commerce plays role in improving supply chain responsiveness.

To explain how e-commerce plays role in the flexibility of supply chain

To explain how e-commerce plays role in improvement of customer service of supply chain.

To explain how e-commerce plays role in improvement of profit in a supply chain.

To explain how e-commerce plays role in reliability of a supply chain.

To explain how e-commerce plays role in efficiency of a supply chain.

1.5 Significance of the study

The significance of this study is to provide insight to business companies for the design of their future directions and to adjust their goals and objectives as per real positive role of ecommerce in their supply chain. Additionally, it enables government organizations and trade associations to develop ecommerce assistance programs which are designed to address the problems and limitations in the sector.

The study results can serve as additional source for reference and it can also serve as a spring board for other researchers who want to conduct detailed research on the issue. So apart from providing a useful insight, it is strongly expected to instigate other researchers to undertake a consideration of information in this research.

The findings in this study provide to supply chain managers with critical information on the need for e-commerce solutions in enhancing the efficiency of supply chains. Such information is critical in making decisions on how to go through the evaluation and implementation processes.

The research also provide recent information with the current situation of the Ethiopian e-commerce and the role of it on supply chain and this may serve as a reference and may motivate for further study. Educational institutes may get an idea from such studies about the existing knowledge gap to implement ecommerce technologies.

The explanations in this research help the government officials and policy makers to consider the positive role of ecommerce in supply chain and design and articulate the policy favoring the e commerce so as the country can benefit from the sector.

1.6 Scope of the study

The scope of the study was to assess few online retail companies which were assumed to show the role of ecommerce in the supply chain in Addis Ababa. Moreover it was only going to show the role of ecommerce in the supply chain from the major suppliers or service provider side only. Explanatory and descriptive research design and mixed (qualitative and quantitative) research method was adopted in this study. It was mainly focusing on the retailers side view. The business to customer (B2C) and customer to customers (C2C) models of ecommerce were the major research focuses therefore the research output may not be generalized to other ecommerce models.

1.7 Limitation of the study

While undertaking this study, researcher has encountered some limitations like; absence of well-organized and documented information with regard to e-commerce in Ethiopia, shortage of reference materials about ecommerce practice in Ethiopia enforced the research to depend largely on foreign countries experiences. Many selected retailers didn’t respond to the questioners. The study was also limited to the retailer perspective of the online retail supply chain which doesn’t represent the whole supply chain. Since the data was collected from selected plat forms it is difficult to generalize the findings and results to all online retail supply chains in

Addis Ababa. Due to these reasons the researcher was bounded to work on a very limited amount of data and information.

1.8 Definition of terms

E-commerce: is the process of selling, buying or exchanging products, services, or information via computer networks usually the internet.

Supply chain management: is the coordination of all supply activities of an organization from its suppliers and partners to its customers.

Information flow: The flow of information from the suppliers to the customers or from customers to suppliers through the supply chain links.

Physical flow of goods and services: The flow of goods and services from suppliers to customers or from customers to suppliers through the supply chain.

Financial flow: The flow of finance from the customer to supplier or from supplier to customers through the supply chain.

1.9 Organization of the study

The research paper is organized in five chapters. Chapter two is about review of related literature. Chapter three addresses research methods which explain the design, sample procedures, instrument and data analysis techniques issued to achieve the purpose of the study. Chapter four is about data presentation, analysis and interpretation while the fifth chapter forwards the summary and conclusions from the findings and recommendation.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2. Introduction

The student has been reviewing different literature so that to base the research on firm theoretical support. A researcher should support research problem issues using theoretical frame work. The proper selection and presence of a theoretical framework shows to any reader that the study is not based on the personal instincts of the researcher but rather it is firmly rooted in an established theory (Akintoye, 2015, cited in Dickson, Emad and Joe, 2018). Therefore this chapter includes theoretical literature review, empirical review, conceptual framework and the literature gaps.

2.1 Theoretical literature review

The impact of e-commerce in supply chain management (SCM) has gained significant interest in researchers and academics of these times since e-commerce and SCM are critical success factors for any firm (Alexander, 2014). For the description of the role of ecommerce in improvement of supply chain, we have to see what supply chain and e-commerce are, and how can e-commerce plays role on improving supply chain, referring to different literature.

2.1.1 Supply chain

There is no single definition about supply chain but we can consider few definitions given by literature which are closer for the purpose of this topic. A supply chain is the flow of materials, information, money, and services from raw material suppliers through factories and warehouses to the end customers. A supply chain also contains the organizations and processes that create and deliver products, information, and services to the end customers (Gupta & Sahay, 2007).

The supply chain is a network of autonomous or semi-autonomous business entities involved, through upstream and downstream links, in different business processes and activities that produce physical goods or services to customers (Samaranayake, 2005). Managing different groups and activities requires an approach that can effectively and efficiently interact among the groups in order to provide high quality service/goods especially when businesses use resources from different parts of the world (Abdulaziz, 2016).

A supply chain is made up of various stages, which involve in conversion of raw material in to final products and its delivery to the end customer. It includes all the major functions i.e. order management, planning, operation, inspections, packaging and distribution, etc. Moreover, supply chain is the approach to control and facilitate the flow of materials, information and finance (Matiwos, 2015).

Supply chain Management (SCM) includes the logistics flows, customer order management, the production processes, and the information flows necessary to monitor all the activities at the supply chain nodes (Sevensson 2002, cited in Matiwos, 2015). The purpose of supply chain operations is putting the right resources and products to the right places at the right times, while producing the highest possible profits (Amit and Thomas, 2004).

2.1.2 Ecommerce

E-commerce is the process of buying, selling, or exchanging products, services, and information mainly through the Internet. E-commerce from different perspectives: Communication perspective: e-commerce is the delivery of goods, services, information, or payments over computer networks or by any other electronic means, business process perspective: e-commerce is the application of digital technology towards the automation of business activities and operation flow, Service perspective: e-commerce is a tool that satisfies the objective of firms and consumers to cut service costs while improving the quality of goods and improving the speed of service delivery, Online perspective: e-commerce provides the ability of buying and selling products and information through the Internet and other online services (Turban *et al*., 2002, cited in Alexander, 2014).

E-commerce is a tradition which is applicable by the use of ICT and focusing on electronic data interchange and through value added networks. It is electronic data transfer by the use of information communication systems among different entities. In fact, electronic transfer of data involves hardware, software and different standards and protocols for further electronic exchange of data (Obrein, 2001).

Ecommerce is a new method of handling business and it involves all perspectives of business processes including commercial activities like marketing, engineering and production and also

supports business operations like finance, information systems, human resources, accounting, purchase, transportation, and other similar activities in a supply chain (Turban et al., 1999).

Business would conduct different types of e-commerce in accordance with their companies' characteristics. Among them are Business to Business (B2B), Business to Consumer (B2C), Business to Government (B2G), (C2B) and (C2C) consumers to consumers ecommerce activities can be listed as the most common ecommerce models (Misevičiūtė, 2001).

2.1.3 Diffusion of Innovation Theory

Diffusion is the social process by which an innovation is transmitted through certain channels over time among members of a social system (Rogers, 1995). This process is similar with the task at hand in the electronic commerce setting; that is, a task or transaction needs to be communicated to a set of firms or customers (members of a social system) within a market or an industry. The communication pipe typically chosen for the present purposes is that of an electronic connection in the form of electronic data interchange (EDI), the use of the Internet, or the WWW. From a diffusion perspective, in which time, speed, and cost with respect to effectiveness and efficiency are the objectives (Rolf, 1997).

The stapes through which a technological innovation passes are:

The first step is Knowledge (exposure to its existence, and understanding of its use and activities). The second one is persuasion (the forming of a favorable attitude to it); and the third step is Decision (commitment to its adoption); the forth the step is Implementation (putting it to use); and finally Confirmation (reinforcement based on positive outcomes from it) is the last step (Rolf, 1997).

Rogers (1995) proposed that adoption behavior is influenced by beliefs related to relative advantage, compatibility, complexity, trial ability, and observe ability.

Relative Advantage is defined as the degree to which an innovation is perceived as being better than the idea, product or service it supersedes. The relative advantage of an innovation is highly innovation-specific.

Complexity is defined as the degree to which innovation is perceived as difficult to understand and use.

Compatibility: The degree to which innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters.

Trial ability: The degree to which innovation may be experimented with, on a limited basis.

Observe ability: The degree to which the benefits of an innovation are detectable to others.

This theory is the contributor to the study to consider a research question that the application of ecommerce can play a role in efficiency in terms of time and cost.

2.1.4 Transaction cost theory

Transaction costs may be seen as the economic equivalent of friction in a physics that is, if friction is too high, no or minimal movement will occur suggesting that if transaction costs are high, no or little economic transaction is likely to occur. These costs are made up of the following four types:

Search costs- the cost for searching of information, products, sellers, and buyers; Contracting costs- the cost of making up a business deal and carrying out the contract; Monitoring costs- the cost controlling and monitoring that the terms of the contract have been met; Adaptation costs- the cost incurred to customize new changes during the life of the contract Firms will choose transactions that economize on coordination costs (Rolf, 1997).

Transaction cost savings may be gained through the use of information and communication technology within the entire business hierarchy and resulting market or value chain. Benjamin and Wigand (1995) demonstrated an example of the purchase of a high-quality shirt with empirical cost figures clearly showing actual savings in transaction costs resulting in minimizing purchase costs for the consumer. Moreover, this example explains nicely how the potential elimination of entire levels within the market. From Wigand (1995) market hierarchy (e.g., wholesaler, retailer) one may argue that with low coast coordinative transactions, interconnected networks and their strategic deployment, and easily accessible databases, there would be a

proportional shift of economic activity to cheaper electronic communications channels to conduct a firm' s business.

This theory support the study with the basic concept that the application of ecommerce in information flow financial flow and material flow can smooth the transaction. Since the theory is explaining about reducing transaction cost as key role in any business application. This study considered application off ecommerce to reduce transaction cost of the supply chain.

2.1.5 Technology Acceptance Model

TAM aims to provide a demonstration of the determinants of the technology acceptance that are general, capable of describing user behavior across a range of technologies and user populations while simultaneously both parsimoniously and theoretically being justified (Davis, 1989). The basic TAM model involved and tested two specific beliefs: Perceived Usefulness (PU) and Perceived Ease of Use (PEU). Perceived Usefulness is defined as the potential user's subjective likelihood that the use of a certain system (e.g: Single ecommerce platform or E payment System) will improve his/her action and Perceived Ease of Use implies to the degree to which the potential user expects the target system to be effortless (Davis, 1989).

Venkatesh & Davis, (2000) stated that the behavioral intention to use of an individual is based upon two beliefs, namely perceived usefulness and perceived ease of use. Both mediate the effects of external variables, such as system characteristics, development process, training, on intention to use. In addition to that, perceived ease of use has an impact on perceived usefulness which sources from the fact that the easier a system is to use, the more useful it may be.

The major variables are included in TAM are five which are; perceived usefulness, perceived ease of use, and attitude towards using, behavioral intention and actual use. The two main variables namely perceived ease of use and perceived usefulness are hypothesized to be the specific determinants of user acceptance model (Davis, 1989). Perceived usefulness is defined as the expectation that the technology will improve job performance and service delivery and perceived ease of use is defined as the belief that using technology will be free of effort (Davis, 1989).

2.1.6 Perceived ease of use

Perceived ease of use is declared as the “the degree to which an individual; believes that using a particular system would be free from application effort” (Davis, 1991). It has also been defined as a user’s subjective perception of the effortlessness of a computer system. Considering all other factors constant, an application perceived to be easier to use than another is more likely to be more accepted by users. Perceived ease of use explains the user’s perception of the amount of effort required to utilize the system or the magnitude to which a user believes that using a particular system will be effortless (Davis, 1989). Perceived ease of use consists of the following dimensions: easy to use, easy to read, easy to understand terms, easy to search related information and easy to return to previous page. This involves facility, complexity and change management.

2.1.6 Perceived Usefulness

Perceived usefulness has been described as a person’s subjective perception of the ability of a technology to increase job performance when completing a task, which affects their perceived usefulness thus having an indirect effect on user’s technology acceptance. It is defined as the degree to which a person believes that using a particular technology will enhance his or her job performance (Davis 1989).

People tend to use or not to use a system to the extent their understanding if it will help them to perform their job in a better way Davis (1989). Usefulness can also be defined as the prospective adopter’s subjective probability that applying the new technology from foreign sources will be beneficial to his personal and/or the adopting company’s wellbeing Phillips (1994). Or that using certain system or technology would improve the way a user could complete a given task. Perceived usefulness describes the user’s perception to the extent that the technology will improve the user’s output performance Davis (1989). This means that the user has a perception of how useful the technology is in performing his tasks. This includes minimizing the time for doing the job, more efficiency and accuracy.

2.2 Empirical literature review

2.2.1 The role of ecommerce on supply chain

Electronic commerce is a system that enhances and improves the company's performance. It is used in every aspect within the organization whether it was externally or internally. Therefore, if companies apply ecommerce technology in the supply chain, the relationship that they will have with the suppliers or customers will be positively affected in many different ways (Abdulaziz, 2016).

The role of e-commerce has also come into play in improving economic growth, smoothing the transformation and upgrading of traditional industries and creating strategic emerging industries. At the same time, the reverse release of e-commerce also faces a large number of consumer demands that have not been effectively met. Online consumption has gradually replaced offline retail (UNIDO, 2018).

2.2.2 Efficiency

From resource management perspective efficiency is an independent measure for evaluating firm's productivity. Output produced per resources utilized should equal 100 % inclusive losses. Efficiency seen in this formula is a good measure of a closed system's output. Efficiency is therein explained as a compound evaluation of quality, delivery, cost, and general capacity which is not only planned and reviewed in the relationship but also a measure of the relationship. The efficiency of the producing/using system is influenced by number of interdependencies through relationships. Efficiency is thus evaluated of different parties within the exchange system and negotiated interdependencies determine efficiency goals.

Ecommerce technology made a powerful tool in contemporary supply management. Efficient information integration between supply chain members delivers several advantages for the business partners, such as the automation of routine work, shorter lead times, transparency and opportunities for further improvements (Goutsos and Karacapilidis, 2004, cited in Anni-Kaisa, Katrina and Veli, 2013)

2.2.3 Flexibility

In the SCM high speed and low cost supply chains have been equally important drivers for companies. Depending on the market the firm is in, these supply chains work perfectly in steady conditions since the overall supply chain is focused on economies of scale, delivering quick supply for the least amount of money. However, these supply chains are not able to respond on sudden changes in demand.

Several articles explain how current market conditions need supply chains that are capable of dealing with sudden changes of demand and strategies instead of a cost and/or speed oriented view only. Changing market demand, differing supplier fulfillment time, product quality and information delay Giannoccaro (2003) are causes of uncertainty that create a need for building 'flexible'- supply chains that can deal with these changes and preferably in a better way than their rivals. In doing so, a competitive advantage can be achieved. Literature about flexibility in supply chain management discusses many definitions about this concept. Viswanadham & Raghavan (1997) describe this concept as the capability of a business process to effectively manage or act to changes with little loss in time, cost, quality or performance. Lee (2004) describes the flexibility of a firm in terms of three diferent components. Adaptable: Adjust the supply chain's design to meet structural shifts in markets, modify supply network strategies, products and technologies (Lee, 2004). Alignment: Create incentives along the partners within the supply chain for better overall performance (Lee, 2004).

Agility: The ability of a supply chain to react to short-term changes in demand or supply quickly and handle external loads smoothly (Lee, 2004). Though alignment is considered to be one of the aspects of flexibility Lee (2004), we consider this aspect as a requirement for a supply chain in order to deal with uncertainty: a supply chain can only deal with changes when common agreement is made between all the supply chain partners and change of strategies is necessary.

2.2.4 Responsiveness

Responsive supply chains mainly are focused on how fast they can react to the customer needs and the facilities such type of manufacturing operations which can produce variable capacity. In short, responsive supply chain controls the issue of aggressive deduction into lead time by sacrificing the cost occurred. Quality aspects like flexibility and speed with which they deliver,

decide the fate of vendors who bid for supplier contracts is only possible through the responsive supply chain (Brant, 2009).

E-commerce based on information technology contributes to the enterprises to span the traditional organizational form, in a manner that maximum the network to connect the customers, retailers, manufacturers, suppliers and employees together, continuously promote the relationships between different supply chain members, reintegration the whole value supply chain, let supply and requisitioning parties get most useful market information in the most right time, make all the enterprise in the supply chain to reach win-win (Meng, 2012)

Catalan and Kotzab (2003) define responsiveness of a supply chain as the capability to react and manage time effectively based on the ability to read and understand actual market signals. Fisher (1997), Christopher (2000) and Grossmann (2005) suggested that responsive supply chain is an essential strategy to gain competitive advantage. Hines (1998) also explained how the responsive supply chains facilitates for a new generation of product, new product development, within a shorter time period and are thus able to achieve an edge over their competitors in terms of capturing market shares.

Electronic commerce and supply chain have become an important section of today's world business and an important element of success. Without a clear structure of the supply chain, companies will face a lot of delays, breakdowns, or mistakes in the delivery. However, with the implementation of e-commerce, businesses can easily track the flow of the shipment and delivery, reach a wide range of customers and markets, and gather information (Abdulaziz, 2016).

2.2.5 Market accessibility

E-commerce makes market access easy for businesses to directly reach wide range of customers by selling products and providing services over the internet (Abdulaziz, 2016). E-commerce has the potential to breakdown many of the traditional barriers to supply chain management caused by geography (Chitra, 2008).

E-commerce provides potential benefits to firms in the form of enhanced participation in international value chains, increased market access. For consumers, online shopping helps

comparisons of prices and acquiring information of features of a wider range of products. It also allows consumers to purchase at times convenient to them and to have packages delivered to their homes. It reduces market entry barriers for MSEs (UNCTAD, 2017).

2.2.6 Cost minimization

E-commerce decreases the costs by transacting documents electronically through the internet. Also, it allows the exchange of information without high cost and the loss of money and time. Moreover, integrating the ecommerce in the supply chain will cause the reduction of the retailers in the channel of distribution which allows the business to directly sell and deliver the products to the customers and minimize the cost (Abdulaziz, 2016).

The gathering, analysis, and dispatching of information through improved e-business technologies have become more precise and far cheaper. As a result, lower inventory levels can be maintained throughout the supply chain, while still allowing producers and suppliers to meet desired demand and minimize their inventory cost. Logistics costs have decreased because inventories are managed more efficiently, warehousing expenses have been reduced, and risks have been minimized (Amit and Thomas, 2004).

E-commerce affects all major areas of supply chain work in companies from design, through buying to fulfillment and service support. Speed, cost, quality, and customer service are the metrics by which supply chains are measured. Consequently, companies must clearly define the measurements for each of these four metrics, together with the target levels to be achieved. The target levels should be attractive to the business partners (Alexander, 2014).

How to integrate and optimize the systems of online shopping supply chain, how to take measures to cooperate with delivery logistics services and how to optimize the relationship between the members in this system, all these are worth thinking issues. E-commerce has the capacity to have an impact on the physical, information and financial flows of supply chains. At a simplistic level, supply chains are typically made up of these three major flows (Alexander, 2014)

In contrast to many other studies Susan *et al* (2002) observed on their research that increased information visibility leading to higher levels of uncertainty. Relationship management can

enable trading partners to more efficiently deal with increased visibility of information afforded by the e-commerce environment. Information overload often leads to uncertainty as firms struggle with decisions regarding which information is important and how to interpret it.

Due to the high growth of e-commerce, more and more people can benefit from its convenience, but it is not without its problems. The main serious one is the infringement of intellectual property rights and malicious falsehood in competition between e-commerce firms, which has brought social attention. Internet security includes the usability, confidentiality, integrity and facticity of information. Many networks ensure the payment and personal information by setting security protocols. The use of security servers can decrease online security problems to a certain degree as they use encryption technology to avoid being wiretapped during the data transmission of online business (UIDO, 2018).

2.2.7 Global e-commerce

The growth of e-commerce is a special opportunity to create access to international markets for small and medium-sized enterprises (SMEs) in developing and least developed countries (LDCs). E-commerce was estimated at over US$15 trillion for annual business-to-business transactions and over US$1 trillion for annual business-to-consumer transaction trade is now a normal business in developed countries. However, this is not the similar in many developing countries where the use of e-commerce remains very poor. By 2018, the African e-commerce market is increased to US$ 50 billion, from just US$ 8 billion in 2013 (UNCTAD, 2018).

In 2014, approximately 110,000 e-commerce websites generated revenue worldwide, while in 2016 the number reached more than 1 million. In 2018, the number of global Internet users was 4.157 billion and the Internet penetration rate had reached 54.4%. China is the world's largest Internet market with about 772 million Internet users and an Internet penetration rate of 55.8%. China's B2C online retail market reached US $187.74 billion with an increase of 43.2% in 2017. The number of Internet users in India has reached 462 million, making it the second largest Internet market in the world. In countries like Denmark, Germany, Netherlands, Norway, Sweden and the United Kingdom more than 80 per cent of Internet users make purchases online (UNIDO, 2018).

E-commerce therefore brought high promise for enabling buyers and sellers from developing countries to benefits of global markets. By the end of 2015, there were 3.2 billion people using the Internet, and two billion of them were in developing countries. There will also be more than seven billion mobile cellular subscriptions, corresponding to a global penetration rate of 97% (UNCTAD, 2018). Mobile payment makes payments easier and more accessible therefore stimulating B2C e-commerce development. In addition, the transaction rate is also expected to increase from US $1.6 trillion in 2014 to US $3.4 trillion in 2020. During 2011 – 2013, global B2C e-commerce maintained an annual growth rate of over 20%. While there was a decline in growth during 2014 – 2016, in 2017, global B2C e-commerce returned to a growth rate of more than 20% and it was faster than the past three years (UNIDO, 2018).

Dell Company is one of the initiators in incorporating e-commerce into its supply chain. Many researches had been conducted taking this company as a case study focus. For Dell, selling online had caused the revenue to increase up rapidly which means customers are now encouraged to purchase products through the Internet using a Smartphone or PC rather than a retailer shop. By removing the intermediate chain members, Dell had also improved and enhanced customer satisfaction by 70% due to having a direct contact with the end user (Abdulaziz, 2016)

Boing 787 Dreamliner project is said to be one of the largest, most complex, and challenging engineering projects being undertaken in the world (Kumar and Gupta, 2006). The supply chain involved in the design and production of this aircraft involves millions of different parts and materials, and thousands of different suppliers, partners, contractors, and outsourcing vendors scattered across 24 countries working from 135 different sites. Absolute precision and meticulous attention to detail is required, and safety and quality are paramount. In addition to designing and producing new aircraft, the new production processes had to be designed, tested, and implemented. Close collaboration and communication among thousands of employees, information and knowledge management, and sound management of this complex global supply chain were essential to the project's success. The Dreamliner, however, was to be a "paperless airliner," with e commerce being employed to support many critical activities. Boeing created a Global Collaboration Environment (GCE), a product management lifecycle solution, in order to support the virtual rollout of the new aircraft.

Ecommerce has played a critical role in supporting collaboration throughout this massive project, reducing the need for physical prototyping and testing, and making substantial impacts on the supply chain. Ecommerce has enabled faster decision making, better management of critical information and knowledge assets, increased sharing and exchange of product-related information and process, reduced time-to-market less rework and reduced costs of manufacturing by reducing the final assembly time for the aircraft from 13 to 17 days to just 3 days (Albert, Balan and David, 2016).

2.2.8 E-commerce in Africa

The major reason for believing that e-commerce will soon start to have a fundamental impact on Africa is the growing number of e-commerce platforms developed from inside the continent itself, sometimes supported by foreign investment. In 2014, American hedge fund Tiger Global Management injected US$ 100 million in South African online shopping company. Nigeria's Jumia was having a net worth at nearly US$ 550 million, including a EUR-120 million investment in November 2014 by Rocket Internet, a German-based global ecommerce investment company.

There are issues on financial transaction systems but PayPal, an international payment solution platform used by various marketplaces, may overcome some of these transaction problems. It has about 152 million active accounts with in 200 markets and transact 9 million payments per day in 2014. In Africa, PayPal is available in 50 countries, but in only 13 of them can have a business account in which it can receive payments. Third-party payment providers such as PayPal also face a number of regulatory and commercial low challenges in different countries in deciding which markets to serve (UNCTAD, 2015).

The B2C e-commerce market in Africa was transacting about $ 5.7 billion in 2017, which relates to less than 0.5% of GDP, far below the world average44%. While Africa needs to boost Internet penetration to grow e-commerce, it also needs to get more of its current Internet users to trust the online market for making purchases. Unlike developed markets such as the European Union, where 68% of Internet users made an online purchase in 2017, the related magnitude in Africa was only 13% on average in 2017. If the ratio of online shoppers to Internet users in the region

was increased to 50%, an additional 77 million online shoppers would be added and the estimated B2C revenue (UNCTAD, 2018).

There are reasons to be considered that Africa's broadband penetration gap will narrow. One of the reasons is the International Telecommunication Union (ITU) has called mobile telephony in Africa a "game-changer", projecting that at the end of 2014 there will be 630 million mobile subscriptions on the continent, 27% of them offering broadband connection rates. E-procurement systems can highly reduce the costs of governments which incurred in the traditional offline procurement process. They also decrease the time and expenses incurred by organizations in submitting their bids. This is particularly important for small local businesses, which often find the traditional procurement process too expensive and time-consuming, given their limited resources (UNCTAD, 2015).

Country	As a share of Internet users (%)	As a share of population (%)	Latest data
Kenya	24	9	2017
Ethiopia	0.3	0.03	2017
Nigeria	10	4	2017
Uganda	23	4	2017
Rwanda	11	1	2017
Zambia	21	5	2017
Zimbabwe	12	4	2017

Table 2.1: Percentage of the population using e-commerce in some African countries adopted from (UNCTAD, 2019).

The table shows how far behind African e commerce with related to developed countries. As an example 83% of the united Kingdome population is using e commerce but the number in African countries with best experience is less than 10%.

2.2.9 E-commerce in Ethiopia

It is very difficult to find the application and impact of e commerce information in Ethiopia. There are few researches mainly focusing why e-commerce is not applicable in Ethiopia. Many challenges described in these researches for example Ann and Yasin (2014) stated on their work that enterprises in the country have low levels of e-commerce utilization due to: (1) the scarcity

of infrastructure development and expertise in the area, and (2) barriers created by government policy and bank regulations.

There are few e-commerce models (B2B, B2C, C2C, O2O & C2M) and start-ups in Ethiopia which are not fully released to exercise the e-commerce process chain due to the lack of an e-commerce regulatory framework and financial system. Hence, quantification of the domestic e-commerce markets in terms of their market size, transaction value, sales, customer number and major products were found to be challenging (UNCTAD, 2018). This might be justified by the lack of deployment of trained human power in e-commerce companies and the national central statistic agencies responsible for collecting analysis and divulging ecommerce-related information.

The majority of C2C e-commerce practices constitute as online-to-offline e-commerce in Ethiopia, due to also to an unavailability of credit cards to customers or due to poor delivery logistics systems. O2O is a business strategy that draws potential customers from online channels to make purchases in physical stores by motivation customers through emails and advertising (UNIDO, 2018).

Among the new emerging e-business activities in Ethiopia, Eth-Switch and the iceaddis e-commerce business models are the most pioneer examples. Eth-Switch is owned by the Ethiopian Banker's Association. The National Bank of Ethiopia helped the company to establish a national payment system as an important step in order to build collaborations with all the connected member banks and for them to benefit from interoperability as well as to provide a new level of convenience and access for their consumers (UNIDO, 2018). Eth-Switch S.C. has posted a net profit of 12.6 million Br for the year 2019; it is the first positive record in the company's history. The number of transactions hosted by Eth-Switch has reached 11 million, with 30 million balance inquiries and with a total of 10 billion Birr in cash transactions in the last year. This has shown a 72% increase in the number of transactions and a 60% increment in cash transactions from the previous year (Fikiru, 2019).

Manisha, Nagender and Omprakash, (2016) on their study show that Ethiopia doesn't have significant and effective e-commerce platforms and Information and Communication Technology (ICT). For the enhancement of e-commerce in Ethiopia, government has to prepare

draft law to govern e-commerce and provide e-commerce infrastructure like e-shipment mechanisms and e-payment systems.

Rank in Africa	Economy	Share of individuals using the Internet (2017 or latest)	Share of individuals with an account (15+, 2017 or latest)	Secure Internet servers (normalized) (2017)	UPU postal reliability score (2017 or latest)	Index value (2017 data)	Index value change (2016-17 data)	World Rank
2	Nigeria	42	40	52	85 5	54.7	5.5	75
7	Kenya	39	82	37	27	46.2	3.7	89
8	Uganda	17	59	31	58	41.5	-3.2	99
35	Ethiopia	15	35	4	17	17.8	-0.4	141

Table 2.2: The e commerce readiness index rank of Ethiopia and few African countries adopted from (UNCTAD, 2018).

Ethiopia is very far behind the world in using e commerce according UNCTAD (2018) report it was 141st from the 155 assessed countries and it is 35th from African countries. Some of the major observed problems are lack of expertise to adopt e-commerce, Unavailability of legal frameworks for e-commerce, Cultural preferences for traditional commerce, Low levels of e-literacy and less awareness of e-commerce practices, Limited use of the Internet among businesses and consumers, Insufficient access to affordable ICT infrastructure, Absence of statistical data on e-commerce, Inadequate trade logistics and facilitation, Lack of security and trust in online transactions (UNIDO, 2018).

2.2.10 E commerce and COVID19

On Jan. 23, 2020, the Chinese government imposed a full lockdown on the City of Wuhan. Eleven million citizens were placed in quarantine and all major highways were blocked. The lockdown would last for 60 days – a duration no one expected at the time of the announcement. The two biggest e-commerce companies Alibaba and JD were playing the critical role in helping to prevent the spread of COVID. This great example is teaching how responsive agile and flexible can a supply chain be through ecommerce (Chengyi,2020).

JD.com and other retailers deployed their new automated technologies into Wuhan. They shipped smart vehicles to the Wuhan boarder, loaded the local map, and remotely operated (from Beijing,

about 750 miles away) deliveries of donated goods to hospitals and household purchases to communities in Wuhan. The empty streets were an ideal sandbox for experimenting with the smart machines. At the same time, they made it possible for the retailers to cope with surges in demand needs without violating government restrictions. In a moment of creativity, JD's local logistics team proposed deploying the drones, which did the job in just 20 minutes to the farthest place in Wuhan (Chengyi,2020).

In order to implement effectively the social distancing measures aimed at containing the further spread of COVID-19, several governments around the world have encouraged online marketing. Consumers have changed their shopping patterns and behaviors to reduce risks of getting infected. In some developed countries, distribution service platforms have managed to address problems without government intervention. In developing countries, some governments have been more proactive than others, and in particular in countries where face-to-face transactions had, until now, remained the norm. For example, in some African countries, to facilitate online purchases of essential food items, local governments have compiled and circulated, via social media and other means, the telephone contacts of coordinators of different food products in various markets to enable consumers to call and order groceries. Consumers then pay with mobile money (i.e. by means of their mobile phones) and have their purchases delivered by bicycle and motorcycle taxis known as tuku-tukus3 operated, for example, by Uber, SafeBoda, or other similar options. This expansion of delivery services has had positive knock-on effects for increased employment, even if these may be temporary (WTO, 2020).

As well as mentioning the pick in e-commerce during the COVID-19 crisis, the report looks at measures taken by governments to facilitate e-commerce and some of the challenges meeting these initiatives. Governments have worked to improve network capacity, encourage the provision of expanded data services at little or no cost, and lowered or scrapped transaction costs on digital payments and mobile money transfers. (WTO, 2020).

Following the COVID 19 in Addis Ababa many new online retailers are opened to rich their customers who are at home due to the COVID. The examples are like Safeway supermarket, different restaurants, Asbeza.com, Atikilt tera.com, and many different companies launching online service including Ethiopian electric utility for its service payment it started to collect the money through electronic payments like CBE birr.

2.3 Conceptual frame work

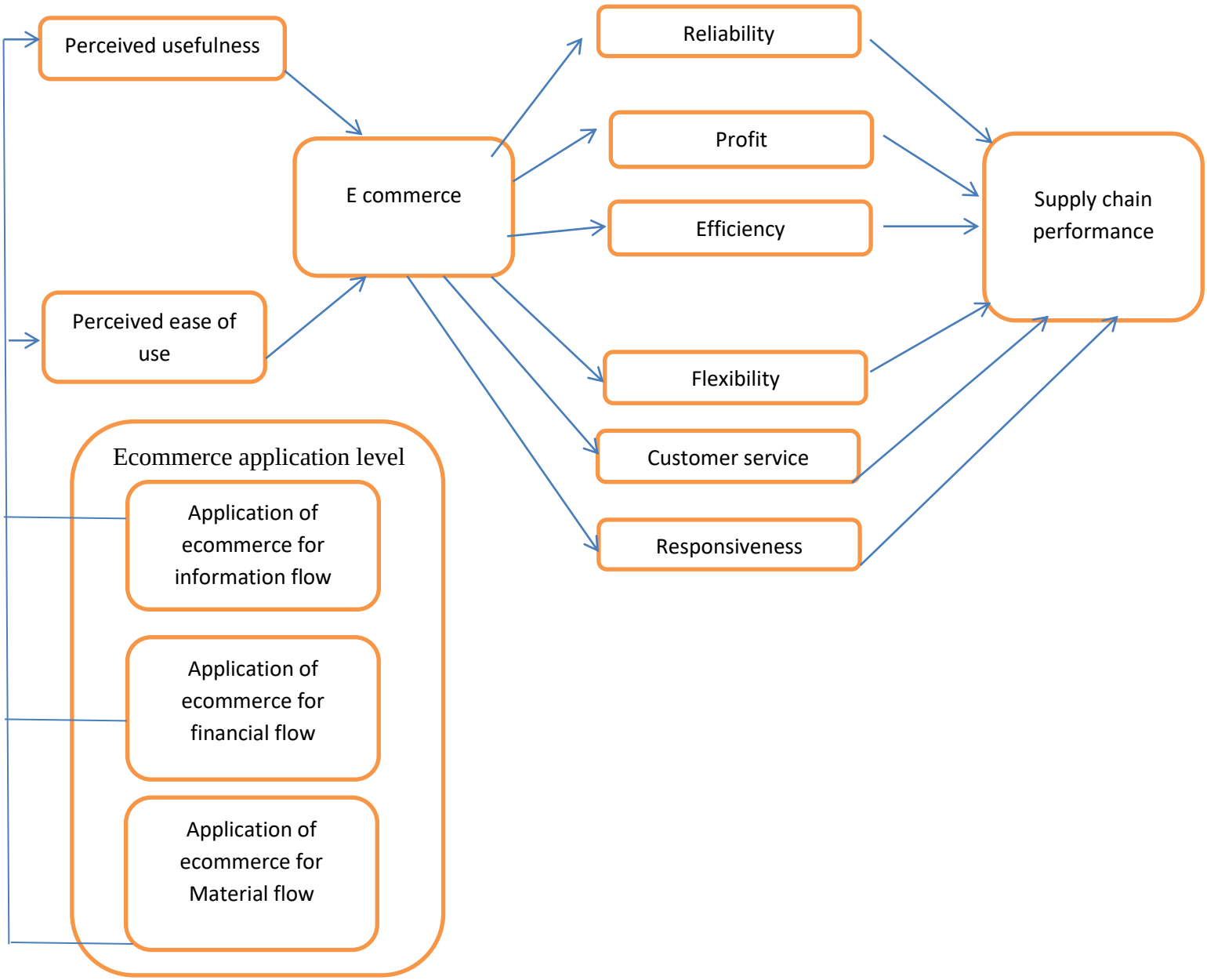

Fig 2.1 Conceptual frame work for the application of ecommerce adapted from TAM model (Davis, 1989)

The major independent variables under this specific study to be focused are application of e-commerce for information flow, application of e-commerce for financial flow and application of e-commerce for material flow. The cumulative resultant of these variables will tell us the application of ecommerce in a supply chain. To identify, explain and quantify the relation

between application of ecommerce for the case of online retail shops and the supply chain performance were the major concern of this study.

2.4 Identified literature gap

Most of the literatures on the issue are from abroad. The student couldn't find enough research documents from local sources. Hence one of the major literatures gap is that there is no enough knowledge and information is given by them about our local situation of the issue. Since e-commerce is highly growing and based on rapidly changing ICT technology there must be new and current information for any decision to make. In this regard the literatures have no updated and enough information in our local situation. There are few literatures about e-commerce and its challenges and most of them are describing why e-commerce is not active or working in Ethiopia and telling opportunities and challenges of it. But the researcher couldn't find any research on the existing e commerce status and activities. The researcher believe the role of e-commerce on supply chain improvement in our local case need to be studied since there are companies working regardless of the challenges.

There is a change in banking system, in internet network quality and accessibility which were the issues mentioned as challenge in literatures which were conducted in Ethiopia. There is no information about the activity of e commerce and its role in our country after the recent changes mentioned. Therefore the researcher believes that many researches need to be conducted to provide resent information, knowledge and data about the role of e-commerce in supply chain improvement in Ethiopia.

CHAPTER THREE

METHODS OF THE STUDY

3.1 Description of the study area

The research focused on supply chains which implement e-commerce for their product or service delivery. The research was going to study specifically about B2C model of ecommerce type applications on supply chain. The major purpose of the e-commerce in the supply chain is to deliver the product or service to customer or consumer satisfying specific requirements. Efficiency and effectiveness of the supply chain are highly influenced by the e-commerce.

The study is mainly about explaining the role of e-commerce on selected few online retail companies who are using e-commerce for the delivery of service and products. The main focus area of the study is about online retailers in Addis Ababa and the study has collected data and information form systematically selected online retailers in Addis Ababa. The study intended to explain the activities of online retailers and their supply chain performance based on the information, financial and physical flow of goods and services in selected online retailers in Addis Ababa.

3.2 Research approach

The research was on selected e-commerce online retail service providers and it was a case study. The research used both quantitative and qualitative data and it may be considered as a mixed method approach to follow. Because, mixed research is useful to capture the best of both qualitative and quantitative research data and using these, the research also intended to examine detail features of the role of e commerce in supply chain. The advantage of using mixed methods is that it enables to triangulate and support the data and result collected by questionnaire (Greener, 2008 and Sunders, 2007 cited in Getinet, 2019).

The mixed method focuses on collecting, analyzing and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise was that the use of quantitative and qualitative approach in combination provides a better understanding of research problems than either approach alone (Kothari, 2004).

3.3 Research design

The research has been following descriptive and explanatory research designs. Explanatory research is mostly to explain how e-commerce plays role in supply chain. In explanation, the research was focused in exploring the reasons or the causes of the occurrence of certain behavior or event. It involves understanding the cause and effect relationship between phenomena. The researcher uses the facts or information already available to analyze and make a critical evaluation of the data/information (David, David and Geoffrey, 2005).

When we encounter an issue that is already known and have a description of it, we might begin to wonder why things are the way they are. The desire to know "why," to explain, is the purpose of explanatory research. It is a continuation of descriptive research and builds on exploratory and descriptive research and goes on to identify the reasons for something that occurs. Explanatory or analytical research aims to understand phenomena by discovering and cause and effect relation (David, David and Geoffrey, 2005).

To accomplish the study objective and to answer the stated research questions, descriptive and inferential statistics were employed. Descriptive statistics such as frequency, percentage, mean and standard deviation were used to assess application of e-commerce and measure the impact on supply chain performance. Inferential statistics such as correlation analysis and regression analysis were also applied to identify the relationship between e-commerce and supply chain performance.

3.4 Population and sample

The population of the study was the selected online retailers in Addis Ababa. The selected platforms are 22bole.com with 335 shops, Merkatoonline.shop with 72 shops, Qefira.com with 120 shops and Shola mart.com with 12 shops.

To decide the sample size the researcher has considered the margin of error to be 5 percent and confidence interval to be 95%. Hence the acceptable sample size for 539 population size is calculated to be 230 according to Cochran (1977).

After doing proportional calculation to each platform the samples were selected using probabilistic sampling method. The researcher distributed 230 questionnaires to the responsible

contact of the shops who are the managers of the shops or the owners of the shops. Finally 146 questionnaires were successfully collected which was about 63.5 % percent of totally distributed questionnaires.

Collecting back the questionnaires was the very difficult task mainly due to the Covid19. Hence the researcher was forced to conduct the study with minimum requirement of sample size according to Richard and David (2008)

Online shop platform	Population	Rate of population	Distributed questionnaires	Questionnaires collected back
22Bole.com	335	62.2	143	51
Qefira.com	120	22.2	51	19
Merkatoonline.shop	72	13.4	31	22
Sholamart.com	12	2.2	5	4
Total	539	100%	230	146

Table 3.1: Description list of the population and samples

3.5 Data source and types

The research has used primary source of data through questioners and secondary sources of data from different reports and literatures articles journals and magazines. Secondary sources like annual reports, the database and the websites of the companies ware very important sources for the study.

3.6 Data Collection procedures

Before the full scale survey, a sample of 15 respondents were selected and given the prepared questionnaire to fill. The major objective of the pilot taste was to check if it is possible to get the desired result using the prepared questionnaire and to identify and eliminate potential problems associated with question content and description. Based on feedback received from the test respondents few modifications were made in order to make it more clear and understandable to the full scale survey respondents.

The data was collected with the help of open ended and close ended questionnaire and anchored on a 5 point likert scale. During the full scale survey, the questionnaires were administered to the

target population through personal contact and email by the student and collaborators. Respondents are kindly requested to fill the questionnaire based on their experience on managing online retail shops using the platforms.

115 questionnaires have been distributed through email to the contacts provided in the platforms but only 22 respondents fill questionnaires and resend them. The rest 124 questionnaires are collected from the respondents through personal contact.

3.7 Ethical consideration

The author keeps the research ethics. Data providers, organizations and institutions were properly acknowledged and the information which has been collected from them was used for the purpose of the research objective only and the author has respected issues related to confidentiality.

3.8 Data Analysis

The statistical tool (SPSS) version 26 was used to analyze the data. Tables have been used to summarize responses for further analysis and to facilitate comparison. The researcher carried out a regression analysis so as to determine role of application of e-commerce for information flow, application of e-commerce for financial flow and application of e-commerce for material flow on supply chain performance. Similarly the regression analysis was carried out to evaluate the role of ecommerce on responsiveness of a supply chain, flexibility of a supply chain, efficiency of a supply chain and reliability of a supply chain. The correlation analysis was taken into account to evaluate whether variables have significant relation or not.

3.9 Validity Test

Data quality assurance is measured based on its internal validity which is instrument validity-using correct research instrument to accurately measure the variables during the data collection procedures. Validity of questionnaire has been examined through face and content validity. For this purpose, the questionnaires were given to professionals and owners of online stores from the selected online platforms, and thereby the validity was examined and necessary changes were applied.

3.10 Reliability Test

A test is seen as being reliable when it can be used by a number of different researchers under stable conditions, with consistent results and the results not varying. Reliability reflects consistency and replicability over time. In the same way, Reliability is a very important factor in assessment, and is presented as an aspect contributing to validity and not opposed to validity.

The reliability of a research instrument is established by including numerous comparative things on a measure, by testing various instance of people and by utilizing uniform testing methods The researcher has selected a pilot group of 15 respondents from the target population to test the reliability of the research instruments as recommended by Robert and Richard (2008) and has checked whether the Cronbach alpha to measure the reliability of the Likert scale questions. The alpha value ranges between 0 and 1 with reliability increasing with the increase in value. The coefficient of 0.7 is a commonly accepted rule of thumb that indicates acceptable reliability (Mugenda, 2003).

	Reliability Statistics		
	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Ecommerce adoption	.868	.864	26
Ecommerce application level	.740	.732	21
Supply chain performance	.739	.741	22

Table 3.2 Reliability statistics table of the Cronbach's alpha level of the variables

CHAPTER FOUR

RESULT, DISCUSSION AND INTERPRETATION

4.1 Introduction

This chapter of the study attempts to show results of the data analysis, discussion and interpretation of the data analysis. Frequency distribution was used to demonstrate the demographic profile of the respondents and description of the variables. Correlation and regression analysis ware also the analysis taken to satisfy the objective of the research.

4.2 Demographic Profile of the Respondent

As per the results, there were 108 male and 38 female respondents. This means that more males were working in the online retailing sector of selected platforms. The results show that the majority of the respondents (65.8%) were aged below 30 years. The least number of respondents (1.4%) were 50 years and above. The rest of the respondents who were between31-40 represented 27.4% whereas the respondents who were in the age bracket of 41-50 were 5.5%. This possibly suggests that most of the online retailers are young who were below 30 years of age.

The results show that the majority of the respondents 38.4% have attained degree and diploma with equal proportion, while the least number of participants have attained Masters (2.7%). The rest of the respondents were High school graduate (20.5%). The findings indicate that majority of online retailers in the selected plat forms are qualified Degree and Diploma.

The result show 39.7% of the retailers have more than 5 years of experience in doing business and 37.0% of the retailers have experience of doing business between 3-5 years. 1.4% of the retailers have only less than 1 year of experience. The rest (21.9 %) of the retailers are having less than 2 years of business experience. However 53.4 % of the retailers are only having less than 1 year of online retail experience, while 35.6% of the participant are having less than 2 years of online business experience. Only 1.4 % of the retailers are having more than 5 years of online retailing experience and the rest 9.6% were having experiences of 3 to 5 years. This indicate that majority of the online retailers were new to the online business who were having only less than a year of experience. The data may imply that the online retailing business participants are increasing in the recent years.

Table 4.1: Demographic profile of the respondent

Sex Of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	38	26.0	26.0	26.0
	male	108	74.0	74.0	100.0
	Total	146	100.0	100.0	

Age of respondent

Valid	18-30	96	65.8	65.8	65.8
	31-40	40	27.4	27.4	93.2
	41-50	8	5.5	5.5	98.6
	>50	2	1.4	1.4	100.0
	Total	146	100.0	100.0	

Educational back ground of the respondent

Valid	High school graduate	30	20.5	20.5	20.5
	diploma	56	38.4	38.4	58.9
	first degree	56	38.4	38.4	97.3
	Masters or More	4	2.7	2.7	100.0
	Total	146	100.0	100.0	

Years of doing business

Valid	< 1	2	1.4	1.4	1.4
	1-2 years	32	21.9	21.9	23.3
	3-5	54	37.0	37.0	60.3
	>5	58	39.7	39.7	100.0
	Total	146	100.0	100.0	

Years of experience on online retail

Valid	< 1	78	53.4	53.4	53.4
	1-2 years	52	35.6	35.6	89.0
	3-5	14	9.6	9.6	98.6
	>5	2	1.4	1.4	100.0
	Total	146	100.0	100.0	

When we categorize the participants according to their product and service delivery type, Most of them (53.4%) were participating on clothing and shoe sales, while 50.7% of them ware participating on electronic retailing. The list numbers of participant (1.4 %) were observed to provide house sales and rental service online in a plat form, whereas the rest (38%) of the participants deliver jewelry to their customers online.

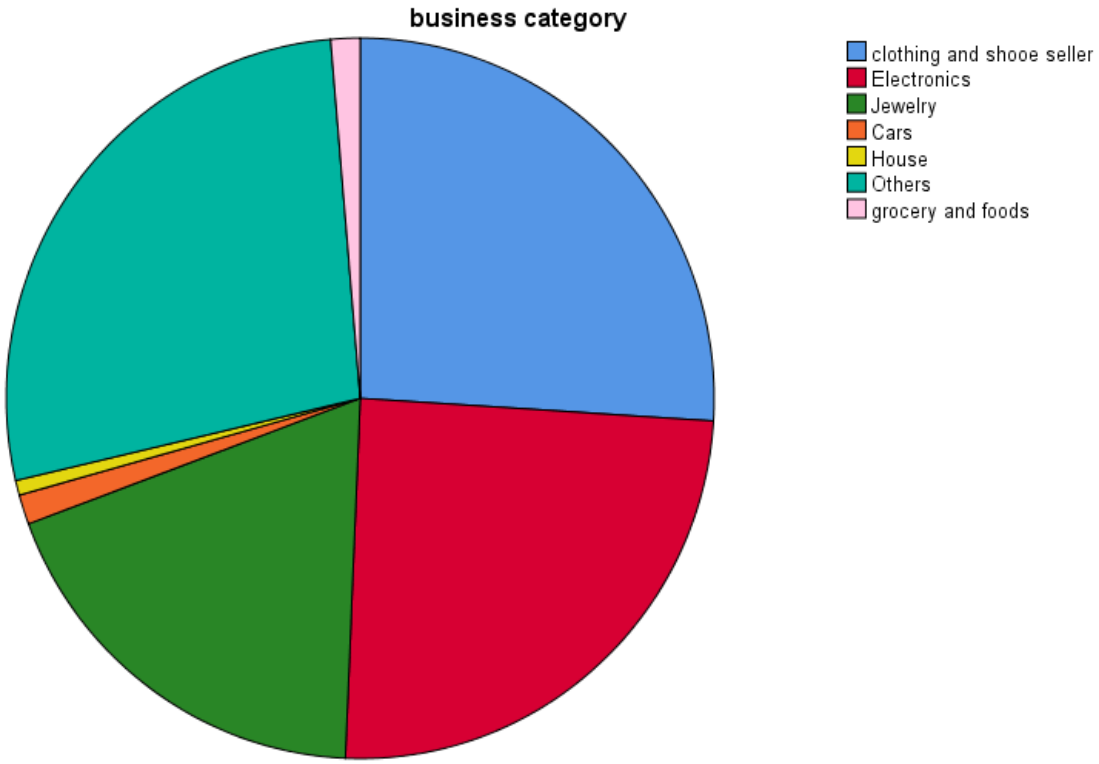

Fig 4.1: Online retail category of participants

4.3 Descriptive analysis of e-commerce application

The descriptive statistics or e-commerce application tells about the three major variables of ecommerce applications which are application of ecommerce for information flow, application of ecommerce for financial flow and application of ecommerce for material flow. Analysis and interpretation for each major variable describe the current online retail shop plat forms and the

shops application of ecommerce level. Respondents were requested to rate the variables with 5 point likert scale. Starting from very low and continued to very high where 1= very low, 2=low, 3= medium, 4=high and 5= very high.

4.3.1 Descriptive analysis for application of e-commerce for information flow

The conducted descriptive statistics about e-commerce application for information flow level is listed below. The information flow dimension is described by 10 dimensions. The table shows the mean and standard deviation values of the responses.

Table 4.2: Frequency table e-commerce application for information flow level

Application of E-commerce for information flow	Mean	Std.D
We provide the right product description online	4.650	0.742
We provide the exact price information online	4.321	0.884
We update information faster	4.833	0.610
Our order processing plat form is very simple to use	4.021	0.733
Our platform is responsive to both mobile phone and pc	4.566	0.860
We provide easily downloadable application for easy access	3.450	0.813
Customers can track their order status easily.	3.320	0.758
We offer aftersales service information	3.700	0.855
Our customers can request any additional info easily through the platform	3.654	0.802
We respond faster to customer information requests	3.860	0.755
Total Mean	4.042	0.781

As shown in table 4.2 most of the respondents agreed to very high level: We update information faster (M=4.833, SD=0.610); we provide the right product description online (M=4.65, SD=0.74); our platform is responsive to both mobile phone and pc (M=4.566, SD=0.86). The two list score dimensions are scaled at medium levels which were: We provide easily downloadable application for easy access (M=3.450, SD=0.813) and Customers can track their order status easily (M=3.320, SD=0.758). The other values are measured at high level: Our order

processing plat form is very simple to use (M=4.02, SD=0.733); our customers can request any additional info easily through the platform (M=3.654, SD=0.802); we respond faster to customer information requests (M=3.86, SD=0.755) we offer aftersales service information (M=3.70, SD=0.855). Most of the respondents agreed they are applying ecommerce for information flow at high level with total mean of 4.04 and Standard deviation of 0.781.

4.3.2 Application of e-commerce for financial flow of a supply chain

Seven dimensions were given to assess the application of e-commerce for financial flow. The results shown most respondents agree that the application of e-commerce is at high level for financial flow. The collected results are listed in the table 4.3.

Table 4.3: Frequency table e-commerce application for financial flow level

Application of E-commerce for Financial Flow	Mean	Std.D
Our platform accepts mobile money transfer	4.536	0.801
Our plat form accept internet banking transfer payment	4.824	0.754
We make payments to our supplier through electronic payments	3.640	0.885
We refund through electronic payments to our customers	3.672	0.901
Our payment system is secured	4.355	0.689
We provide cash payment on delivery service	3.460	0.786
We refund for canceled or returned goods immediately	4.282	0.825
Total Mean	4.110	0.806

According to table 4.3 respondents agree for two dimensions at very high level. Those are: our plat form accept internet banking transfer payment (M=4.824, SD=0.754). The mean value for we provide cash payment on delivery service (M=3.460, SD=0.786) is with the lowest of all other dimensions. The rest dimensions are having the mean value of high category. Our payment system is secured (4.355, 0.689); we refund for canceled or returned goods immediately (4.282, 0.825); we make payments to our supplier through electronic payments (M=3.640, SD=0.885); we refund through electronic payments to our customers (M=3.672, SD=0.901)

4.3.3 Application of e-commerce for material flow of a supply chain

According to Alexander (2014) supply chains are typically made up of three major flows and material flow is one of the flows. The dimensions to measure application of ecommerce for Material flow are listed in the table 4.4.

Table 4.4: Frequency table ecommerce application for material flow level

Application of Ecommerce for Material flow	Mean	Std.D
We provide package delivery service	3.451	0.978
We use third party logistics service provider partners for the delivery	3.360	0.899
We have our own logistics team for delivery of packages	3.103	0.874
We encourage customers to collect their orders by themselves	3.572	3.572
We deliver packages to any part of the city	3.225	0.933
We deliver packages shortly after the order	3.253	1.016
We use the plat form to manage our inventory	3.644	0.985
We manage order tracking through the plat form	3.102	0.893
We have returned goods collection center at different places	3.062	1.02
We work extra hours than normal working hour to deliver customers order	3.881	0.997
Total Mean	3.365	0.956

The findings listed in the table 4.4 tell us application of ecommerce for material flow is at medium level according to the responses from the questionnaires. We work extra hours than normal working hours to deliver customers order (M=3.88, SD=0.99) is the dimension where the most of the respondents agreed at high level. Similarly we use the plat form to manage our inventory (M=3.644, SD=0.985) we encourage customers to collect their orders by themselves (M=3.572, SD=3.572) are at higher level. Most of the respondents agreed in the medium level for the dimensions like we use third party logistics service provider partners for the delivery (M=3.360, SD=0.899), we provide package delivery service (M=3.451, SD=0.978), we deliver packages shortly after the order (M=3.253, SD=1.016), we deliver packages to any part of the city (M=3.225, SD=0.933), we use our own logistics team for delivery of packages (M=3.103,

SD=0.874), We manage order tracking through the plat form(M=3.102, SD=0.893) and We have returned goods collection center at different places (M=3.062, SD=1.02).

4.4 Factor triggering ecommerce adoption for online retail shops

In this study Perceived usefulness and perceived ease of use are considered as the major factors for the ecommerce adoption based on technological acceptance model (Davis, 1989).

4.4.1. Perceived usefulness as a triggering factors of E commerce adoption

The descriptive statistics of perceived usefulness according to the data collected from the respondents with mean and standard deviation are listed in the table 4.5.

Table 4.5: Descriptive statistics of perceived usefulness

Perceived usefulness	Mean	Std.D
Remain open all the time	3.93	1.26
Overcome geographical limitations	4.07	0.94
Can work from home	4.09	0.87
Minimize costs of doing business	4.26	0.81
Low initial investment	4.23	0.98
Permit Faster response to customer need	4.34	1.15
Improving transaction speeds	4.18	0.89
Reducing Travel Time	3.92	1.25
Provide flexibility	4.25	0.94
Providing up-to-date information	4.54	0.76
Reduced information search costs	4.22	0.84
Easy data retrieval	4.45	0.80
Encourage direct communication with customers	4.24	0.91
Total mean	**4.21**	**0.95**

According to table 4.5 provide up-to-date information (M=4.54, SD=0.76) is with the highest mean which means most of the respondents agreed that providing up-to-date information is one of the main reason for the adoption of ecommerce. Meanwhile reduce travel time (M=3.92, SD=1.25) is with the lowest mean value. Most of the respondents agreed that all the perceived usefulness dimensions are at higher level important for the adoption of ecommerce. The total mean value is 4.21 and standard deviation is 0.95.

The finding describes that perceived usefulness is a significant driver for the adoption of ecommerce in the selected online retail platforms. Similar to this study with respect to perceived usefulness Xi-Ya (2016) study showed that improving customer service level and improving information flow and efficient use of resources were important motivators for the ecommerce implementation in china. Improving control and planning was found an important motivator in the china survey.

4.4.2 Perceived Ease of use as a triggering factor of e-commerce adoption in online retail shop plat forms

In the table 4.6 the respondent's perspective on perceived ease of use dimensions are listed and it was found that most of the respondents were agreed to the medium level that the adoption of ecommerce is because of perceived ease of use.

Table 4.6: Descriptive statistics of perceived ease of use

Perceived ease of use	Mean	Std.D
Easy to start working.	3.99	0.70
Learning how to do with online platform is easy	3.86	0.81
To describe the product is only once for all customers	4.23	0.98
Easy to disperse information	4.17	1.06
Easier to serve customers	4.34	1.15
To work online is simple and has no complication	2.70	1.02
It is User friendly	3.53	0.78

Offers convenience to customers	3.86	0.91
Provide freedom to work online	4.22	0.84
Working online is enjoyable	2.99	1.25
Total	**3.89**	**1.46**

According to the table 4.6 easier to serve customers (M=4.34, SD=1.15) is with the highest mean value and to describe the product is only once for all customers (M=4.23, SD=0.98) is with the next highest mean value. To work online is simple and has no complication (M=2.70, SD=1.02) and working online is enjoyable (M=2.99, SD=1.25) are the two least mean values. The rest are easy to start working (M=3.99, SD=0.70), learning how to do with online platform is easy (M=3.86, SD=0.81), easy to disperse information (M=4.17, SD=1.06), it is user friendly (M=3.53, SD=0.78), offers convenience to customers (M=3.86, SD=0.91), provide freedom to work online (M=4.22, SD=0.84). The total mean value is 4.12 and standard deviation is 1.46. This implies most of the respondents agreed on adoption of ecommerce because of perceived ease of use though it is at lower level compared to perceived usefulness.

The results are similar with findings in Meng (2012) which suggested, ecommerce allow firms to more quickly and easily share demand data, it reduces repetitive works and it reduces paper works which are very slow and resource consuming. In the face of a constantly changing environment ease of doing business is one of the significant factors to run businesses with fast pace.

4.5. Descriptive analysis for supply chain performance

Measuring dimensions of supply chain performance which were efficiency, effectiveness, responsiveness and flexibility, the results are described through the following tables for each dimension.

4.5.1 Supply chain performance from efficiency perspective

According to Amit and Thomas (2004) E-business solutions have transformed supply chain operations especially the operation efficiency is extremely affected positively. Efficiency is one

of the dimensions for supply chain performance in this study and the descriptive statistics of mean and standard deviation values are interpreted.

Table 4.7: Descriptive statistics of Efficiency

Efficiency	Mean	Std.D
Minimize cost of marketing	3.20	0.92
Specific information to specific customers	3.13	1.08
Lower price of doing business	3.10	0.83
Efficient time management	3.26	1.14
Work with lower inventory	3.37	0.78
Higher sales amount	3.21	0.97
Avoid cash handling cost	3.36	0.94
Easy business reports	3.17	0.78
Avoid paper works	3.10	1.14
Total Mean	3.26	0.96

Most of the respondents set points to all the dimensions with medium level for the efficiency of the supply chain of the online retail shops. Hence the results are minimize cost of marketing (M=3.20, SD=0.92), specific information to specific customers (M=3.13, SD=1.08), lower price of doing business (M=3.10, SD=0.83) and efficient time management (M=3.26, SD=1.14) Work with lower inventory (M=3.37, SD=0.78), higher sales amount (M=3.21, SD=0.97), avoid cash handling cost (M=3.36, SD=0.94), easy business reports (M=3.17, SD=0.78) and avoid paper works (M=3.10, SD=1.14) .This shows the efficiency of the supply chain performance in general in these selected platforms was at medium level.

4.5.2 Supply chain performance from responsiveness perspective

The results from descriptive analysis to responsiveness dimension of a supply chain are listed below under table 4.8 and interpreted accordingly.

Table 4.8: Descriptive statistics of Responsiveness

	Mean	Std.D
Responsiveness		
Helps to manage different quantity orders easier	3.88	0.97
Helps Faster transaction	3.95	1.14
Helps to process orders faster	4.12	1.10
Helps to Deliver packages in good condition	4.40	1.06
Total mean	4.08	1.07

According to table 4.8 most of the respondents set the responsiveness dimensions to high level. Which implies application of ecommerce is helping them to be responsive at higher level. It helps to manage different quantity orders easier (M=3.88, SD=0.97), helps faster transaction (M=3.95, SD=1.14), helps to process orders faster (M=4.12, SD=1.10) and helps to deliver packages in good condition (M=4.40, SD=1.06). The total mean value is 4.08 and this put responsiveness at high level.

Alexander (2014) showed that ecommerce allow firms to more quickly and accurately share demand data, sales amount information and production schedules which provides adopting organizations greater flexibility and responsiveness and it is the issue of survival for big businesses in the face of a constantly changing environment.

4.5.3 Supply chain performance from flexibility perspective

The following table demonstrates the flexibility dimensions and the respondents mean rate and standard deviation of the responses.

The descriptions are parallel with Abdulaziz (2016) which reveal how e commerce integration can facilitate greater agility in the supply chain, leading to improved operational performance, such as responsiveness, flexibility.

Table 4.9: Descriptive statistics of flexibility

Flexibility	Mean	Std.D
Update information faster	4.20	0.87
we can work from any where	3.74	0.84
we can sell any type of product	3.58	0.85
Easy to manage orders	3.69	0.87
Easy to manage different quantity requests	3.57	0.85
Different payment modes	3.41	1.04
Total mean	3.60	0.89

Most of respondents respond that ecommerce application is helping to flexibility at higher level. The dimension update information faster (M=4.20, SD=0.87) is having the highest mean value and we can work from anywhere (M=3.74, SD=0.84) is the next preceding one. The rest we can sell any type of product (M=3.58, SD=0.85), easy to manage orders (M=3.69, SD=0.87), easy information update (M=3.57, SD=0.85) and Different payment modes (M=3.41, SD=1.04) are having relatively closer values to each other.

4.5.4 Supply chain performance from Customer service perspective

The dimensions of customer service are listed in the table 4.10 below and interpreted accordingly.

Table 4.10: Descriptive statistics of Customer service

Customer service	Mean	Std.D
Convenient to buy products easily	3.25	1.26
Faster response to customer complains.	3.01	1.01
Provide standard service	3.25	0.62
Better Individual contacts	3.17	0.85
Total mean	3.17	0.963

The two dimensions our online shop is convenient to buy products easily (M=3.25, SD=1.26) and we provide standard service (M=3.25, SD=0.62) are the two dimensions with highest mean value. Whereas we respond fast to customer request (M=3.01, SD=1.01) is with the least mean and the other better individual contact (M=3.17, SD=0.85) is also under similar range. Most of the shop owners respond that customer service is in medium level in their supply chain.

Customer service is one of the significant dimensions of supply chain performance. It is what sticks customers with a firm in addition to many other performance issues. It is one of the competitive issues of this time (Alexander, 2014).

4.5.5 Performance of supply chain in Reliability perspective

The reliability dimensions results and interpretations are presented based on table 4.11.

Table 4.11: Descriptive statistics of Reliability

Reliability	Mean	Std.D
Low Occurrence of system failure	3.45	0.92
Return of goods granted	3.61	1.07
Easy after sells service	3.19	0.79
Provide warranty or guaranty to services and products	3.46	0.93
Provide consistent service	3.60	1.05
Total mean	3.462	0.952

The total mean value for reliability is under medium category. Low occurrence of system frailer (M=3.45, SD=0.92), return of goods granted (M=3.61, SD=1.07) easy after sells service (M=3.19, SD=0.79), provide warranty (M=3.46, SD=0.93), provide consistent service (M=3.60, SD=1.05) are the results seen in the table 4.11.

4.5.6 Supply chain profitability

Supply chain profitability is the cumulative resultant of many dimensions. The following table 4.12 and interpretations are about supply chain profitability of online retail shops of the selected platforms.

Table 4.12: Descriptive statistics of supply chain profitability

Profitability	Mean	Std.D
Increase total sales amount	2.550	0.846
Increased total turnover	2.583	0.842
Increase profit margin	2.340	0.882
Increase total profit amount	2.360	0.866
Total	2.458	0.858

Profitability of online retail shops supply chain has shown the list mean value compared to other dimensions. Increased total turnover (M=2.583, SD=0.842) is with the highest mean value which enters to the category of medium level and increased total sales amount (M=2.550, SD=0.846) is also with similar category. Increased total profit amount (M=2.360, SD=0.866) and increased profit margin (M=2.340, SD=0.882) are under low level category. Most of the respondents agreed that their online retail shops profit is at low level.

4.6 Correlation Analysis

For the sake of inferential analysis of the relationship between independent variables application of e-commerce for information flow, application of e-commerce for financial flow and application of e-commerce for material flow and dependent variable supply chain performance of online retail shops the researcher was using Pearson correlation to measure the strength and the direction of relationship among variables. Pearson correlation is the most commonly used analysis to determine relations among variables (Robert and Richard, 2008).

4.6.1 The relationship among the variables

Pearson Correlation analysis was used to determine the relationship between independent variables (application of e-commerce for information flow, financial flow, and material flow) and dependent variable supply chain performance with respect to efficiency, responsiveness and flexibility customer service and reliability.

The Pearson Correlation results range between 1 (perfectly linear positive correlation) to -1 (perfectly linear negative correlation). When the correlation value is 0, no relationship exists between the variables.

Table 4.13: Pearson's Correlation (r) Among Independent Variables, Dependent variables, and between Independent and Dependent Variables. **N=146**

		A	B	C	D	E	F	G	H	I
Application of ecommerce for Information flow (A)	Pearson's correlation	1	.637**	.750**	.458**	.731**	.634**	.389**	.121	.742**
	Sig.(2-Tailed)		.000	.000	.000	.000	.000	.000	.306	.000
Application of ecommerce for financial flow (B)	Pearson's correlation		1	.682**	.521**	.833**	.791**	.447**	.204	.739**
	Sig.(2-Tailed)			.000	.000	.000	.000	.000	.069	.000
Application of ecommerce for material flow (c)	Pearson's correlation			1	.625**	.782**	.691**	.611**	.164	.664**
	Sig.(2-Tailed)				.000	.000	.000	.000	.113	.000
Supply chain Efficiency (D)	Pearson's correlation				1	.770**	.641**	.569**	.012	.502**
	Sig.(2-Tailed)					.000	.000	.000	.665	.000
Supply chain Responsiveness (E)	Pearson's correlation					1	.769**	.578**	.074	.548**
	Sig.(2-Tailed)						.000	.000	.256	.000
Supply chain Flexibility (F)	Pearson's correlation						1	.719**	.169	.665**
	Sig.(2-Tailed)							.000	.084	.000
Supply chain Reliability (G)	Pearson's correlation							1	.028	.788**
	Sig.(2-Tailed)								.427	.000
Supply chain Profit margin (H)	Pearson's correlation								1	.203
	Sig.(2-Tailed)									.047
Supply chain customer service(I)	Pearson's correlation									1
	Sig.(2-Tailed)									

As the results under table 4.13 described there are strong relations between the independent variables with each other since application of e-commerce for Information flow and application of e-commerce for financial flow has shown the value (r=.637 P=000); application of e-commerce for Information flow and application of e-commerce for material flow (r=.750, p=000); and Application of e-commerce for Information flow and application of e-commerce for financial flow (r=682 p=000). Similarly four dimensions of supply chain namely efficiency, responsiveness, customer service and flexibility have shown strong positive relation with each other and with the independent variables.

The table 4.13 has presented significant correlation with the supply chain performance dimensions and the variables of application of ecommerce for information flow, financial flow and material flow. The remaining two supply chain performance dimensions reliability and profitability have not shown relation at significant level. Even though they have a positive relation they are not at significant level.

Table 4.14: Correlation analysis of variables major variables

Correlations							
		Mean	Std.D	1	2	3	4
A	Supply chain performance	3.408	0.950	1			
B	Application of ecommerce for information flow	4.042	0.781	.693**	1		
C	Application of ecommerce for financial flow	4.110	0.806	.742**	.637**	1	
D	Application of ecommerce for material flow	3.365	0.956	.552**	.750**	.682**	1

As can be witnessed on table 4.14 above, which depicts the relationship between independent variables (application of ecommerce for financial flow, information flow and material flow) and supply chain performance, all application of ecommerce for material flow, financial flow and information flow are found to have significant positive correlation with supply chain performance since two-tailed significance test values are less than 0.01. Pearson correlation value illustrates that application of ecommerce for information flow (r=.693), application of ecommerce for financial flow (r=742), application of ecommerce for Material flow (552) have strong positive correlation with supply chain performance.

Xi-Ya (2016) studied that there exists a significant positive relationship between application of ecommerce and the supply chain performance. The results reveal that of e commerce application elements like delivery speed, payment mod, logistics type, distance of delivery and working hour are positively and significantly related to the supply chain performance. These results imply that if there is application of ecommerce in retail shops, it is very likely to influence and lead to improved supply chain performance.

4.7 Regression Analysis

In this study multiple regressions was used to predict the relation of application of ecommerce and supply chain performance. Though running multiple regressions is controversial in likert scale type data which is ordinal by its nature. The study has considered the recommendation given by Robert and Richard, (2008) which recommends when it is needed to do multiple regression for likert scale it is important to consider true likert scale made up of many items which all measuring the same item, the item need to have at least 5 points, and strong results with high significance value. When running a Multiple Regression, there are assumptions that need to be checked. In order to analyze reliability and validity, it aims to show how the independent variable or predictor variables may predict the dependent variable or outcome variable.

4.7.1 The role of application of e-commerce on supply chain Performance

To examine the role of e-commerce application for information flow, e-commerce application for financial flow and e-commerce application for material flow on supply chain performance of online retail shops with respect to dependent variable performance by the independent variables, the first assumption we can test is that the predictors' the e-commerce applications for financial flow, material flow and information flow are not too highly correlated. We can do this in two ways. First, we need to look at the correlations Table 4.14. Correlations of more than 0.8 may be problematic. This is not an issue in this research, as the highest correlation is r=0.750.

For other assumption to be satisfied, we need to look at the Model Summary box. Here, we can use the Durbin-Watson statistic to test the assumption that the residuals are independent (or uncorrelated). This statistic can vary from 0 to 4. For assumption to be met, we want this value to be close to 2. Values below 1 and above 3 are cause for concern and may render our analysis invalid.

Table 4.15: Supply Chain Performance model Summary

Model summery[b]					
Model	R	R square	Adjusted R square	Std. Error of Estimate	Durbin - Watson
1	.785[a]	0.616	0.610	.41578	1.432

Table 4.16: The coefficient table of regression supply chain performance and ecommerce application

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.958	.561		1.709	.092		
	Application of ecommerce for Information flow	.324	.117	.326	2.782	.000	.759	1.317
	Application of ecommerce for financial flow	.489	.117	.219	4.443	.000	.852	1.174
	Application of ecommerce for material flow	.294	.108	.285	2.717	.008	.736	1.358
a. Dependent Variable: Supply chain performance								

The findings has been structured around each research objective and made from the analysis of the multiple regressions the significance levels of each variables in the regression analysis is acceptable (P<0.05) (Robert and Richard, 2008). The researcher is fortunate enough to find the three variables positively related in significant level, though the research was dealing with small number of samples and variables. The hypothesis was right about application of ecommerce significantly affects the supply chain performance positively. The following linear model is the result from the table 4.16 which is based on the assumption $SCP= \beta_0 + \beta_1X_1+ \beta_2 X_2+ \beta_1X_3+ \varepsilon$.

$$SCP= 0.958 + .326X_1+.219X_2 .285X_3+\varepsilon$$

Constant = 0.958, shows that if application of ecommerce for information of flow, application of ecommerce for financial flow and application of ecommerce for material flow are rated as zero or held constant; supply chain performance would be a factor of 0.958. It is still positive value. $\beta 1$ = 0.326, shows that one unit increase in application of ecommerce for information flow an increase in supply chain performance by a factor of 0.326. β_2= 0.219, implies that one unit increase in application of ecommerce for financial flow results in an increase in supply chain performance by a factor of 0.219. β_2 = 0.285 shows that one unit increase in application of ecommerce for material flow an increase in supply chain performance by a factor of 0.285.

Hence the research result tells that application of ecommerce has a significant positive role in supply chain performance.

The findings are linear with Alexander (2014) application of ecommerce has a significant positive impact in supply chain performance. His research explained the supply chain performance of Dell Company was affected by the application of e-commerce positively.

Results in the Table 4.15 reveal that application of e-commerce for information flow, financial flow and material flow can predict up to 61% of the total variance in the supply chain performance of online retail shops on the selected platforms (Adjusted R Square =.610). This means that the regression model can only explain 61% of the changes in the dependent variable while the remaining percentage can be attributed to other factors other than application of ecommerce variables. This regression model was significant (sig. <.05) with its results worth using it as a basis to make decisions related to supply chain performance of Online retails on the selected plat forms.

Xi-Ya (2016) found that the adoption of ecommerce exhibits significantly positive influences on supply chain performances. Therefore China's online retail service providers with a more favorable attitude toward adopting innovative ecommerce technologies will attain better supply chain performance.

4.7.2 Regression analysis for supply chain performance dimensions

The following tables and interpretations are to check the specific research questions with in ecommerce application level and supply chain performance dimensions.

Table 4.17: The coefficient table of regression for supply chain flexibility

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.724	.307		5.614	.000
	Application of ecommerce	.555	.081	.633	6.883	.000
a. Dependent Variable: Supply chain flexibility						

Table 4.17 describes the positive relation between application of ecommerce and supply chain flexibility at higher significant level.
The linear model for this relation is supply chain flexibility = 1.724 + .633applicaton of ecommerce + ε. The supply chain flexibility is factored by ecommerce application 0.633 putting

other factors aside. One unit increase in application of ecommerce in general will increase .633 times the flexibility of a supply chain.

Table 4.18: The coefficient table of regression for supply chain responsiveness

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.817	.336		5.407	.000
	Application of ecommerce	.536	.088	.584	6.065	.000
a. Dependent Variable: Supply chain responsiveness						

Table 4.18 describes the positive relation between application of ecommerce and supply chain responsiveness at higher significant level.
The linear model for this relation is SCR= 1.817 + $0.584X_1$+ ε.

The supply chain flexibility is factored by ecommerce application 0.584 putting other factors aside. One unit increase in application of ecommerce in general will increase 0.584 times the responsiveness of a supply chain. The p value is less than 0.001 and it explained that application of ecommerce is a highly significant factor for supply chain responsiveness.

Table 4.19: The coefficient table of regression for customer service

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.982	.518		3.826	.000
	Application of ecommerce	.429	.136	.351	3.163	.002
a. Dependent Variable: supply chain customer service						

Table 4.19 describes the positive relation between application of ecommerce and supply chain customer service at significant level of 0.05.
The linear model for this relation is SCF= 1.982 + $.351X_1$+ε. The supply chain customer service is factored by ecommerce application 0.351 putting other factors aside. One unit increase in application of ecommerce in general will increase 0.351 times the customer service of the online retail shops supply chain.

Table 4.20: The coefficient table of regression supply chain reliability

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.225	.495		6.512	.000
	Application of ecommerce	.211	.129	.190	1.628	.108
a. Dependent Variable: supply chain reliability						

Table 4.22 tells that the relation between application of ecommerce and supply chain reliability is positive at .190. Which implies the one unit increase of application of ecommerce will increase by 0.190 units supply chain profit. But this factor is not significant enough to determine the character of the dependent variables since the P value is above the minimum acceptable level (p=108 >0.05). Hence the hypothesis application of ecommerce has a significant positive role in supply chain reliability is not acceptable according to the data and analysis of this research.

Table 4.21: The coefficient table of regression for supply chain efficiency

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.926	.417		4.621	.000
	Application of ecommerce	.463	.105	.465	4.429	.000
a. Dependent Variable: Supply chain efficiency						

Table 4.17 describes the positive relation between application of ecommerce and supply chain flexibility at higher significant level (p<0.001). The supply chain flexibility is factored by ecommerce application 0.465 putting other factors aside.
Anni-Kaisa, Katrina and Veli (2013) study result showed ecommerce enables an organization to upgrade its efficiency particularly information processing efficiency is significantly affected by the application of ecommerce in a supply chain.

Table 4.22: The coefficient table of regression for supply chain profit

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.163	.585		5.410	.000
	Application of ecommerce	.239	.141	.198	1.699	.094
a. Dependent Variable: Supply chain profit						

Table 4.22 tells that the relation between application of ecommerce and supply chain profit is positive at .198. Which implies the one unit increase of application of ecommerce will increase by .198 units supply chain profit. But this factor is not significant enough to determine the character of the dependent variable. Hence the application of ecommerce has a significant positive role in supply chain profit couldn't be justified according to the data of this research.

Table 4.23 Result summary table

E commerce plays significant positive role in improving supply chain responsiveness.	ß=0.584 p< 0.05
E commerce plays significant positive role in the flexibility of supply chain.	ß=0.633 p< 0.05
E commerce plays significant positive role in improvement of customer service of supply chain.	ß=0.351 p< 0.05
E commerce doesn't play significant positive role in improvement of profit in a supply chain.	ß=0.198 p > 0.05
E commerce doesn't play significant positive role in reliability of the supply chain.	ß=0.190 p> 0.05
E commerce plays significant positive role in efficiency of the supply chain.	ß=0.465 p< 0.05

The table 4.23 tells the summary which is about the significant role of e-commerce on supply chain performance and the positive significant role of application of ecommerce with supply chain dimensions: efficiency, flexibility, responsiveness and customer service. But the results of this study couldn't justify the Positive role of ecommerce on profitability and reliability of the supply chain.

CHAPTER FIVE

SUMMERY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter includes summary of the research findings, conclusions, recommendation and suggestion for further research. The main objective of this study was to examine the role of e-commerce application in the supply chain performance of selected online retail shops.

5.2 Summary

The study has detected the triggering factors of e-commerce adoption from perceived ease of use and perceived usefulness perspectives. It also examined the role of ecommerce application for the material flow, information flow and financial flow of selected online retail plat forms in Addis Ababa.

According to the respondents perceived usefulness has been described as more important factor to the application of e-commerce for the online retails. The total mean value for perceived usefulness was 4.21 and standard deviation 0.95. The results have shown that most of the respondents agreed at higher level that the perceived usefulness was triggering factor for the application of ecommerce.

The major objective examined was the role of e-commerce application for information flow, financial flow and material flow on supply chain performance in the selected online retail shops. The study revealed that relationships between e-commerce application and supply chain performance of online retail shops. The results showed that there exist significant positive relationships between e-commerce application for material flow, e-commerce application for financial flow, e-commerce application for material flow and supply chain performance. E-commerce application influences better customer service. Customers are able to get good services in time limit expected. E-commerce enables online retail shops to be more responsive than traditional shops. This helps firms to deliver products and services to customers in expected time. Services are available to customers at their convenience. Retail shops with ecommerce application provide wide scope of product and services than those that lack e-commerce application. Retail shops create competitive advantages over others due to efficient and better customer services provided to customer. Application of ecommerce has a great impact on

flexibility of product type delivery and time of delivery. Shop owners captured the advantage of working place flexibility. The research has explained the strong positive relation between e-commerce application and supply chain responsiveness, efficiency, customer service and flexibility. The results are similar with Alexander (2014) who argued that e-commerce application can contribute to a firm's competitive advantage by providing efficiency and responsiveness. Supply chain performance can potentially improve by building e-commerce application. Ecommerce application significantly affects important dimensions of the retail service quality.

The study has shown significant positive roles of application of e-commerce in financial flow, information flow and material flow for the improvement of supply chain performance. This means that retail shops need to do better on adoption of e-commerce application for information flow, financial flow and material flow of their supply chain. Firms which have e-commerce application serve well their customers and are more flexible. The products and services delivery are efficient and the response to customer's inquiry and order processing is quicker while adopting e-commerce. The findings are consistent with Abdulaziz (2016) who indicated that e commerce increases operational responsiveness, flexibility and productivity of supply chain performance. According to Abdulaziz (2016) using advanced e-commerce in the supply chain enables firms to respond timely and effectively to customer's needs and requirements thus meeting customer expectations. It also reduces the lead time of orders and improves service level of enterprises. Among the independent variables, application of e-commerce for Information flow (β=.326, $p<.000$) was the one with the highest coefficient. Application of ecommerce for financial flow (β=.219, $p<.000$) is the other significant positive relation with supply chain performance. The third variable, application of e-commerce for material flow (β=.285, $p<.008$) has also a significant positive relationship with the supply chain performance. Though application of e-commerce in general has a positive significant relation with the supply chain dimensions like; responsiveness, flexibility, efficiency and customer service it has reflected no significant relation with reliability and profitability of online retails. This implies that in order to improve the performance of online retail shops, there is a need to increase application of e-commerce for material flow, information flow and financial flow. The profitability and reliability dimensions need to be seen with more additional variables and with other factors to identify their relationships with application of ecommerce in a supply chain.

5.3 Conclusion

The study focused on the role of e-commerce application for information flow, e-commerce application for financial flow and e-commerce application for material flow on supply chain performance of online retail shops. According to the findings e-commerce application for financial flow is the most significant predictor for supply chain performance and e commerce for information flow is the next significant influencer. E-commerce for material flow has also a positive significant role in a supply chain performance. Application of e-commerce has been found positive and significant influencer of efficiency, responsiveness, flexibility and customer service of the online retail supply chain performance. However, e-commerce application was found not to be a significant predictor of profitability and reliability of retail shops.

The study concluded that perceived usefulness more triggering factor to adopt e-commerce than perceived ease of use in the selected online retail platforms. The research concluded that Applications of e-commerce for information flow, financial flow and Material flow were significant predictors of supply chain performance of the online retail shops.

5.4 Recommendation

Based on the study results it was concluded Application of e-commerce for information flow, financial flow and material flow play significant role in supply chain performance of the online retail shops. Therefore there should be increased awareness on the perceived usefulness and awareness to increase perceived ease of use on the need to accept adoption of e-commerce on online retail platforms because of its multidimensional benefits in enhancing supply chain performance. The online platforms can increase their e-commerce developing dimensions by encouraging or supporting their partners to adopt new technologies as well as by training and educating their shops administrators to become experts and more disciplined on the sector to the higher level. The online Retail shops should provide efficient and reliable delivery and high shopping services quality to their customers, by avoiding delays in order processing, package delivery and short led time. This will increase their competitive advantage in the field of online market and the e-commerce sector and hence helps providing customer satisfaction.

Even though there are some challenges to be considered and needed to be carefully managed like security and reliability issues the advantage of e-commerce is much more positive for the

improvement of supply chain. Therefore the author recommends the members in a supply chain to use e-commerce effectively to benefit from it. Many of business organizations can use the e-commerce to optimize the use of their resources and get wider market access for their products and services.

To benefit from the positive impact of ecommerce in supply chain the government needs to give attention on providing the infrastructure, policy and rules to manage it effectively. The government should encourage and support banks and telecom companies since they are the critical role players in the application of e-commerce. Moreover the government also needs to use the e-commerce application on its services. Last but not list universities need to fill the gap of the skilled man power demand to benefit from the sector more.

5.5 Future Research Recommendation

In the future it is recommended that to do vast and deep research on topics like the impact of e-commerce on supply chain for different electronic business models like Business to Business (B2B), Business to Consumers (B2C), Consumers to Consumers (C2C), Government to Business (G2B) and other different e-commerce business models since the impact of ecommerce is very vast and has many different aspects to be researched.

In this study it is found no significant relation between e-commerce application and profitability of the online retail shops. Hence the author recommends the same issue to be researched in wider capacity covering much more variables and sample size. It will be important to include a customer perspective in future studies matching service user and provider perspectives. Furthermore the business to government e-commerce B2G recommended to be researched since it is very significant in many ways affecting the business and the whole society in a country. The role of e-commerce on the customs commission and traders, the role of e-commerce in education, the role of e-commerce on import and export, and the role of e-commerce in logistics development are some of recommended issues to be researched.

Finally e-commerce and its impact on supply chain require up-to-date data for decision makers, other researchers or the government to consider the results and output data. Therefor to do frequent researches according to the dynamism of the sector is highly recommended.

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Appendix A: Questionnaire

ADDIS ABABA UNIVERSITY SCOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT GRADUATE PROGRAM

First of all I would like to forward my heartfelt gratitude and respect to you for Administering this questionnaire honestly and responsibly. The questionnaire is designed to collect the necessary information to undertake a research on the topic " the role of Electronic commerce in improving supply chain' in Addis Ababa" for the partial fulfillment of the requirements of the degree of Masters of Art in logistics and supply chain management at Addis Ababa University.

Electronic commerce is the basic and contemporary concept that embraces a complex amalgam of technologies, infrastructures, processes, and products and services. It describes the process of buying, selling, transferring, or exchanging products, services, payments and/or information through computer networks, principally the Internet. In this research context, E-commerce: refers to the application of ICT to undertake trading activity which include from simple information searching using web to electronic payment and full digitization. The main objective of this research is to explain the role of e commerce in improving supply chain in Addis Ababa city particularly on selected online retail shops. Please answer every question. You can tick the option that you choose or write your answer on the blank space provided. Space is provided for you to add further comments or explanations. Therefore, your genuine, frank and timely responses are quite vital to determine the success of this study. So, I kindly request your contribution in filling the questionnaire honestly and responsibly.(No need of writing your name) Finally, I would like to confirm you that all the information you provide in this Questionnaire will be strictly confidential and will exclusively be used for this research purpose. Thank you very much ahead for your cooperation!

Researcher's Name: Kalehiwot Sirak , Student at AAU

e-mail:likabrands@yahoo.com

If you have questions to this questionnaire - please contact by this address

Thank you again for your time and attention to this research, please fill out the forms below:

Personal information/Profile

1) Sex M ☐ F ☐

2) Age (Years):

Less than 18 ☐ 18-30 ☐ 31-40 ☐ 41 -50 ☐ ove 50 ☐

3) Educational Qualification

Less than high school ☐ High school graduate ☐ Diploma holder ☐

First Degree ☐ Masters or above ☐

4) How long Have you been in the business

Less than One year ☐ 1 Year and more ☐ 2 years and more ☐

5 years and more ☐

5) How long have you been since you started online retail?

Less than One year ☐ 1Year and more ☐ 2 years and more ☐

5 years and more ☐

6) Which products or service you provide online (you can thick more than one)

Clothing ☐ Electronics ☐ Jewelry ☐ Cars ☐

House ☐ Grocery ☐ Others ☐

Part II ecommerce adaption perceived usability and ease of use

1) How does e-commerce gives better Usability and ease of use than traditional commerce in a supply chain? Select all benefit you expect.

Statement	Strongly dis agree	Dis agree	neutral	Agree	Strongly agree
Perceived ease of use					
Provide freedom to work online					
Easy to start working.					
Learning how to do with online platform is easy					
To describe the product is only once for all customers					
It is user friendly					
Working online is enjoyable					
To work with on ecommerce is simple and has no complication					
Offers convenience to customers					
Easy to disperse information					
Easier to serve customers					
Perceived Usability					
Fair competition rules					
Providing up-to-date information					
Overcome geographical limitations					
Improving transaction speeds					
Can work from home					
Permit Faster response to customer need					
Remain open all the time					
Reduced information search costs					
Reducing Travel Time					
Minimize costs of doing business					
Provide flexibility					
Low initial investment					
Easy data retrieval					
Encourage direct communication with customers					

Part III applications of E commerce usage level

How is the ecommerce application level of your online retail shop?

	Very low	Low	Moderate	High	Very high
Ecommerce for information flow					
We provide the right product description online					
We provide the exact price information online					
We update information faster					
Our order processing platform is very simple to use					
The platform is responsive to both mobile phone and pc					
We provide easily downloadable application for easy access					
Customers can track their order status easily.					
We offer aftersales service information					
Our customers can request any additional info easily through the platform					
We respond faster to customer requests					
Ecommerce for financial flow					
Our platform accepts mobile money transfer					
Our plat accept internet banking transfer payment					
We made payments to our supplier through electronic payments					
We made refund through electronic payments to our customers					
Our payment system is secured					
We provide cash payment on delivery service					
We refund for canceled or returned goods immediately					
Ecommerce for material flow					
We provide package delivery service					
We have third party logistics service provider partners for the delivery					

We have our own logistics team for delivery of packages					
We encourage customers to collect their orders by themselves					
We deliver packages to any part of the city					
We deliver packages shortly after the order					
We use the plat form to manage our inventory					
We manage order tracking through the plat form					
We have returned goods collection center					
We work extra hour for product delivery than the normal working hour					

Part IV The role of E commerce on supply chain performance

7) Check your performance level those are gained because of e-commerce.

	very low	low	moderate	High	Very high
Efficiency					
Minimize cost of marketing					
Specific information to specific customers					
Lower price of doing business					
Efficient time management					
Work with lower inventory					
Higher sales amount					
Avoid cash handling cost					
Easy business reports					
Avoid paper works					
Responsive ness					
Helps to manage different quantity orders easier					
Faster transaction					
We deliver packages on time					
Deliver packages in good condition					
Flexibility					
I can work from any where					
I can sell any type of product					

Easy to manage orders					
Easy information update					
Different payment modes					
Customer service					
Convenient to buy products easily					
Faster response to customer complains.					
Better contact for every individual customer.					
Provide standard service to all					
Reliability of system					
Low Occurrence of bribe					
Return of goods granted					
Easy after sells service					
Provide warranty					
Provide consistent service					
Profitability					
Increase total sales amount					
Increase profit margin					
Increase total profit amount					

8) Why should e-commerce be encouraged and facilitated in a supply chain in the current Ethiopian socio, economic, political and business environment?

Finally, if you want to add anything to your answers, or e-commerce, please would you write them below?

Thank you for completing this survey!!