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**INTEGRATION OF ENVIRONMENTAL, SOCIAL,
AND ECONOMIC DIMENSIONS IN E-COMMERCE
SUSTAINABILITY: KENYA**

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**INTEGRATION OF ENVIRONMENTAL, SOCIAL, AND ECONOMIC
DIMENSIONS IN E-COMMERCE SUSTAINABILITY: KENYA**

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in the scientific field of “Management and Business Administration”

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INTRODUCTION

In recent decades, electronic commerce (e-commerce) has grown steadily and exponentially, becoming the norm for contacting businesses across the globe. Internet advancement has seen the growth of e-commerce (EC) in the business fraternity, locally and internationally. TÄUSCHER-LAUDIEN (2018) defines e-commerce as a marketplace that adds value addition to the supply chain and enables new dimensions and business models through an e-commerce platform. Most of the biggest and most successful firms in the world are involved in EC. EC has brought a new dimension of sustainability and increased sales. A recent study performed on the digital emerging e-commerce economy in the United States indicated that the annual revenue of the five biggest firms in e-commerce is more than the United States' GDP per annum. DUCH-BROWN ET AL. (2017) emphasizes how companies have strategized and concentrated on the enormous advantages that can be realized from e-commerce. For example, Uber and bolt have radically transformed the taxi industry, by providing service and passenger delivery enhanced through the internet and e-commerce.

REINARTZ ET AL. (2019) notes how the internet and e-commerce have enabled globalization and digitalization to reach the global village, offering a competitive advantage in business. If a company wishes to remain successful and competitive, it must adopt the use of e-commerce. It is everyone's (business, customers, and society) effort to deal with the key challenges that the world is facing today, such as climate change, high pollution levels, degradation of the environment, high unemployment rates, various forms of social/societal empowerment and gender equality.

Similarly, FRISHAMMAR EL AL. (2018) mention that e-commerce can be a platform for good which can enhance sustainability and help to solve these problems. JUN-JAAFAR (2011) reveals that business organizations are tapping into the various advantages of the internet to sell, distribute, and advertise through their social network pages to reach a larger market share, while simultaneously staying updated on dynamic and changing behaviours, attitudes, and customer preferences. He cites how customers are kings. Therefore, a model system connects all the stakeholders to think of the customer first even before production takes place. Such an attitude towards good customer service is widespread and seen in the behaviours of manufacturers, suppliers, and Logistics Supply Providers (LSPs) in the retail industry.

This study intends to investigate the integration of environmental, social, and economic dimensions with mediating factors to enhance e-commerce sustainability. Additionally, the focus of this paper is on how a company uses competitive advantage and remains in business for the long-term, while making a profit with the least production and supply costs. The integration of the sustainable environmental, social, and economic dimensions and their mediating factors must be entwined in a relational manner or multi-sided levels for efficient and effective e-commerce. IGWE (2014) points out that e-commerce is a platform that provides products and services in a digital platform, linking the sellers and buyers in an eco-friendly environment.

Internet business comprises environmental, social, and economic dimensions. From one point of view, producers and suppliers provide goods on a website. On the other hand, customers looking to satisfy their needs can acquire such products by going to the websites of the vendors. The requirements for using e-commerce are a secure internet connection and a user-friendly website, unlike traditional offline shopping which requires greater starting capital to set up a physical enterprise. Undercutting the need for middlemen means online businesses can offer their customers quality products at a cheaper price compared to traditional retailers.

DENG-WANG (2016) indicated that e-commerce has many advantages, one of the most outstanding being as a reliable platform for connecting sellers and customers to exchange goods and services at an economical value. Despite their location or geographical boundaries, customers benefit from a wide range of products. In general, sellers indicate that end-customers of e-business should take advantage of the numerous benefits that accompany e-commerce by buying from online business than offline traditional shops. The outbreak of coronavirus has only propelled e-commerce to heretofore unseen levels in sales (ROTAR, 2020).

E-commerce encompasses numerous models, but we will discuss only the major ones: particularly Business to consumers (B2C) is the most popular known e-commerce platform, with the largest customer base, but with fewer sales compared to Business to Business (B2B). Business to consumers (B2C) is a business selling direct to customers. Business to Business (B2B) is the model with voluminous sales revenues, as it involves selling large quantities to wholesales and other merchants, between companies to companies. Consumer to consumers (C2C), is where e-tailers sell goods to online customers directly through an e-commerce

platform and attempt to cut out the need for distributors at all. Government to consumers (G2C) is where government institutions will offer online services for their citizens at a fee.

Additionally, there are new e-commerce models that are drastically coming into play in the market, e.g., app stores, the applications that are used by e-tailers that give a competitive advantage by offering customers to order customized products from manufacturers that are involved in e-commerce platforms. This approach has made the supply chain shorter based on orders from customers directly to producers and back. Thus, app stores are playing and creating an important role in sustainability in the supply chain by reducing traders and greenhouse gas emissions. Also, M-commerce has also gained a lot of attention with its seamless and easy method of shopping online with the least challenges using mobile phones, tablets, and iPads to shop online.

Retail e-commerce was forecasted to grow to \$ 4.9 trillion in the year (CLEMENT, 2019). This growth was enabled by Internet connectivity, information communication technology (ICT) infrastructure development, and advancement among developed and developing countries, as well as e.g., internet penetration and the increasing number of people accessing the internet for online shopping. Another factor is the availability of cheap smartphones that have a 4G internet connection, which has promoted and furthered the increase of M-commerce shopping.

Despite the exponential growth of e-commerce worldwide, e-commerce is faced with sustainability challenges. These challenges may be grouped into major categories, primarily environmental, social, and economic. In addition, governments and all other stakeholders need to come together to foster policies, legislation, and regulations that support e-commerce sustainability. Much research have been done on online shopping or e-commerce, adoption of online shopping and consumer behaviours, attitudes, and preferences in developing countries (ESCURSELL ET AL., 2021; KRISTENSEN ET AL., 2003).

However, several components have been hindering the development and growth of e-commerce, especially in developing countries such as Kenya. These are the risks associated with online shopping ventures compared to brick and mortar or traditional shopping or offline shopping. In the past, online shopping was perceived to come with great risks, such as trustworthy, privacy and security issues, identity theft, and online security. There are various ways will work to assist e-vendors is to create and build trust among online consumers. Trust

influences online consumer shopping behaviour to purchase and re-purchase, as RAHI ET AL. (2017) concludes.

ABOBUCKER-BAO (2018) argues that security and privacy also give customers the confidence to shop online. However, no combined research has been done of e-commerce sustainability on the environment, social and economic aspects, coupled with perceived risks from past bad experiences and the way to enhance policy formulation that enhances sustainable e-commerce. Therefore, there is a research gap which our study can help to fill.

The benefits of e-commerce have enabled cross border trade, thereby breaking down geographical barriers, and the issues related to distance, import and export tariffs. Today, anyone can sell goods and services via an e-commerce platform internationally, despite whether the customer or seller is located in developing or developed countries, as DENG-WANG (2016) indicates. E-shops are open with no limitation of hours, like brick-and-mortar shops. One can shop online 24 hours a day, 7 days a week, allowing consumers to do online shopping at a convenient time - whether at home, in a car, or an office, doing their normal duties. Due to many benefits that accompany e-commerce, it will continue to grow, day by day.

However, there have been challenges to do with trust, privacy, and security issues as risks associated with e-commerce and, therefore, online businesses should offer solutions to overcome them. Trust has been used as a moderator and security and privacy as mediating effects in this study. E-retailers must guarantee their customers the safety of their information related to credit cards, to avoid financial loss while visiting e-websites and prevent the consumer panic that occurs whenever there is a security breach.

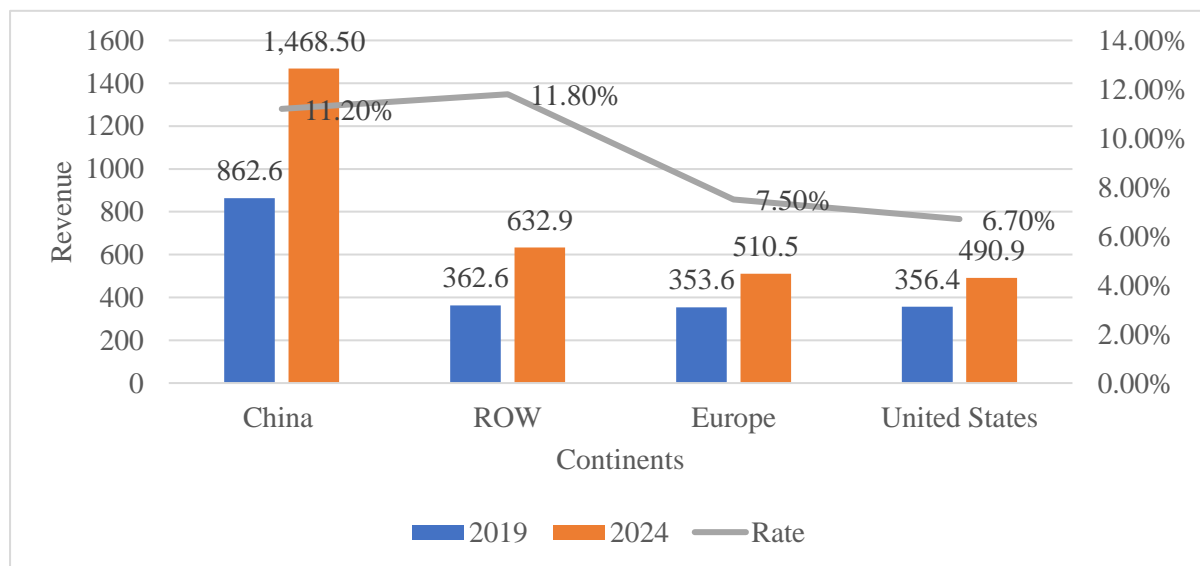
E-commerce has emerged globally. Statistics show that e-commerce is experienced in almost every part of every country. The United States is one of the countries known to be doing very well in e-commerce. However, China has been seen overtaking the United States and Europe in revenue growth on e-commerce platforms. Sooner than later, there will be a great shift from the West to East Asia. In Europe, Germany, the United Kingdom, and France will follow suit, too. Africa also has not been left behind; South Africa is leading, followed by Nigeria and Kenya as it is shown E-commerce report Statista, 2020 (ROTAR, 2020).

The forecast is done on the compound annual growth rate (CAGR) and revenue gross merchandise value (GMV). The forecast is between Asia (China), Europe, the United States, and the rest of the world (ROW) across 2019 and 2024.

Compound annual growth rate (CAGR) forecast for 2019-2024 is the U.S. at 6.7%, Europe 7.5%, China 11.2%, and the rest of the world (ROW) 11.8%, respectively. China, the U.S., and Europe are estimated to be US \$1.48 trillion, US\$495.8 billion, and US\$373.5 billion, respectively, with 2024 compared to the year 2019. The Middle East and Africa are also following suit, with US\$ 355.6 billion, but were expected to double, with an increase in internet connection and penetration of cheaper mobile phones from China in the year 2020. The total outlook of e-commerce forecasted in 2020 total sales of US\$ 6.05 trillion, with more than 249,600 companies involved in e-commerce and are expected to either double or triple turnover of the same by 2024 (STATISTA, 2020).

Especially with coronavirus restrictions by governments and WHO to contain the spread, now 90% of retail sales are being done via e-commerce platforms. It can be noted that there is a high surge of medical apparatus, medicine, health care products, food, and groceries on the e-commerce platform. Table 1 show e-commerce revenue forecasts in US \$ billion 2019-2024. CAGR: compound annual growth rate, GMV: revenue gross merchandise value, ROW: rest of the world.

Table 1: Total e-commerce revenue forecast in US \$ billions



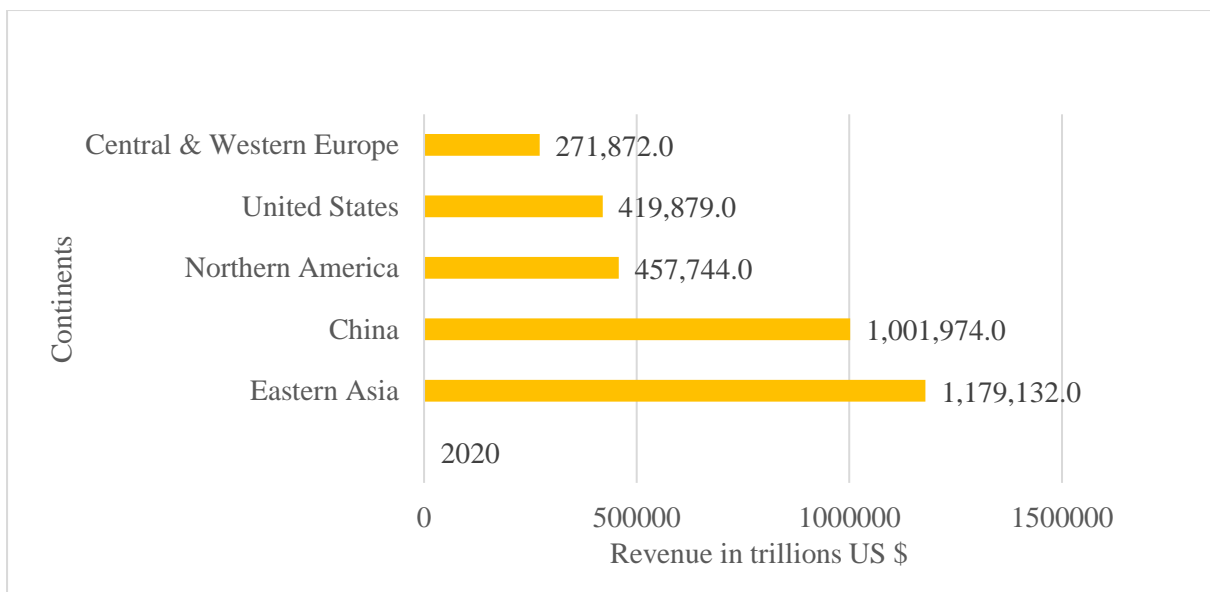
Source: Statista.com and author editing (2021)

The e-commerce or online market platforms are growing steadily and with exponential potential generating 57% of countries' Gross Domestic Product (GDP).

This competitive advantage over mortar and brick shopping is brought about by the various benefits of e-commerce, as there is a great awareness of online shopping. Consumers now can make price comparisons in different e-shops or web companies, such as Amazon, eBay, or AliExpress, among others. Also, e-commerce was influenced and multiplied by the impact and restrictions by different governments to combat the spread of coronavirus (2020), This has dramatically boosted e-commerce, seeing it outperform most industries for nearly a decade.

The e-commerce platform is also seen as a valuable sales channel boosting retail sales worldwide. This is the norm that all other businesses should follow to experience growth and competitive advantage and is also influenced by social media. Thus, many companies are creating pages for their online consumers. The 2024 e-commerce growth forecast between continents predicts a move from Western to Asian markets, with China being the greatest beneficiary of this movement, since about 95% of its revenue is generated from e-commerce platforms. China's performance is followed by the Middle East, Africa, the U.S., Europe, and the remainder of the world. Table 2 show revenue growth projections of different continents in 2024 revenue growth levels.

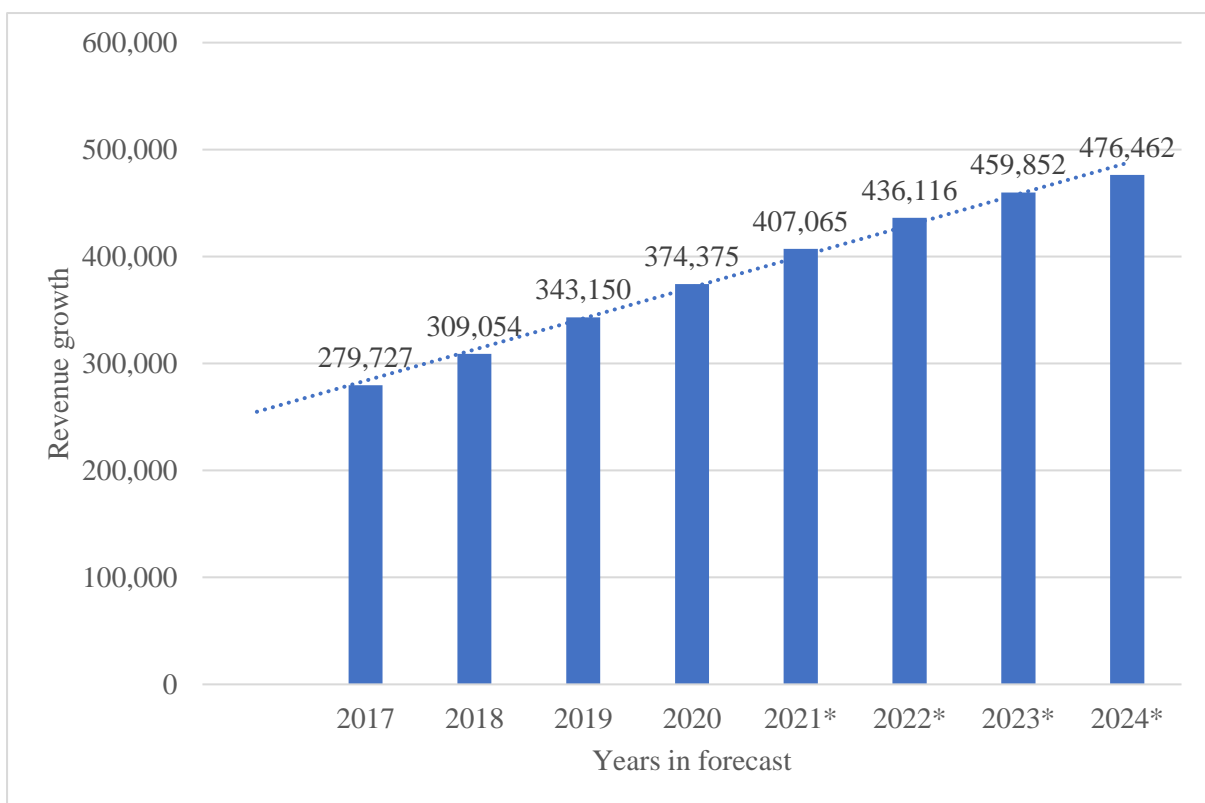
Table 2: Revenue growth projections of different continents in 2024 US dollars



Source: Statista.com and author editing (2021)

In addition, narrowing my study to the Middle East and Africa due to the availability of data collected have shown growth in e-commerce over recent years, South Africa, Nigeria, and Kenya, respectively STATISTA (2020). Especially Kenya has become the hub of online shopping malls. This has boosted the Kenyan economy by 5.9% from 5.2%. Online consumers in Kenya have overcome geographical and distance barriers. Kenyans can export and import products and services from any country. This has seen exponential growth to 52% retail sales and a compound annual growth rate of 5.9% in 2020. Table 3 show Kenya retail e-commerce growth sales from 2017-2024 (million US. Dollars).

Table 3: Kenya retail e-business growth in sales 2017-2024 (in million U.S. dollars)



Source: Statista.com and author editing (2021)

Now, more than ever, it is evident with the impact of coronavirus that e-commerce will continue to grow and surpass other industries. This is because of digital transformation that will increase the significance of e-commerce or online shopping or e-retailing among the retail sector in the business industry. However, sustainability is the major challenge in maintaining the sparring growth of e-commerce. Consumers have grown their consciousness towards the

green environment and sustainable products. Accordingly, the demand for sustainably sourced, produced, and packaged with recyclable or re-use materials products continues to rise.

This gives online companies a competitive advantage by producing higher-quality consumer services and products, thereby identifying a niche market. Consumer behaviours and purchasing intentions are currently pegged on integrated sustainability dimensions in environmental, social, and economic aspects. Therefore, this shift shows how retailers and consumers perceive sustainability as a major benefiting factor contributing to win/win solutions for all stakeholders for the long-term.

Sustainability can be attained in three dimensions: environmental, social, and economic dimensions. Thereby, long-term goals can be achieved for companies to attain efficiency and effectiveness, realizing growth, cost savings, profits, and investment more in research and development activities towards green and sustainability, thus becoming economically viable and attractive to consumers. As added plusses, such companies can offer society better standards of living, jobs, education, and equal opportunity. This will support the environment in terms of better use of natural resources, in pollution prevention, and in biodiversity conservation. When sustainability is prioritized, it is not only achieved, but offers the world a better place to live.

Where the integration impact can be enjoyed more diversely, trade-off benefits are reaped, i.e., social-economic aspects better business ethics, improve fair trade, and lead to high worker benefits. Consequently, employees and consumers will enjoy green products and services at a fair price, while companies will save a lot in terms of production cost and minimum waste. Social-environmental conservation policies, environmental justice, and global stewardship will lead to a society more aware of the need to protect the environment and to ensure the regeneration of natural resources. Environmental-economic focusses will result in more energy efficiency, increased use of renewable fuels, subsidized incentives, and green technology. By integrating environmental, social, and economic dimensions to sustainability and taking possible trade-offs will bring a win/win solution. Figure 1 show the impact of sustainability on ESE dimensions and trade-offs.



Figure 1: The impact of sustainability on ESE dimensions and trade-offs

Source: Author' research (2021)

However, e-commerce has received its fair risks that hinder its potential growth and development. For example, with the much-increased growth of e-commerce platforms, defrauders are taking advantage of and intercept consumer credit card information on e-commerce websites. Also, these criminals are taking advantage of consumers who are not able to distinguish genuine e-commerce websites from fraudulent ones, and therefore fall prey to conmen. As a result, more fraudulent activities taking place on e-commerce platforms are a great concern that should be resolved to guarantee e-commerce sustainability. These risks can be viewed as major drawbacks to e-commerce establishment in developing countries such as Kenya.

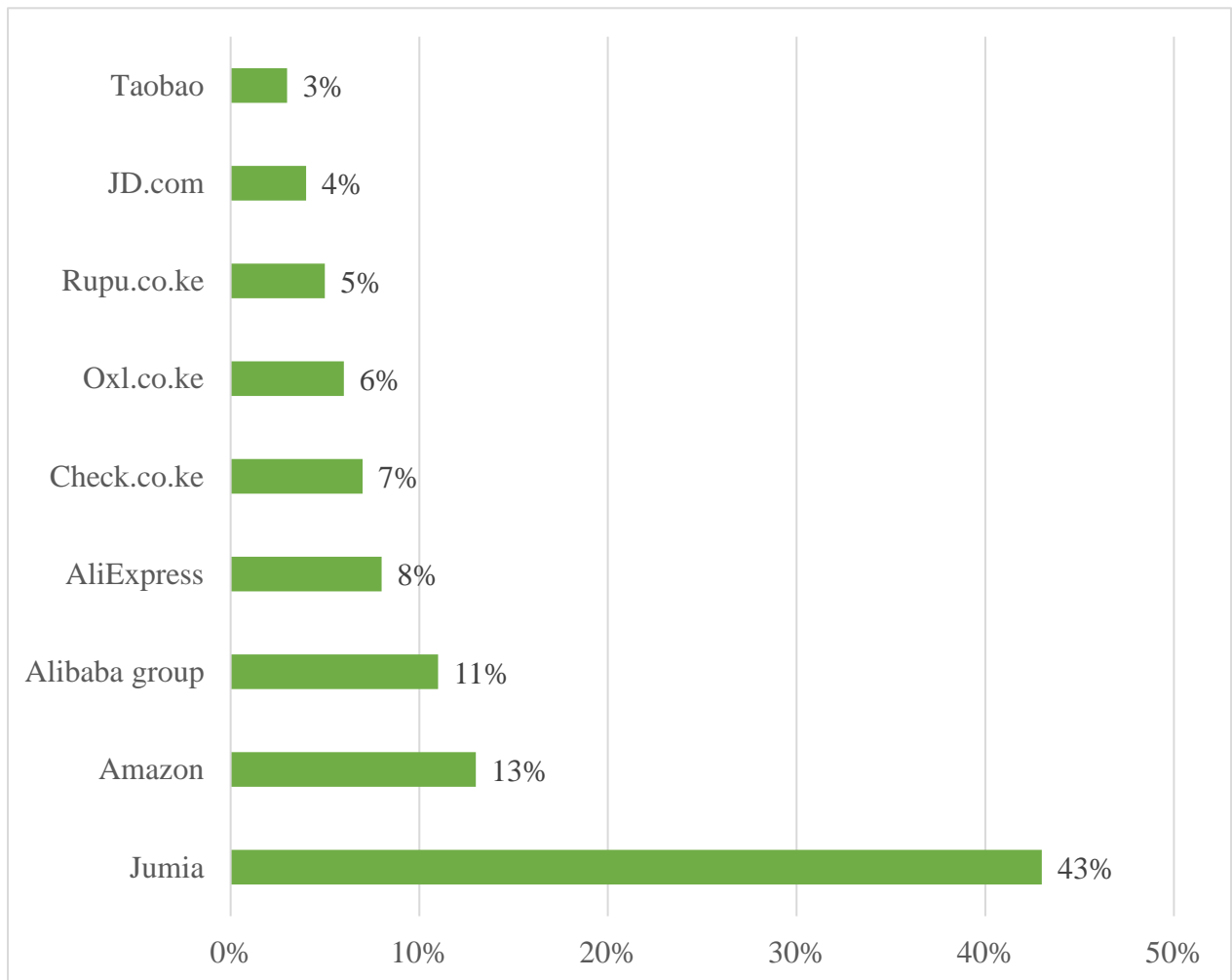
E-commerce platforms experience risks, such as a lack of trust by online customers, especially those online websites and brands that have no international recognition. Local brands therefore face acceptance challenges and difficulties to emerge or become accepted by local buyers. Consequently, there is low growth and development of e-commerce in developing countries

e.g., Kenya. Additionally, security and privacy are factors that contribute to the low growth and acceptance of e-commerce in developing countries. E-retailers must guarantee customers the safety of their private information and protect them from financial loss due to cyber theft and crime.

The lack of formulation and implementation of policies that support e-commerce has led to low growth of e-commerce in developing countries. As a result, this led the authors to the objectives of this study and to offer a solution on how to make e-commerce more sustainable in developing countries. Otherwise, customers will end up being involved in e-commerce and dealing only with big and globally recognized companies with a good reputation, thus promoting the growth of the gross domestic product (GDP) of other countries' economies.

This has been witnessed in Kenya's economy, in which customers are buying from companies, such as AliExpress, Amazon, Alibaba, JD.com, Taobao, and Tmall, which are mostly from China. The author of this study has sought to determine how to integrate the environmental, social, and economic dimensions and trust, privacy, and security as mediating factors to make e-commerce more sustainable in Africa, or more specifically to Kenya, a turnaround that can be achieved more through sustainability. Table 4 show Online companies and the percentage of acceptance in Kenya. How global companies are dominating the Kenya e-commerce platform that primarily might be due to perceived risks, such as trust, security, and privacy. Consumers therefore end up making purchases from globally recognized brands with good reputations, instead of trying products and services from domestic e-businesses.

Table 4: Online companies and the percentage of acceptance in Kenya



Source: Author's research (2021)

1. TOPICS AND OBJECTIVES

The impact of e-commerce has been felt in every country. This has been brought about by continuous innovation in ICT, transforming how different stakeholders are conducting business. These stakeholders include retailers, consumers, and businesses switching to a green and digital environment. Through innovations, artificial intelligence, and big data, analytics have enabled and spurred the growth and development of e-commerce globally. Businesses are engaging e-commerce in search of competitive advantages, including cost reduction, fast delivery of goods, improved productivity, availability of a range of products, and a large customer base.

Consumers are becoming more aware of the importance of green products and voicing demands for more sustainable means of consumption and production. Despite the growth of e-commerce, consumers in developing countries are still faced with such as issues with trust, privacy, and security risks. Therefore, great concern as to how online sellers can avert such risks and assure their customers secure online environments are key questions to which any emerging e-business must provide responses. Likewise, the world is faced with problems of high pollution, unfair business practices, and unemployment in environmental, social, and economic dimensions. After a careful and thorough literature review, no combined research on how to integrate environmental, social, and economic dimensions and mitigation of online risks such as issues with trust, privacy, and security to achieve sustainable e-commerce was discovered. This study therefore seeks to fill this research gap.

Objectives of the research

- To investigate e-commerce sustainability through the integration of environmental, social, and economic dimensions.
- To investigate e-commerce sustainability through the mitigation of online risks, such as issues with trust, privacy, and security.
- To investigate e-commerce sustainability to enhance sustainable e-commerce through strengthening policy legislation and regulation.

The research questions.

1. How can one integrate the environmental, social, and economic dimensions into e-commerce to make it more sustainable now and future, both for customers and retailers?
2. What is the influence of issues such as with trust, privacy, and security on consumer behaviour to enhance e-commerce sustainability in the retail industry?
3. What are the recommendations for policy legislation and regulation formation that can strengthen e-commerce sustainability?

The hypothesis of the research

The following hypotheses were developed to determine the influence on connections, relationships between independent and dependent variables with a mediating effect. The assumptions of the study will be confirmed by accepting or rejecting the hypotheses. Thus, the hypotheses will address the research questions and objectives of the study.

- **H1:** Environmental, social, and economic dimensions have a significant and positive influence sustainable e-commerce.
- **H2:** Trust, privacy, and security issues have a significant and positive influence on the indirect effect of sustainability of e-commerce.
- **H3:** Policies on environmental, social, and economic dimensions have a significant and positive effect on the direct effect of e-commerce sustainability.

The structure, research approach, significance, and scope of the study

This section outlines the structure of this study: This study is comprised of seven parts. First, an introduction, giving an overview of the research topic, development of aims, objectives, research questions, and hypothesis of the study in chapter one. The subsequent part gives a literature review on integration of environmental, social, and economic dimensions and mitigation of online risks such as issues with trust, privacy, and security as a mediating effect on e-commerce sustainability in chapter two. The third part, which is chapter three, expounds on materials and methods used for the study. Chapter four discusses the results and discussions. The results are analysed by several tests, such as the reliability and validity test, the population and sampling test, factor analysis, partial correlation, and regression model using the SPSS program, a case study, and an R model. Chapter five involves discussion of the conclusions,

limitations, future study areas, and recommendations. Chapter six highlights new novelties that distinguish this dissertation from others. Chapter seven draws attention to the summary of the entire thesis.

In this study, the author used a mixed-method approach of both qualitative and quantitative methods. Also, the R model was used for the confirmation of the results between the two methods. MANDY-ARCHIBALD (2015) noted that mixed methods accord the research all the opportunities to be able to explore, examine, and investigate independent, dependent, moderator, and mediating variables to give a broader perspective with a better understanding.

The importance of this study will give more insights - both practical and theoretical - to the existing theories and concepts to business segment retailers, merchants, consumers, government, and academic scholars, on how to integrate environmental, social, and economic dimensions and mitigate online risks to e-commerce sustainability. As refers to the scope, this study will only take the business to consumer model (B2C), the example of its use in Kenya.

2. LITERATURE REVIEW

2.1 Previous studies

In this section, a literature review is done from previous studies. The reviews are of the most recent papers that have been published in a peer-reviewed journal. We will analyse and investigate how to integrate environmental, social, and economic dimensions (ESE), and the effects of trust, security, and privacy as mediating factors (MMF) on e-commerce sustainability. This will be done by investigating the connections and relationships between the independent and dependent variables with the mediating effect and control factors on how to influence e-commerce sustainability. The main reason for this chapter is to give an in-depth understanding of the topic of study from previous research. This will allow the authors to identify the gaps that were not addressed in previous research (OLÁH ET AL., 2018; SATAR ET AL., 2019; XIAO ET AL., 2019).

E-commerce can be defined as the activities of buying and selling goods and services via the internet. These are not limited to an exchange of information via the internet, transfer of funds, and online consumer behaviours to purchase and sell via the internet. E-commerce is known also under the synonym's electronic commerce, online shopping, e-web shops, e-retailing, e-commerce, all of which can be used interchangeably to mean the same thing.

This research used Google Scholar as the main search engine in secondary data, direct science, and Mendeley databases, for the convenience and suitability of the study. Convenience and snowball anchor were used as our strategy for tracking citations. Investigating and analysing the connections and relationships among the variables is the author's motivation to study how to ensure sustainable e-commerce to achieve sustainability, which led to the creation of a comprehensive theoretical framework using enough literature relevant to this study. Through literature review, several studies have been investigated. The author found out that many studies on e-commerce have been carried out, but there is no direct study investigating how to make e-commerce more sustainable in one combined study on environmental, social, and economic dimensions and mitigating online risks, such as issues with trust, privacy, and security to ensure e-commerce sustainability. Therefore, this study seeks to begin to fill a gap in research.

2.2 Background

Around the 1960s, the internet was invented for military use and communication between researchers and scientists. Later, there was the development of computer and internet connections via Local Area Network (LAN) and later into a wide area network (WAN). Later, the World Wide Web was discovered in Switzerland, by a British computer scientist. In the 1990s, e-commerce began when Amazon sold their first product online. Subsequently, this type of activity resulted in contributing unity across different sectors and the study of the consumer behaviours. Trade has been made simpler through technological innovation.

Life and communication styles of numerous societies have undergone transformations due to the possibilities afforded by electronic interchange and exchange of information via the World Wide Web. This transformation is seen in today's ease in being able to send an email, electronically transfer data and payments, hold chats and video calls, as well as instant messaging in the www, with its manifold electronic communication abilities, making life for many more interesting and meaningful.

Powerful online service providers, such as WhatsApp, Facebook, Instagram, and Snapchat, among many others, have influenced e-commerce growth. People can post products and buyers can connect with them via such social media, hence empowering individuals in practically most communities. Information communication technology advancement has led the world to become a global village, e.g. through online education, online malls, and online shopping, bringing more opportunities that have linked nations together and created economic sustainability through job creation in e-government services, as CHILEMBO-TEMBO (2020) highlight.

The modern industrial revolution has led to the development and advancement of information communication and technology (ICT) at an increasing rate. First, mechanized production used water and steam power. The second such revolution was mass production using electric power. Next was the third industrial revolution, based in electronics and information technology advancement to automate production. Today, the fourth one is here, the industrial revolution based on the real use of the internet, linked with e-commerce, Industry 4.0, IIoT, and many other areas. This new revolution in industry led to more job opportunities, greater innovation, increased production, and reduced border barriers among nations and business transactions.

The Internet has taken over the world by storm. How things can happen in a fraction of a second across the globe is a very interesting phenomenon. With the continual advancement in

technologies, there is an increased demand for e-commerce, Artificial Intelligence, the internet of things, block chain, and cryptocurrency. Given the rising prevalence of the internet, there is an essential need to embrace e-commerce along with its benefits to both e-retailers and online consumers.

E-commerce platforms are of added value, with great significance to business and society. Therefore, facilitating sustainability - while at the same time eliminating associated risks - are crucial topics of study. Despite the benefits of using e-commerce, it has its fair risks and challenges hindering online shopping, as seen e.g. in the studies by KIM (2016), MATHWICK ET AL. (2002). Yet, enthusiasm for e-commerce is still high and growing. There is a need to study the theoretical and practical implications associated with e-commerce sustainability, since less attention is given to how to make e-commerce more sustainable. Similarly, there is a need to study how e-commerce affects the environment, social, and economic dimensions in the short and long terms, as well as issues with trust, privacy, and security as mediating factors on e-commerce sustainability.

Most previous studies on e-commerce investigated e.g., e-commerce adoption, the importance of e-commerce in SMEs, and barriers to e-commerce, with less attention given to sustainability. Also, most studies are in case-based and hypothetical analysis prompting unclear considerations and mixed reactions in the literature review TIAN-TAN (2018). The fast growth of the e-commerce sector is indeed experiencing unsustainable production and consumption patterns, as RISTOVSKA-MACEDONIA (2010) reveal. However, traditional offline shopping has been experiencing severe environmental factors, leading to pollution and high unemployment, gender inequalities, and high costs of production, high energy use, all with less effectiveness and inefficiency, as ALHADDI (2015) explain.

International e-commerce platforms, for example, Amazon, eBay, Alibaba group, and AliExpress are the marketplaces changing the business industry, realizing more opportunities, and causing vulnerabilities to small and offline businesses. The literal mushrooming of online stores is evident in the growth of e-commerce. Nevertheless, the challenge is how to sustain this enormous growth and keep it high.

More challenges are evident with the growth of e-commerce, e.g. high pollution with an increasing number of online businesses, due to increased delivery of products, leading to

adverse negative environmental impacts, as FRAME-NEWTON (2007) indicate. Various authors in the literature review have noted the problematic landscape that is facing e-commerce and retail business, which might influence the stagnation of e-commerce growth.

Thus, the authors of this study highlight the importance of and the interest in a better understanding of digital markets and how to sustain them. We would refer here to the study by HÄNNINEN ET AL. (2014). Furthermore, other studies stress the vital significance of sustainable ways to make the world a better place to work and live. Similarly, online businesses must remain competitive in the digital economy, as argued by YU (2019); TEECE (2018); COYLE (2017).

Especially, e-commerce platforms need to reconsider how to repackaging their products and services in a more environmentally sustainable manner, to reduce pollution. They need to offer better experience services that will create high satisfaction and loyalty among online customers to local e-retailers, as CARRILLO ET AL. (2014) affirm.

Simultaneously, by developing more ecological methods in e-commerce environment guarantees more open doors in improving sustainability. E-commerce platforms seem to be the best link, and the most appropriate strategy is to know customers' changing behaviour and preferences. E-businesses must create an atmosphere that gives customers what they want with utmost trust and at least cost. E-commerce sustainability will be the ecosystem that offers the most advantages to all users of online business, as KIM (2016) notes.

Studying, e-commerce theory is a prerequisite for a better understanding, therefore, will enable better policies and strategies for sustainability put in place. Particularly, there is a need to understand the dynamic and changing behaviours, attitudes, and perceived values of online customers towards sustainable dimensions. Alluding to Jeff Bezos' statement, "one can say that clients are integral to the achievement of business success". He suggested that offering products and services fitting client requirements is one of the most important steps towards sustainable e-commerce to thrive, grow, and develop in an eco-friendly environment. Interview contacted on 23/03/2020.

2.2.1 Theoretical background: theories that support e-commerce adoption and growth

This study discusses three theories in connection to e-commerce development. The theory of planned behaviour (TPB) by AJZEN-FISHBEIN, (1975-1980), the theory of reasoned action and the theory of technology acceptance. The first theory of reasoned action, which can be defined as the individual intention to behave or act in a particular manner, is the primary determinant of behaviour. Hence, subject norms: how individuals perceive a particular society's culture, beliefs, norms, and way of doing things.

Therefore, attitude can be reflected in the individual's aspects - whether negative or positive - due to adopting a certain manner of doing things. The model perceives and considers rational behaviour that is contributed towards a certain direction, for instance, online shopping actors are considered to influence the customers and the organizations. It discusses the factors that influence the adoption of technology, and e-commerce, such as perceived usefulness, and ease of use.

By the virtue of evolution, the theory of planned behaviour was used by TAYLOR-TODD (1995), explaining how the theory could ending up making specific components. This resulted in a decomposed theory of planned behaviour that was useful in identifying salient beliefs that influence IT usage, whereby online transactions could be between the resource owners and resource user's establishment of e-commerce.

The technology acceptance model was discovered by DAVIS (1989), in which he attempted to explain how individuals would accept information technology. This model was used to explain cause and effect with a special interest in how individuals come to accept computer-based technologies to make their daily tasks easier and more efficient.

2.2.2 E-commerce benefits to e-retailers and customers of online platforms

Countless benefits are associated with e-commerce over traditional shopping or brick and mortar shopping. Successful companies, even while operating offline stores, are now engaging websites that offer online shopping, due to the many advantages that come with e-commerce platforms. Benefits to online companies include a large customer base, overcoming geographical boundaries, low cost of production, and distribution, and provision of adequate information, creating direct personalized communications with their customers. Online shops are open 24 hours a day and 7 days a week.

Nevertheless, e-commerce customers face security and privacy threats whenever visiting online websites. Trust is equally a major concern that e-retailers should focus on and they must provide websites with security features that guarantee customers their safety, thereby creating more confidence in one-commerce platforms.

The nature of human beings is to be lazy, therefore given an opportunity, they would do everything in their comfort zones. For example, they would prefer to work from home, do online shopping while still at the office or in bed, taking breakfast, or traveling. E-commerce benefits to customers include convenience, good customer experience, real-time information available at a click of a button, with many online promotions, coupons, exclusive deals are available. A one-stop-shop, shopping under one roof, thereby saving time and money, all while avoiding traffic jams.

There is also the ability to compare prices before actual shopping, while enjoying secure online payment and websites. Companies can offer fast responses to customer inquiries through robots and instant chats and quality products at a cheaper price. Personalized messaging is also available, according to the changes, demands and preferences of consumers. However, consumers experience the challenge of high pollution through carbon dioxide emissions and packaging materials scattering everywhere.

2.3 Drawbacks of the previous studies

Through this study research, the author discovered a wealth of literature on e-commerce ranging from adoption, growth, development, and different angles on e-commerce. However, the author failed to find research done combining environmental, social, and economic dimensions and mitigating risks, such as trust, privacy, and security on e-commerce sustainability.

The previous research done investigated e-commerce with a single sustainability variable and with no moderator factor or mediating effects. With this knowledge, the author has developed a comprehensive model that will solve these drawbacks and be able to integrate the three triple bottom line: environmental, social, and economic dimensions and the ability to mitigate online risks: issues with trust, privacy, and security to e-commerce sustainability, in this research.

2.4 E-commerce sustainability

What is e-commerce? The word electronic commerce is also used to mean e-retailing or internet commerce or written as e-commerce or the buying of goods and services through the internet, transfer of funds. Exchange of information and communications among other services using the internet. What is sustainability? Is the ability to meet the current needs to the satisfaction without compromising the ability to meet the future needs within the three-bottom line? The triple/three bottom lines are the environmental, social, and economic dimensions of sustainability.

First, allowing the natural resources to regenerate, conserving, and protecting the environment. Second, at the same time taking care of social needs; companies offering green products. Products that are safe for the consumption and good health of the consumer. Better working conditions and fair wealth distribution. In return, society preserves the environment from pollution and degradation. Third is the economic dimension, ensuring companies are not making profits at the expense of humanity and the environment. If this is not well balanced, negative impacts can be experienced. Especially, companies fail to exercise caution, leading to environmental degradation, social injustice, and inequality in life.

The concept of e-commerce is not new and has with time evolved and become a phenomenon tool that is mostly used in the trade industry around the world for better opportunities as ANVARI-NOROUZI (2016) note. In other words, digital marketplaces have been established to be the direct link between suppliers and consumers. Furthermore, internet business is certainly a two-sided venture, bringing economies of scale and reduction of cost to retailers, as well as convenience with good experience and customer satisfaction.

Especially in the internet business industry, advanced commercial activities are increasing alongside a wide item offering and low costs, as LIU (2012) indicates. TIAN-TAN (2018) emphasize that e-commerce has changed the retail industry. Certainly, the traditional way of shopping cannot match online shopping with the recent development of the internet. There is stiff competition to run a traditional shop compared to e-web shops, due to the high cost. For example, rent payment, initial setup cost of pieces of machinery, design, advertising, storage of inventories costs, marketing, and sales cost involved, as discussed by YANG ET AL., (2016). Additionally, with the convenience of e-commerce, most customers shop online with anticipation of a large range of product choices, discounts, low prices with high-quality

products and flexible delivery times, all promoting sustainability in e-commerce (KIANPOUR-JUSOH, 2014).

2.5 Referencing literature

As mentioned above in the previous studies, we did not come across combined research on e-commerce sustainability on how to integrate the environmental, social, and economic dimensions and mitigate online risks, as well as the effects of issues with trust, privacy, and security on e-commerce sustainability to make online businesses more sustainable. Therefore, referencing literature, means that the author will study all literature that is relevant to this topic and will identify the gap, as a means to solutions on how to have a win/win solution for both consumers and retailers (YANG ET AL., 2016). In the case of sustainability, many studies were done, but in individual cases, such as (SULLIVAN-KIM, 2018; YANG ET AL., 2016; MANGIARACINA ET AL., 2015).

That is why sustainability is very important in the three aspects. A quality environment, a healthy community, earn gains for the investors, as well as better living standards for society, as LOZANO (2007) mentions. A study was done recently stated that about 3,000 representatives said the most grounded and persuading ways to embrace e-commerce sustainability is aligning the organization's visions, objectives, missions, with sustainability goals (NISAR-PRABHAKAR (2017B)).

Therefore, customer expectations will be met, and new opportunities will be available for the growth and development of e-commerce platforms. PAUWELS ET AL. (2011) mention that sustainability of the environment, social, and economic dimensions will not only give chance to business opportunities to profit. But guarantee to solve most of the world's problems in business and society at large.

LEE (2001) compare traditional offline shopping to online shopping, its inability to sustain all dimensions and create a sustainability framework. The endeavour of attaining sustainability in the three dimensions will result in more effective and efficient use of resources hence better decision making. MOLLA-HEEKS (2007); NAIR (2017) urge the importance of the adoption of e-commerce on global business and consumer perspectives with opportunities that can be achieved when well utilized. Factors that hinder the adoption of e-commerce. AKHTER (2016) studied challenges of e-commerce, factors that influence online shopping consumer

behaviours, attitudes, and preferences were also cited by BISWAS (2019). HASAN (2016) analyses factors that lead to customers abandoning shopping carts online.

RODRÍGUEZ ET AL. (2020) examine customer value, customer satisfaction with a good experience that leads to customer loyalty in e-commerce shopping. However, with the growth of e-commerce, no combined research has been done on how to integrate environmental, social, and economic dimensions and mitigation on trust, privacy, and security on e-commerce sustainability to enhance sustainable measures towards e-commerce. Table 5 shows the previous studies on e-commerce and sustainability.

Table 5: Previous studies on literature review concerning e-commerce

TOPIC OF THE STUDY	AUTHORS AND YEAR OF PUBLICATION
E-commerce adoption antecedents of e-commerce theory of planned behaviour theory of reasoned action theory of technology acceptance (TAM)	GIOTOPOULOS ET AL. (2017), CHAPARRO ET AL. (2016), HUA ET AL. (2015), CHENG-HUANG (2013), CYR (2013), KOLOMVATSOS (2013), GRANDÓN ET AL. (2011), HERRERO ET AL. (2010), HERRERO ET AL. (2008), MASWERA ET AL. (2008), TARAFDAR-VAIDYA (2006), HONG-ZHU (2006), LEFEBVRE ET AL. (2005), PIRES-AISBETT (2003), EASTIN (2002)
Online perceived risks: trust, privacy, security	BADA ET AL. (2021), MAQABLEH ET AL. (2015), TOUFAILY ET AL. (2013), WU ET AL. (2013), PARK ET AL. (2012), BOCK ET AL. (2012)
Consumer attitude towards online shopping, green products, repurchase intentions	ZHANG ET AL. (2020), SANCHEZ ET AL. (2020), LESTARI (2019), GÁZQUEZ ET AL. (2017), XIAO-BENBASAT (2013), ZHANG ET AL. (2011), GUNASEKARAN ET AL. (2002)

E-commerce globalization, digitization, single e-economy	FLYVERBOM ET AL. (2019), ETTERET AL. (2019), FATIMA (2017), AĀAN ET AL. (2016), BRUTON ET AL. (2010), KRAEMER-GIBBS (2005)
E-commerce satisfaction, good experience, customer loyalty, Website dimension	NIKHASHEMI ET AL. (2013), ENDO ET AL. (2012), VERHAGEN ET AL. (2011), LIN (2007), DELONE-MCLEAN (2004), GOLICIC ET AL. (2002)
Environmental dimension: pollution prevention, better waste management, quality air	WEIDELI (2019), CHUANG-HUANG (2018), AL-OMOUSH ET AL. (2018), AÑÓN ET AL. (2017), YI-THOMAS (2007)
Social dimension: inclusivity, social justice, better worker's benefits, empowerment, trust	MASOCHA (2019), CHEN ET AL. (2019), JUNG (2017), LAI (2010), MAZAR-ZHONG (2010), KOH-KIM (2004)
Economic dimension: low cost, high profits, energy-efficient	JIAN ET AL. (2020), SELES ET AL. (2019), XIAO ET AL. (2019), ANVARI-NOROUZI (2016)
Sustainability: green products, sustainable development goals, clean and affordable energy	CHENG (2020), ZHANG ET AL. (2020), JIE-SI (2018), FICHTER (2017), BALDASSARRE ET AL. (2016), ERIKSON (2002)

Source: Author' research (2021)

2.6 Variables

2.6.1 Environmental dimensions

In this section, the author attempts to establish how e-commerce sustainability influences environment protection, conservation, and biodiversity in different aspects and better use of natural resources. OLÁH ET AL. (2018) urge more benefits can be attained by taking possible

trade-offs in environmental-social-economic through e-commerce sustainability. The following studies were done concerning trade-offs in the triple bottom line sustainability; Conservation policies ADAMO ET AL. (2019); LIN ET AL. (2000). Environmental care (ALEXANDER ET AL. 2019; SARKIS-ZHU, 2018). Proper disposal of waste (BONILLA ET AL. 2018; DAO ET AL. 2011). Minimized pollution (GONI ET AL. 2015; PETRARU-GAVRILESCU, 2010). On the other hand, environmental-economic cooperation will create energy efficiency, renewable energy, subsidies, incentives, and green technology. HAFEZ (2020) notes that through e-commerce, one can realize the smart economy across borders, with less or no restrictions on reaching large and new markets.

GIELENS-STEENKAMP (2019) note how with traditional shopping there exist a lot of uncertainties. Yet, e-commerce sustainability can create a friendly environment for both consumers and retailers. With the organized distribution and use of non-pollutant LSPs, the environment will enjoy quality air and enhance social commerce by factors that accord customer intention to re-purchase (ALI ET AL. 2020; JUNGE-STRAUBE, 2020).

CALDERON ET AL. (2020) note that consumers have raised their awareness to have sustainable products and services. LUBOWIECKI ET AL. (2020) mention that customers would prefer to pay a higher price to companies that are inclined to produce eco-friendly products. PANDA ET AL. (2020) cite how e-commerce sustainability led to the welfare and wellbeing of the consumers, as well as society at large. This study intends to identify and obtain adequate data that will be useful and offer a better way for online companies to use to facilitate sustainability goals. MUJKIĆ ET AL. (2018) investigate website features that attract and keep online consumers. MUJKIC ET AL. (2019) indicate poor sustainability commitment will lead customers to look for firms that are engaged and committed to sustainability.

Sustainability has become a centre of discussion in every forum in many organizations that support sustainability, such as the United Nations on sustainable development goals, the World Bank, or the International Monetary Fund. All of these have their visions, missions, and objectives on sustainability. The United Nations suggested 17 sustainable goals to address the following areas: end poverty, no hunger, well-being (good health), quality education, clean water and sanitation, affordable and clean energy, economic growth and decent working conditions, industry innovation, and infrastructure, reduced inequalities, sustainable cities, communities and environment, responsible consumption and production climate change,

protection of life below water and on the land, peace, justice and in collaborations with the partnership for the achievement of the all the goals. All these goals can be achieved using ICT and e-commerce, even before the 2030 vision.

The following studies show environmental sustainability issues have been adversely affected. SHAO-ÜNAL (2019) studied how environmental sustainability has become progressively important to the customer. OLDE ET AL. (2020) note how the natural environment has become critical since the 1980s, from one nation to worldwide. KUMAR-IMAM (2013) urge that pollution is the biggest challenge. CHIARINI ET AL. (2020) studied destructive climate in Eastern Europe and MARTÍNEZ ET AL. (2019) investigated a negative environmental impact. ARCHUNDIA ET AL. (2019) studied environmental challenges. GRUNDMANN (2018) examined climate change to the depletion of the ozone layer. REIMANN ET AL. (2018) conducted water contamination, and soil polluted due to improper discharge of waste. Consequently, literature on green sustainability has focused on the environment only, but not on social and economic dimensions.

TALWAR ET AL. (2020) state major concerns should not be only green products but include environmental sustainability in e-commerce. However, organizations, advertisers, and marketers see "green" as a product alternative. DUARTE-SILVA (2020) mention that e-commerce is a component of solutions to environmental challenges. Additionally, MIAO ET AL. (2017) conclude that e-commerce contributes to sustainable consumption and cultivates a culture of protection, conservation, and better utilization of natural resources.

SINGH-SAHU (2020) indicate that green methodology ought to be more embraced that can guarantee conditions of sustainability are accomplished. According to previous studies, conflicting environmental challenges are creating an unreasonable, unacceptable, and unsatisfying society. Therefore, treating environmental concerns with high priority as a business has a positive result contributing to sustainability (CHATZIMENTOR ET AL. 2020). Thus, to avoid the negative result of harming the environment, POLONSKY (2011) upholds sustainability by maximizing utilization of resources with minimum waste.

Therefore, this direction is more concerned with environmental protection as well as social and economic dimensions of sustainability. As a result, the ESE is promoting green products and services to consumers. In several studies done previously, it was indicated that the environment

is faced with various challenges hindering sustainability (TOPPINEN ET AL. 2020; ZHAO ET AL., 2019).

LEE-PARK (2020) state that increased transportation has led to carbon emissions increase and therefore greater pollution of the environment - more so in urban centres. SU ET AL. (2020) emphasize that high use of non-degradable packaging materials has led to the filling of landmasses everywhere hence the spread of diseases. The studies by (SCHERER ET AL. 2020; SKOGEN ET AL. 2018) indicate high cutting down of trees and contamination of water services creates interference with biodiversity and extinction of wildlife. AMATO ET AL. (2019) explained the lack of use of the bio-economy approach has resulted in the high use of energy by non-renewable energy sources.

It is an understatement to emphasize how important it is to utilize resources efficiently. WANG ET AL. (2020) state that because everything else depends on natural resources, sustainability is important to avoid depletion of resources. FILER (2020) and SADHUKHAN ET AL. (2020) reveal that non-renewable resources will be left at constraints and will not be able to support the production of goods and services in the manufacturing industry if not well maintained.

This has ripple effects on production and consumption since suppliers and consumers will also be affected. Supplies will be inadequate and in short supply, while there will continue to be high demand for goods (SAKTI-TAKEUCHI, 2020). In return, this situation affects the supply and demand curve, resulting in economic sustainability breakdown (ZHANG ET AL. 2020). Consequently, BRETOS ET AL. (2020) notes how imports and exports are negatively affected, creating imbalances of payment.

Nevertheless, with the current trend, scholars and authors are investigating solutions to environmental challenges that have suggested several solutions, such as optimal use of resources and consumption, which can guarantee the time for regeneration of the environment (NUORIVAARA ET AL., 2019). Subsequently, it is important for firms to develop and engage in sustainability reporting, which can be enhanced by having a sustainability department. training their employees on the importance of commitment to sustainability values (SNELSON ET AL., 2020).

Holding seminars and forums to create a culture of understanding sustainability is of importance to everyone. Sustainability missions and visions must be set and stated in all

company policies, objectives, and goals on company websites, as well as at the office entrance, among movable and non-movable, fixed and intangible assets, to emphasize its importance (MOFFETT, 2020; SAAD ET AL., 2019). Businesses should create awareness among consumers about the importance of sustainability (CHOONGO ET AL., 2016), so as to order and purchase according to customers' needs and avoid impulse buying consumer behaviour attitudes (FOOK-MCNEILL, 2020; AKRAM ET AL., 2018).

To be able to reduce carbon emissions and footprints, sustainable ways should be adopted by logistics service provider companies to use less pollutant transport systems. For example, China uses drones to deliver products within a short geographical location in the last miles or the same radius (SALAMA-SRINIVAS, 2020; CHIANG ET AL., 2019; KOIWANIT, 2018;).

Also, Japan has been known to use electric cars for the delivery of goods. Similarly, Indonesia uses bicycles to deliver products within short distances in e-commerce platforms. These are few among many other sustainable ways that can be adopted to ensure sustainability (MEIXELL-LUOMA, 2015).

Logistic service providers should partner with the retail industry, e.g., to assemble all the deliveries that are of the same route and delivered at once (CHEN ET AL., 2017). In the spirit of ensuring sustainability, companies can come up with green initiative plans. The green initiative is a vital integral organ not only to support the environmental sustainability dimension but also social and economic sustainability (KUSHWAHA-SHARMA, 2016; BAGDAD-MOHAMMAD, 2013; TIWARY ET AL., 2013).

Likewise, e-commerce companies should include in their mandates the use of recyclable packaging materials for their products, to reduce pollution (WANG ET AL., 2021). This will foster to minimize waste and refilling of landmasses in the cities. Packaging materials have been known as big contributors to environmental pollution (MEYS ET AL., 2020). If not well checked, packaging materials can be a nuisance to retailers, society, and consumers. Also, the appropriate and suitable size of any package is of great importance. Companies should adopt the 3 Rs and use packaging materials that are reusable, recyclable, and reducible. In this way, firms will save costs and become more efficient in using packaging materials (ESCARIO ET AL., 2020).

Previous studies lacked a comprehensive methodology or approach used to address the lack of policies that support the integration of e-commerce sustainability into the environmental, social, and economic dimensions, as cited by (GRIGGS ET AL., 2014). Most of the examined studies address the matter of policy formulation and implementation (RICHA-KOTHARI ET AL., 2020).

Sustainability can be supported through the integration of the three environmental, social, and economic dimensions with the UN Sustainable Development Goals (SDGs) (OLÁH ET AL. 2018). Together with a couple of policies, SDGs emphasize the importance of sustainable consumption patterns of both retailers and consumers (PEDERSEN, 2018), including clean and affordable sustainable energy for use both domestically and commercially (BÜYÜKÖZKAN ET AL., 2018), protection of life, reduced inequality, fair distribution of income, and wealth (COSTANZA ET AL., 2016), safe cities and communities and responsible consumption by all - among many ways of stopping climate change (HASHMI-ALAM, 2019). The UN has called upon all stakeholders in the business world to come up with tailored strategies to implement the SDGs.

2.6.2 Social dimension

In recent years, e-commerce sustainability has been gaining popularity in the quest to discover ways to utilise a more sustainable e-commerce platform as a business model. Sustainability in e-commerce is in the triple bottom line. Environment and economic sustainability have gained much attention in most previous studies. This has left the social dimension with less attention in the literature.

The social dimension, in this case, will mean online customers, employees, e-retailers, investors, and all the stakeholders of e-commerce platforms. Social will mean the need for employment (job opportunities), better working conditions, fair equality, better health, and living standards, with minimum pollution to the environment. Consumers are putting pressure on producers, retailers, suppliers, and the government to work towards sustainable services and green innovations (ZHANG ET AL., 2020).

Looking back at the introduction of the internet, most employees of organizations were afraid to accept the new wave of change, and to use a computer in the workplace (MARÍA ET AL., 2019). It was believed that the computer would take jobs from humans, leaving many workers

opposed to the idea. Little did they know that computer use was to their advantage. Training and development took place at a very slow pace. Finally, when employees learned one can do more with computer literacy in the workplace, it was embraced eagerly (BIAGI-FALK, 2017). Today, the internet is a source of employment for young to old in various sectors of the economy, through e-commerce.

Consequently, every institution depends on the internet to run its daily affairs. For example, hospitals and teaching institutions are holding zoom meetings daily, to conduct their affairs. Conferences have become the norm of meeting others and as a user interface to provide other services, especially in the face of coronavirus. Thus, sales in e-commerce have doubled. E-commerce will continue to increase at a growing rate, as there is no turning back to traditional methods of doing business due to its inability to keep a pace with changes in technology and customer preferences for green products. Acceptance of the internet and e-commerce has more benefits for society.

CHENG ET AL. (2020) emphasize the importance of the adoption of technology that brings financial inclusion to countries that are trading together, creating economic growth. Not only do countries benefit from technology in the workplace, but so too do companies and individuals who participate in commerce platforms, thereby raising standards of living in a range of social aspects (ZHAO ET AL., 2019).

The world is converging to a digital era. Millennium X, Y, and Z generations will find it hard to survive or even work without the internet and its technologies. Everything currently is done on the internet, e.g., ordering food from restaurants, delivery of groceries, a search for information about a product or service, shopping, or traveling is done via e-commerce platforms. Thus, people are engaging the internet throughout their lives. This has created a sub-system in the system.

The emerging and increasing use of the internet and e-commerce have changed the norm and traditional way of doing business. Online customers are endowed with many benefits in e-commerce. As never before, individuals can market and sell their products, ideas, and services via e-commerce, despite their geographical location. Therefore, e-commerce is becoming a source of employment and income for many people.

Yet, the big question is how e-commerce, and the social dimension can be more sustainable? The challenges of privacy, security, and trust of online website retailers pose serious problems to start-ups and lesser-known e-businesses. Customers find it hard to engage in e-commerce. With internet development and the growth of e-commerce, retailers have come up with mechanisms to guarantee their customers their privacy, security, and there by earn their trust (CHOI-GAO, 2014).

E-vendors have put measures in place that will protect and secure client private information (RIQUELME-ROMÁN, 2014). They have established policies and regulations on their websites that no customer information will be used without their consent, to safeguard the reputation and integrity of the customers (JOSE ET AL., 2009).

More small and large companies have emerged in contacting their business online as this a competitive advantage of e-commerce. In return, customers might return the goods if do not meet their requirements or with defects or fault. This has seen an increase in transportation everywhere and majorly in the urban cities causing high pollution. Yet e-commerce is meant to give better living standards, thus a solution must be sort, on how to manage the negative impact to a social dimension through an e-commerce platform.

More so, online customers have become more aware of the need for green products (sustainable products) that have no negative impacts. Sustainability is drawing much attention to both customers and companies. Companies require to keep up with consumer changing demands, preferences, behaviours, and attitudes towards sustainable ways.

First and foremost, e-commerce firms need to have contracts with different partners that support sustainability policies. Second, it is high time manufacturing companies turned to adopting the practices of the bioeconomy for better energy use, a better way to produce energy than the use of non-renewable resources.

Also, these firms need to cultivate among their employees the necessity to exercise care while in their offices, homes, and factories to use energy efficiency guides and turn off power and lights when not in use. Third, during transportation and distribution, e-commerce companies should comply and use non-polluting logistics service providers. For instance, they could use bikes and drones for short distances and alternative electric vehicles on long distances. However, pollution does not stop with the distribution and transportation of goods: packaging

materials have become a major source of environmental pollution. In recent research on paper bag pollution done in the last two years, it was recommended that all plastic bags should be banned from use to reduce pollution.

Creating environmental awareness in online companies will promote the notion that sustainability is key to sustainable e-commerce, as well as better living standards with a clean environment. While this attitude must be emphasized to all stakeholders, it cannot be assumed to be the sole responsibility of companies, but also that of customers and society in general. Legislation, regulations, and policies must be established in line with the three dimensions of sustainability (ESE).

Therefore, everyone should work to ensure sustainable measures and policies are formulated and implemented. The truth is that sustainable e-commerce is a gateway for all other industries that are involved in trade. Companies can foster sustainability by integrating sustainability objectives into their missions and be included in the vision of the company, also displayed on their websites.

Commitment and advocating for sustainable ways will not only translate into an increase in sales, but also into the winning of a large customer base at reduced cost, all while creating a better atmosphere to live in. These sustainable practices will attract a manageable population within a sustainable environment, spurring economic growth by empowering e-commerce as a business model for sustainability.

E-commerce companies can support sustainability through corporate social responsibility (CSR), bringing benefits that accrue not only to the customers, employees, investors, and the general society at large, but also to a business itself. According to MOUSIOLIS ET AL. (2015), businesses that implement sustainability practices in their business activities besides CSR not only align with customers and social expectations, but also becomes the solutions to the problems faced by the world today.

Similarly, CSR and sustainable business practices sometimes may result in conflict e.g., when management thinks the costs of doing CSR are higher than its benefits. In conclusion DJLOLHQŌ (2015) indicates that the social dimension is one of the most important dimensions that lead to the well-being of online consumers and society at large, if it is integrated with the other sustainability dimensions.

2.6.3 Economic dimension

Every manager must maximize profits and increase income for the investors at the least possible cost. This is what is referred to as efficiency. However, there is always conflicting interest between the management and shareholders, i.e., an agency problem. The following studies addressed the agency problem (CHEN ET AL., 2019; HOLDERNESS, 2018; ROSSI ET AL., 2018; SÉNÉCHAL-LOURES, 2016; FAUVER-NARANJO, 2010).

Managers want to pay themselves a higher salary and to pay investors lower returns on their investments. Therefore, policies and contracts are made to govern the two parties and how to work best for the interests of the two parties to attain higher results. This brings in other costs, such as monitoring costs, supervisory costs, and management costs. For companies to be efficient, they must minimize costs.

Many costs are involved in running any organization, including an online business venture. Costs have been a stumbling block for many businesses to break even and realize profits. It is up to management to study critically what costs can be avoided, reduced, or even eliminated. For every business, the cost of setting up the business can drain the company's resources. Production costs must be factored in; energy costs, cost of materials, purchase, and installation of machines used in the production, as well as salaries paid to employees.

MAINARDES ET AL. (2020) notes that traditional business finds it difficult to avoid such costs. However, with e-commerce, costs can be reduced a great deal, since it links the seller and buyer directly, cutting out many costs involved in general businesses. Thus, e-commerce is better than mortar and brick shopping in terms of economic sustainability. In an e-commerce platform, a secure and interactive website is the most expensive capital expenditure item. Other related services can be outsourced to external parties with expertise and bring economies of scale and thereby making e-commerce more sustainable.

E-commerce sustainability in economic dimensions can be translated into making efficient use of every available asset and resource to maximize profits for its stakeholders. Likewise, customers get value for their money on any product or service purchased. Moreover, companies should recognize that the 'customer is king' and therefore monitor closely the changing behaviours and preferences towards online shopping.

PANDA ET AL. (2020) show how customers are becoming more aware of sustainable and green environmentally friendly products. Therefore, while producing or sourcing materials from suppliers, e-businesses should consider engaging suppliers that comply with sustainable policies. Indeed, BEBBINGTON-UNERMAN (2015) agreed with the UN SDGs (2017) - that the use of sustainable solutions through e-commerce leads to a clean environment.

According to SMITHSON ET AL. (2011), it is clear that e-commerce is one of the major components of sustainability in the trade sector worldwide. E-commerce is a catalyst for inefficiency, low costs, high sales, and meeting customer demands with many conveniences. By applying the sustainability approach properly into e-commerce, such businesses will continue to grow steadily and exponentially, reaching the largest possible customer bases.

Companies that do not adopt e-commerce within their business structures will lack a competitive advantage over online businesses. By the virtue of e-commerce, websites able to track customers' changing behaviours and preferences can customize accordingly and thereby increase retail sales and enjoy a large customer base market. Another advantage of e-commerce is overcoming geographical boundaries, meaning that an e-business can reach anyone, as long as the individuals have an internet connection and possess digital literacy.

Moreover, e-commerce companies have been at the forefront, engaging their customers through social network pages to ensure better reviews, referrals, and that they are providing instant responses to customer inquiries, contributing overall to e-commerce sustainability (RAHAYU-DAY, 2017).

More importantly, ABUKHADER (2008) states that economic growth is realized at a 90% level in e-commerce business establishments, compared to their counterpart's offline businesses. Why is this the case? Advantages that come with e-commerce; high efficiency and effectiveness are paramount in such ventures. This allows a business to extend its horizons to current and new customer markets globally. Exports and import tariffs are always lower.

E-commerce saves a lot of money, with minimum maintenance costs and in utilities associated with their operation - if any. Goods sold online come with no overhead costs; therefore, more profits are realized, giving high profits. Similarly, GUPTA ET AL. (2020) urged that selling and buying online requires the least capital. Also, its operations able to run once there is the

availability of an internet connection, as compared to traditional businesses, where there are often many government regulations to be fulfilled before one can start operations.

SALEHI ET AL. (2012) notes that online consumers enjoy many benefits that are integrated into sustainable e-commerce, such as a wide selection of products and services. Internet shopping enables customers to choose products from any e-web shop, coupled with price comparison in advance. This represents a strategy that is missing to offline shopping customers.

Thus, e-commerce saves money and time with many conveniences with a click of a button once, allowing them to avoid traffic jams and save the time queuing up to pay for their purchases. INGALDI-ULEWICZ (2019) emphasizes e-commerce benefits can be realized by the entire world through the integration of environmental, social, and economic dimensions for the long-term, leading to improved sustainability.

Trade-offs between the inter-three dimensions of sustainability in e-commerce

Sustainability can be defined as “meeting the needs of the present generation without compromising the ability of future generations to meet their own needs”(MENSAH, 2019). When it comes to describing sustainability, we need to be concerned about three main areas of influence, which are interconnected spheres that describe the relationships between the environmental, economic, and social aspects.

These are a related set of concepts forming a solid ground from which major decisions and actions can be made. Examples include land use planning, surface water management, building design and construction, and even law-making. When the three spheres of sustainability are applied to real-world situations, everybody wins. Natural resources are preserved, the environment is protected, the economy is not harmed, and quality of life is improved or maintained. Table 6 explains trade-offs between the three aspects of sustainability in e-commerce. To make it more sustainable now and in future generations/businesses.

Table 6: Trade-offs between the inter-three dimensions of sustainability in e-commerce

Social-Economic	Fair taxation CHENG-HUANG (2013)
	Engage in sustainable business practices GIOTOPOULOS ET AL. (2017)
	Growth and sustainable e-commerce HERRERO ET AL. (2010)
	Workers' rights MASWERA ET AL. (2008)
	Product longevity durability (HONG-ZHU (2006)
	Empowerment and equity PIRES-AISBETT (2003)
	Fairtrade MAQABLEH ET AL. (2015)
	Energy efficiency WU ET AL. (2013)
	Subsidies/tax breaks BOCK ET AL. (2012)
	Carbon credits ZHANG ET AL. (2020)
Economic-Environment	Growth and productivity LESTARI (2019); GÁZQUEZ ET AL. (2017)
	Green products and eco-friendly ZHANG ET AL. (2011)
	Reusable, reduced recyclable packages FLYVERBOM ET AL. (2019)
	E-commerce sustainability leads to a green environment ENDO ET AL. (2012)
	Product repair eligibility BRUTON ET AL. (2010)
	Energy efficiency in manufacturing VERHAGEN ET AL. (2011)
	Renewable fuels and green technology WEIDELI (2019)

Environmental-Social	Efficient and effective resource management CHUANG-HUANG (2018)
	Environmental protection AL-OMOUSH ET AL. (2018)
	Habitant preservation and restoration MASOCHA (2019)
	Healthy promoting lifestyle CHEN ET AL. (2019)
	Global poverty reduction via e-commerce JUNG (2017)
	Elimination of public health risks JIAN ET AL. (2020)
	Consumer social responsibilities SELES ET AL. (2019)
	Job opportunities LAI (2010); MAZAR-ZHONG (2010); KOH-KIM (2004)
	Eco-environment and biodiversity protection XIAO ET AL. (2019)
	Global stewardship and conservation policies ANVARI-NOROUZI (2016)

Source: Author' research (2021)

2.6.4 Moderator and mediating effect factors

First and foremost, online customers always worry when they visit e-commerce websites for the first time that their personal information might be misused or stolen or that even the worst might happen: financial fraud takes place, meaning money loss (KASSIM, 2010). Therefore, there is a need to create trust in the minds of the online consumers. If trust is not cultivated by retailers to guarantee security and privacy issues, then customers can abandon shopping carts and turn to offline shopping.

To increase e-commerce sustainability online, risks must be mitigated by e-retailers. An effective website must be set up that is free from hackers and cybercrime. Also, the website must guarantee the privacy of customer information and create trust in online buyers. Security and privacy proved to be a mediation effect while trust moderates the effect of e-commerce sustainability environment. Trust is an antecedent for e-commerce success. Trust can be enhanced by e-retailers subscribing to security features on e-commerce platforms, creating more confidence in online shopping (BENBASAT, 2004).

Some of the factors that build the trust of customers are the positive reviews written by other customers who had a good customer experience and who were satisfied with the products purchased. E-trust has a positive relationship with building customer loyalty in the online shopping environment (PALVIA, 2009).

This goes hand in hand with customer perceived values that must be respected and adhered to by online retailers, to retain and gain customers. Trust positively influence the social and economic dimensions of sustainability and security strengthens the effect of environmental sustainability (PRADANA-HIDAYAT, 2020).

BALAPOUR ET AL. (2020) mention how trust can be increased by having a genuine website that is established and registered, with a well-organized information flow; one that customers will find useful and interactive with the ease of use of a user-friendly interface. Additionally, customers should be able to search for information or products quickly and add them to their e-shopping carts. Then, the customer can make a secured payment either by credit/debit card, digital wallet, bank transfer, cash on delivery or whichever preferred means (HASSAN ET AL., 2020).

The website should be encrypted, and certified security features on it will give customers more confidence (ALI, 2020). Company profile, brand identity, and responsive customer care support agents all represent added value to sustainable e-commerce brands.

MARC (2020) stated open communication is the key to success and a sustainable e-commerce platform. Customers expect no hidden information that will accrue extra costs. Otherwise, customers will feel betrayed and cheated, even if there were no cost and economic implications. It is on the merchants to provide all the information on a product, including price, shipping, and delivery costs, if any. Similarly, advice on any side effects of the products before and after use must be listed. Detailed information about products creates confidence between sellers and customers.

A return policy, in the case a product does not meet a customer's requirements or is delivered with defects or has expired before use, is another essential element of any e-business. It is a kind gesture and shows the willingness of companies to support after-sales services to their customers. By ensuring that environmentally friendly and sustainable organic products are produced and supplied to customers, e-commerce can grow much more than offline shopping,

and establish its roots across the globe. This practice will protect and conserve the environment and be economical for the company, as well as to customers, since there will be less returns of goods.

JIN ET AL. (2020) defines privacy as the state one secures from the intrusion of others, whether directly or indirectly. Online customers fear their information will be stolen or tapped through technical mechanisms of cookies on the vendor's website. Online retailers tend to collect customer information, in order to monitor preferences, tastes, attitudes, and behaviours once a customer has visited their e-commerce websites.

Nevertheless, such data collection is done with no harmful intention, but merely to personalize information to the buyer as a marketing strategy. However, companies should do this with caution and inform their clients of the reasons for their actions, emphasising that there is no cause of alarm or fear.

Why is privacy important to e-commerce sustainability? MUTIMUKWE ET AL. (2020) mentions this is because personal information should be protected and kept under lock and key or in a secure database with usernames and passwords, to prevent the use of such information without one's consent. If online retailers can guarantee this, customer trust is won, while avoiding identity theft and financial loss to customers (CHANG ET AL., 2020).

Privacy is a mediating effect on e-commerce sustainability. It simply means if customers feel their privacy is in danger or under attack, then they will avoid online shopping, which would be detrimental to e-commerce and its sustainability (CAO ET AL., 2020). Integration of environmental, social, and economic dimensions and the mitigation of online risks, such as trust, privacy, and security, boost e-commerce sustainability (NANDA ET AL. 2020; FEDORKO, 2019; LIU ET AL., 2005).

The studies that were done by the following scholars (DIJESH ET AL., 2020; ZHU ET AL., 2020; FARAWN ET AL., 2020) indicate security to be one of the major components of e-commerce sustainability. Security determines whether customers feel secure to share their information with e-commerce platforms.

Security has been defined as a set of rules and procedures that guarantee customers safe transactions over online shopping (ALZHRANI & FOTIOU, 2020). It includes protocols and

guidelines on how to provide a secure environment for online transactions - either buying or selling goods or services. E-vendors must guarantee secure online shopping prevention of data theft while transacting business. Integrity and authentication must be given in collecting, storing, and transferring online customers' private information while doing e-commerce. E-commerce security could also mean protecting all online and e-commerce assets, copyrights, patents from authorized access, alteration, distortion of information for economic gain by a third party.

HALLIKAINEN-LAUKKANEN (2019) note that cybersecurity protection is perhaps the most significant e-commerce sustainability. Without the presence and execution of legitimate protocols, online storekeepers put themselves and their clients in danger of extortion and cybercrimes by scammers. More than financial fraud, information access, distortion, and manipulation break and hurt e-commerce reputation, leading to low growth of e-commerce. Major components of web-based business security include trustworthiness: these are the projections that online retailers create in the minds of consumers that their information is secure and safe, by ensuring that all customer data and information is encrypted.

Alternatively, e-businesses must ensure that the use of usernames and passwords are entrusted with key personnel. Nonrepudiation: assurance that the client's information is safeguarded from being taken advantage of, after signing the contracts and agreements. Authenticity: verification of an information source before use that might have financial implications, e.g. the use of digital signatures (WANG ET AL., 2020). Confidentiality and classification: keeping the information in such a way that cannot be accessed by unauthorized persons. Security: making sure that information is secure and under control and without unauthorized access. Accessibility: personal information should only access by an authorized person.

OKAZAKI ET AL. (2020) examine countermeasures to security dangers to safeguard online vendors and customers that are a strategy leading to sustainable e-commerce. Licensed and innovation protection, legislature, regulations, and policy formation with the right implementation help secure online transactions with authentication. E-vendors should protect online customers from cybercrime in the application of security features, such as digital signatures, browser protection, antivirus programs, computer crime scene investigation master, encryption using Public-key encryption (irregular) versus Private-key encryption (regular). Encryption standard: Data Encryption Standard (DES), Advanced Encryption Standard (AES).

Safety protocols such as Secure Sockets Layer (SSL), Secure Hyper-Text Transfer Protocol (S-HTTP). Control over privacy and security enhances e-commerce sustainability.

According to MUSTACOGLU-FOX (2020), the e-retailer must protect customer information always by the use of firewalls to protect against snippers. Network protection is one of the most significant web-based business practices. Without the best possible conventions, online vendors and their clients are in danger of fraud and theft while doing online transactions by cyber-snippers. However, with proper security protection, e-commerce is secure (TIKK, 2011).

ALALI ET AL. (2018) study security as a mediating effect factor on the online business environment and is treated as the most sensitive matter that cannot be left to chance if sustainability is to be achieved. Therefore, environmental, social, and economic dimensions and the mitigation of online risks; issues with trust, privacy, and security on e-commerce sustainability will promote a lucrative venture for both customers and sellers. Integration of the environmental, social, and economic dimensions and issues with trust, privacy, and security is the only way forward for secure and guaranteed online transactions to take place (BARKATULLAH, 2018; SMITH-SMITH, 2006; UDO, 2001). Figure 2 show a theoretical framework developed for this study depicting three hypotheses to e-commerce sustainability.

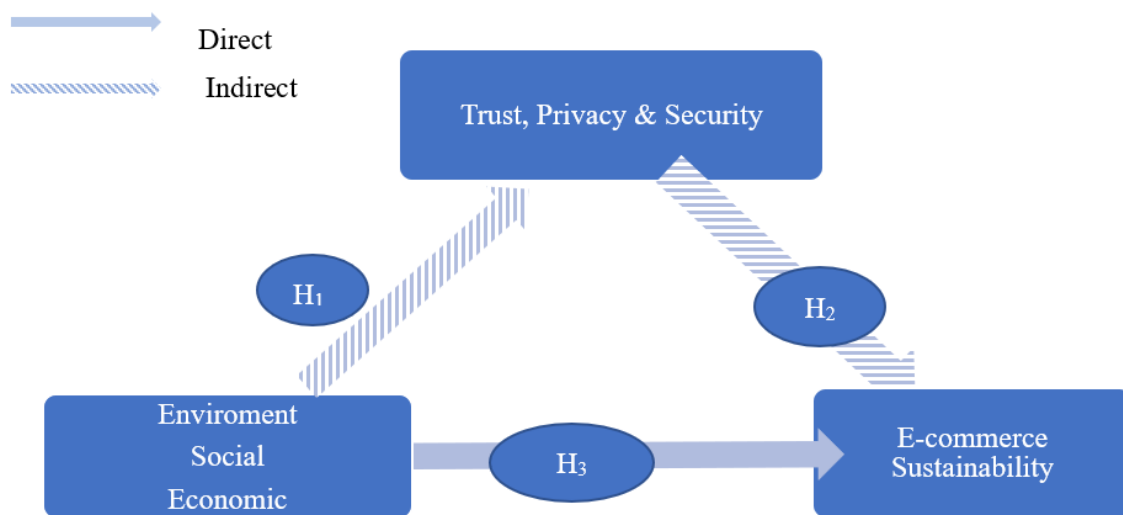


Figure 2: A theoretical framework developed for this study depicting three hypotheses

Source: Author' research (2021)

E-commerce and sustainability advantages outweigh their disadvantages with the integration of environmental, social, and economic dimensions and the mitigation of online risks, such as trust, privacy, and security on e-commerce sustainability. Table 7 show the advantages and disadvantages of e-commerce and sustainability.

Table 7: Show the advantages and disadvantages of e-commerce and sustainability

Environmental dimension	+	Reduced individual consumer travel -> fewer emissions CHENG (2020)
		Flexibility; non-pollutant LSPs ZHANG ET AL. (2020)
		Adoption of alternate transport fleets using electric cars FICHTER (2017)
		More consumption of green products JIE-SI (2018), ERIKSON (2002)
		Environment protection BALDASSARRE ET AL. (2016)
		Efficient of natural resources MAQABLEH ET AL. (2015)
		Biodiversity protection TOUFAILY ET AL. (2013)
	-	Increased transportation; less pollution BADA ET AL. (2021)
		Increased greenhouse emission WU ET AL. (2013)
		Increased amount and type of packaging PARK ET AL. (2012)
		Companies enforcing minimum compliance to environment CYR (2013)
	Health-related diseases BOCK ET AL. (2012)	

Social dimension	+	Global communication and knowledge transfer CHAPARRO ET AL. (2016)
		Create more job opportunities HUA ET AL. (2015)
		24/7 open economy CHENG-HUANG (2013)
	-	Consumer data protection by e-retailers HERRERO ET AL. (2010)
		Customer support hence high satisfaction and loyalty SU ET AL. (2020)
		Increased individual resource use behaviour GIOTOPOULOS ET AL. (2017)
Economic dimension	+	Lack of touch and feel the texture before purchase EASTIN (2002)
		Reduced costs and increased profits KOLOMVATSOS (2013)
		Economic growth and empowerment, GRANDÓN ET AL. (2011)
	-	Economies of scale benefit HERRERO ET AL. (2008)
		Removal of geographical barrier MASWERA ET AL. (2008)
		No guarantee in financial performance TARAFDAR-VAIDYA (2006)
High competitiveness and pressure HONG-ZHU (2006)		
Lack of trust leads customers to abandon shopping carts PIRES (2003)		
Security threats online threaten e-commerce growth JIN ET AL. (2020)		
Digital literacy is required to engage in e-commerce (ALI, 2020)		

Source: Author' research (2021)

3. MATERIALS AND METHODS

The purpose of this section is to highlight and substantiate the reason for the methods applied in this research. Therefore, this research adopted a cross-sectional time horizon, a survey questionnaire for quantitative research data gathering, case study interviews for qualitative strategies, a mixed simple method is used, with deductive and inductive approaches with positivism philosophy.

This study examines relationships between independent variables; environmental, social, and economic dimensions with the mediating effect of trust, privacy, and security on e-commerce sustainability as the dependent variable, to respond to the research, aims, objectives, questions, and hypotheses. This study considers the three constructs to have a positive and significant relationship.

- **H1:** Environmental, social, and economic dimensions have a significant and positive influence sustainable e-commerce.
- **H2:** Trust, privacy, and security issues have a significant and positive influence on the indirect effect of sustainability of e-commerce.
- **H3:** Policies on environmental, social, and economic dimensions have a significant and positive effect on the direct effect of e-commerce sustainability.

Similarly, several statistical tests were conducted to determine descriptive statistics, casual relationships. The deductive examination approach was chosen in quantitative to allow the author(s) to develop hypotheses based on existing theories, concepts, and models. The main advantage of this approach is that one can analyse a particular setting and generalize the findings to the entire population. Consequently, a cross-sectional analysis was applied meaning the sample data was collected from a specific time. A self-fulfilling online survey questionnaire was designed for quantitative technique. Qualitative and inductive approach method using interview questions on two selected companies as a case study for e-commerce sustainability investigated. SPSS and R model software's are used to analyse data. The sample size for the quantitative research questionnaire 1060 responses were considered valid. The data was collected from January to March 2020. Data coded, exported from excel file to SPSS in April. The questionnaire had 27 questions: 3-questions on each variable: sustainability, e-commerce, policy, environmental, social, economic, trust, privacy, and security. In qualitative 3 interviews

forming case studies from sustainability, e-commerce managers and the CEO. Figure 3 shows a methodology flowchart on data collection.

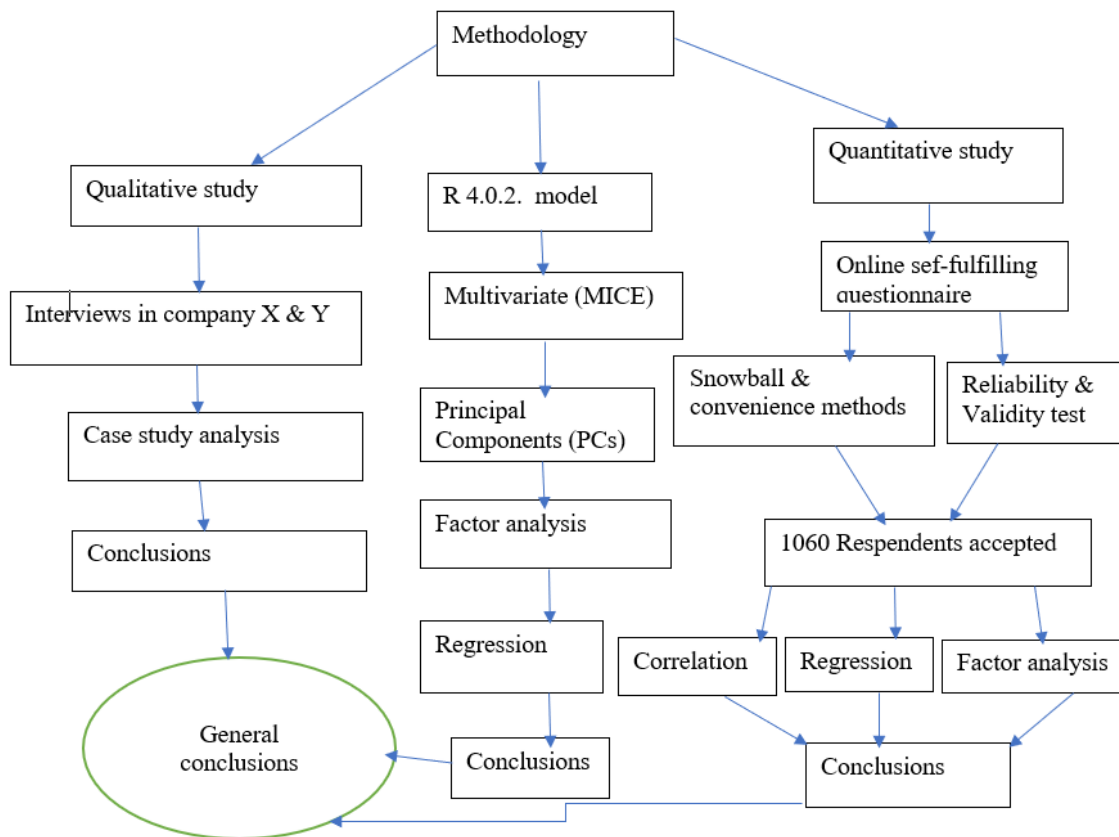


Figure 3: Methodology flowchart for data collection

Source: Author' research (2021)

3.1 Research approach

According to AMOAKO ET AL. (2017), there are advantages to using mixed methods quantitative and qualitative. A deductive approach in quantitative research is applied to start from theories, collecting, and analysing data to respond to the hypotheses, moving from a general to a more specific perspective. An inductive approach in a qualitative study is necessary when one wants to discover individual perspectives and observations to theories, moving from a specific to a more general dimension. With this understanding, both approaches would profit this thesis by finding both viewpoints and including all important factors of knowledge from theoretical to practical application to enhance e-commerce and sustainability. Thus, mixed methods are suitable and appropriately chosen for this study (REINARTZ ET AL., 2019;

JIANG ET AL., 2016). This study has used both methods to answer the questions and determine the influence of the variables towards sustainable e-commerce.

3.2 Research design

According to NOORAIE ET AL. (2018), research design is a crucial aspect of scholarly work and establishes the framework for collecting and analysing data. Thus, research design when done effectively address the problem of the research and fills up the gap. A survey questionnaire was adopted to reach a large number of respondents in a particular time a produce a large sample size. MARDIKO-LENGERKE (2020) highlights the benefits of cross-sectional analyses and breaks down information from a combined statement to a single variable point in time. In the case of the qualitative strategy, customized interviews as a case study to bring deeper insights.

Therefore, it was important to choose several companies that could agree to give several interviews. The organization is significant as it can give profound knowledge to clear objectives and goals towards sustainability. Similarly, the above criterion used is a good basis to determine how companies are committed to sustainability reporting and implementation. Thus, having both quantitative and qualitative strategy designs is of great advantage.

A cross-sectional survey research design is used to draw consumer perspectives on sustainability from a large population within a specific time. The survey was fully structured to avoid diverge to other uninterested topics, while the interview questions were semi-structured to allow the interviewee room for more explanation. CRESWELL (2009) highlights how both methods are important to bring out a clear picture of the relationship and influences between variables.

The survey was self-completing and was first send to close friends. Later, these were asked to circulate the questionnaire link with their colleagues, friends, and family members through the social networks for a large sample data collection. The social networks used were WhatsApp, Facebook, LinkedIn, and Twitter. The author used purposive and snowballing to distribute the questionnaire to close friends via the internet. Online customers were regarded as the correct target sample, who are evenly disbursed around the globe.

Therefore, the author used an online questionnaire to reach spread large population with particular focus on Kenya and developing countries. Benefits of using an online survey include ease of distribution, low cost of data collection from a large population, convenience to both administrators and respondents, a greater percent of the response, and a pilot testing conducting before actual distribution of the final survey.

However, an online survey faces challenges, such as low responses, or the risk of not responding to the questionnaire within the time given, even though this weakness was covered by the use of known individuals. ILIEVA ET AL. (2002) discusses how semi-structured interviews overcome survey weakness.

3.3 Data sources

Primary data

Data collection could be done in two larger categories: primary and secondary data. TAHERDOOST (2019) states primary data is necessary, since there is no single research study that has been done using a combination of all dimensions, as are investigated in the present study. To address research questions, it was important to create an online questionnaire with the relevant questions that would address the gap represents the need for this study. PRADA-RAMALLAL ET AL. (2018) cites the importance of primary data and an original survey questionnaire, as a direct way of getting the true feeling of the addressees.

Consequently, the data were collected using an online consumer survey questionnaire in quantitative, deductive, cross-sectional analysis. Likewise, for the qualitative technique, semi-structured interviews were compiled into a case study to provide in-depth understanding. Primary data on the survey was collected from January-March 2020, using a total number of 92 question items. The interviews were conducted in the 3rd week of March 2020, both as face to face and telephone interviews. where is the 1060 respondents?

Secondary data

A literature review has been the source of secondary data; this segment explains the technique applied to acquire appropriate secondary data for this thesis. JAMALI-ASADI (2010) indicates the importance of secondary data such as published articles by peer-reviewed journals. Similarly, use ABI/INFORM, EBSCO, and the Social Science Citation Index (SSCI) are

viewed as online databases and known to be sources of rich secondary data. SMITH ET AL. (2011) state the advantages of using an online database, include low cost, easily available and online.

In this research, Google Scholar was used as a secondary database and as a search engine for collecting more literature reviews relevant to the study. It is considered a prime web index reference, since it offers the highest number of published papers, articles, reviews, thesis, and dissertations and meets the standards of academic research work. Google Scholar is cited as one of the most resourceful, easily accessible, and rapidly used resources to acquire literature review and overview (AALST, 2017). Another advantage is the ranking and listing of articles and journals with a good reputation. Also, Google Scholar has the effect of snowballing searching web and referencing tools and techniques are significant to authors accessing materials for research writing. JENSENIUS ET AL. (2018) emphasize the importance of Google Scholar in the pursuit of credible data sources and proficiency, through the help feature LUB search that is used to check genuinely and authenticity scholarly work, from a single entry point all online databases and libraries.

3.4 Data collection method in qualitative

Reliability of the interviews in the case study

The author recorded, transcribed, and used notetaking at the same time to ensure that no information was left out or omitted, increasing reliability and validity of the data of the case study. To improve on the reliability and validity, the dissertation supervisor double-checked whether the interview questions were clearly understandable and contained no errors.

Qualitative approach

This is where the author carries out interviews to have a better understanding, through a case study. A case study technique permits the author to explore, to observe the turn of event in their setting. For example, in this study, the author wants to test the practical application of sustainability by companies operating in the e-commerce and retail industry.

NONTHALEERAK-HENDRY (2008) indicates that case studies investigations are frequently applied at the point when an issue is complex. A case study has enormous advantages, and several show cases for example, reports, interviews, observations. As the exploratory nature of

this study case study is deemed suitable and helpful-bring out more understanding of how companies integrate environmental, social, and economic dimensions and the mitigation of online risks, such as trust, privacy, and security on e-commerce sustainability.

Design of the case study

At this point, a decision needs to be made on applying the case study, i.e., whether to do a multiple or single case study. A single case study is used when considering situations that are very similar and repetitive on every occasion, as it focuses on simple explanations of situations that influence the case. However, a multiple case study is a complex situation that needs studying various phenomena at different angles with different subjects to compare the interpretation. Multiple case studies are regularly stronger and more convincing since they have numerous sources of data collection (BLOME-SCHOENHERR, 2011).

The rationale underneath the decision of multiple case study is to explore over time, in detail and in-depth data collection that comprises multiple sources such as interviews, transcripts, reports, and observations. Since this study is on e-commerce sustainability on various dimensions, a multiple case study was chosen to determine how different firms formulate and implement sustainability policies and strategies selected. Table 8 show the criteria used to select the companies in e-commerce for the interviews.

Table 8: Criteria used to select the companies in e-commerce

Criteria used	Company T CEO	Company X Sustainability & e-commerce manager	Company Y E-commerce CEO	Company Z Corporate manager
E-commerce	X	X	X	X
Accessibility		X	X	
Sustainability aspect	X	X	X	X

Source: Author' research (2021)

Unfortunately, the author could not interview all the firms that are on the e-commerce platforms. A selection criterion was identified Out of four companies, two firms were selected, the criteria were that the firm operates in e-commerce, with accessibility being granted to carry out interviews with top senior managers that have a better understanding of the company practices and policies, and sustainability department.

The two companies that matched the criteria are X and Y and are presently working as online businesses in the retail industry. The other two organizations that did not meet the criteria (Company T and Z) and subsequently were dropped. The identity of the selected companies was kept hidden to draw attention to the purpose of this study. However, it is important to mention that company X works solely in e-commerce, while company Y was operating both offline and online stores and was therefore a good opportunity for the author to be able to compare the two models of business.

Before a leading interview, the interview research questions were sent to the interviewees to familiarise them with the study topic, and to give the interviewees enough time to prepare responses to the research questions. This decision was in line with ALSHENQEETI (2014), who emphasised the importance of creating a good atmosphere by engaging respondents in advance, which will produce trust between the interviewer and interviewees. Thus, the decision worked towards creating a conducive environment that will promote more openness towards sufficient responses. All the interviews were conducted in the English language. In addition to notetaking, permission was sought to record transcripts to ensure accuracy, and actual data was recorded.

The interview with company X was done on their premises and was a face-to-face interview. The advantages of the one-on-one interview are that the interviewer can ask leading questions to seek more information. Also, the interviewee can ask for clarification and, at the same time, expound on a subject as s/he feels necessary. In contrast, the interview at Company Y was done via phone call due to the distance between the respondent and the interviewer, as well as because the interviewee could not meet in person.

The advantages that are associated with interviews via phone include access, speed, and low cost (OPDENAKKER, 2006). A phone interview is thus effective and regularly more advantageous (HAWKINS, 2018). The drawback is that it is much harder to get 100% attention between the two parties via phone. The interviewee might be distracted by other things, and

end up not giving all the sufficient information necessary to properly answer the question (BLOCK-ERSKINE, 2012). Nevertheless, this challenge was overcome by asking for confirmation twice. All the interviews took approximately 30 minutes.

3.5 Data collection method in quantitative

Survey design and instrument

This study used an online survey questionnaire as the main instrument of the data collection method. ANDREWS ET AL. (2003) mentions this method is very useful since it can reach many respondents within a short time. The questionnaire was divided into four major parts, as follows. Part one includes demographic data to get the influence of gender, age, education, and the region/continent on e-commerce sustainability. Part two seeks to find whether online consumers can attest to the good experience and satisfaction enjoyed via an e-commerce platform. Similarly, the uses of the internet and reasons why the respondent chose to use e-commerce compared to the traditional method of shopping.

Part three encompasses the importance of the mediating effect (trust and privacy) and the moderator (security) factors on how to influence and reduce the risks that are associated with e-commerce. Likewise, trust influences online retailers, as well as ensures customer information is secure and protected from any financial loss, distortion, theft, and fraudulent activities linked to cyber-crime. Also, security features that customers look for on the website that will guarantee safe e-commerce transactions, and thereby influence customer satisfaction, good customer experience, and customer loyalty. Part 4 involves independent variables as the main backbone of this research: to find how to integrate the environmental, social, and economic (ESE) dimensions to enhance e-commerce sustainability both for business organizations and customers.

The questionnaire was in a standardized manner that made ease the logical flow of information and in a sequence that guided the respondent to increase interest in providing responses. The authors observed ethical responsibilities of conducting research which include consent from respondents, avoiding doing harm, avoiding deception, preservation of confidentiality, and protection of data. Also, participation in the survey questionnaire was voluntary.

Pilot testing

While using a survey questionnaire, MALMQVIST ET AL. (2019) indicate pilot testing is important to ensure that the questionnaire items address accurately the research questions and hypotheses. This practice gives researchers the chance to eliminate errors and misleading questions, and to improve the understandability of the questions. Also, it allows researchers to organise the questions into a logical flow and promote a high level of understanding.

VOGEL ET AL. (2017) notes the importance of using a small group in addition to the supervisor to improve the credibility of the questionnaire items. This gives the author a chance to improve on the survey once receiving feedback from the respondents. Similarly, it will help to develop technological, functionality data instruments, and reduced the collection of unnecessary data. The feedback received from the pilot-testing enabled the authors to delete some questions, modify others, and shorten question numbers 24, 25, 26, and 27 for easy understanding. Pilot testing proved vital to identify spelling mistakes, shorten some questions for better understanding, and reduce the number of questions.

Population and sampling

A population can be defined as the totality number of groups of people, measurements, or respondents in the study area. In this regard, this study assumes the population to be online buyers and sellers on e-commerce platforms. While studying a population can be good for a country to be able to plan and budget for resource allocation, it may prove to be more costly and time-consuming, thus rendering the data outdated once it has been collected. However, this research uses a population sample. The population sample is taken to mean a subset of a small portion of a population. This research will adopt sampling and testing to represent online consumers. Online shoppers possess the skills and knowledge required for e-commerce platform transactions.

3.6 Statistical tests

The research employed a statistical package for social sciences (SPSS) that was developed by IBM and Microsoft Excel to analyse data. The reason for choosing to use the program is the fact that is the most used statistical data software program in quantitative data analysis. Also,

is easily used and convertible with Microsoft Excel. The questionnaire was created in the Google Form drive online survey.

The benefit of Google Form is that the authors were able to track the progress on the responses of the respondents to reach the targeted number of the respondents. At the same time, the software programme is free and gives room for corrections during the pilot-testing. Similarly, it provided the ability to download the data into Microsoft Excel once the period of data collection ends. Furthermore, the researcher can import and export to the SPSS software program for further analyses.

Reliability and validity tests were conducted to verify if the data observed met the threshold. Cronbach's Alpha is used to test reliability and validity. Factor analysis was used to compress many item questions to the principal component of six variables. Also, the correlation analysis was performed to test the degree of the association and regression analysis to test the relationship between the independent, mediating factors and dependent variables.

3.7 Research quality

Reliability

Reliability alludes to the likelihood to repeat tests and get the same results in a different setting or environment of a study. This will infer that the measurement instruments are solid, stable, and give similar outcomes as the tests can be repeated several times and give the same results. According to LI-NIE (2018), there are three dangers to the reliability, in particular errors or mistakes, starting from the author(s), environmental changes, and participants of the member's changes. Even though an instrument may be steady, the researcher's errors and mistakes may prompt diminished reliability since human judgment is required for most investigations.

Internal validity

ALLEN ET AL. (2011) urge internal validity is tested to show the degree of confidence in the causal relationship of items in the questionnaire instrument being used to collect data, as well as in the relationship between independent and dependent variables. HALPERIN ET AL. (2015) cite several factors that may influence an increase in internal validity. These are commonly used criteria in business research to evaluate the consistency, dependability, and

reliability of the items in the questionnaire of the research topic. The significance of research quality is of great paramount as this research uses numerical data as a quantitative technique.

External validity

External validity is a significant value because it shows the extent to which the results can be generalized to the population. Here, the author wants to know whether the sample is representative and can be generalized to a population. It is very important to have high external validity. With the help of experts and supervisors cross-checked the items of the questionnaire with related objectives and hypotheses. It was agreed that items are in line with answering the research questions of the study.

Therefore, internal validity and external validity are carried out to ensure reliability has been achieved from the data collected. This study performed pilot-testing to guarantee that correct data was collected, analysed, and interpreted correctly and appropriately. With independent, mediating effects and dependent variables on environmental, social, and economic dimensions and mitigate online risks, such as trust, privacy, and security on e-commerce sustainability.

Hence, will manage a sustainable business model such as an e-commerce platform efficiently and effectively leading to sustainability.

The main reason for the reliability test is to evaluate the internal consistency of the instrument is reliable and valid. The rule of thumb states that reliability is deemed fit if the Cronbach alpha is 0.7 or higher. The reliability test on this questionnaire was confirmed reliable and valid since the Cronbach Alpha test result was 0.984 and all question items tested were 92 in total. Thereafter, we used factor analysis to compress the items to six variables and reliability was confirmed with .876 Cronbach's value.

3.8 Variables

Independent variable

An independent variable can be defined as a variable that whose changes do not depend on another. Three independent variables were identified as environment, social, and economic dimensions and the main question is how to integrate them to enhance e-commerce sustainability. Why these dimensions were the sort to be of importance to sustainability? SONG

ET AL. (2019) state that environment, social, and economic dimensions constitute the main backbone to sustainability in business performance, good living stands, protection, and conservation of the environment.

Dependent variables

The dependent variable is the ultimate goal of the research that the authors would seek to fulfil. The dependent variable can be noted as Y, whose value depends on another, in this case, is e-commerce sustainability. The benefits of this research will be to enhance e-commerce sustainability through the integration of environmental, social, and economic dimensions and the mitigation of online risks, such as trust, privacy, and security on e-commerce platforms. Thus, seeking how to balance three dimensions of sustainability. A conceptional framework of integrating environmental, social, and economic dimensions, i.e., e-commerce sustainability on a B2C business model. Figure 4 show independent and dependent variables on sustainability

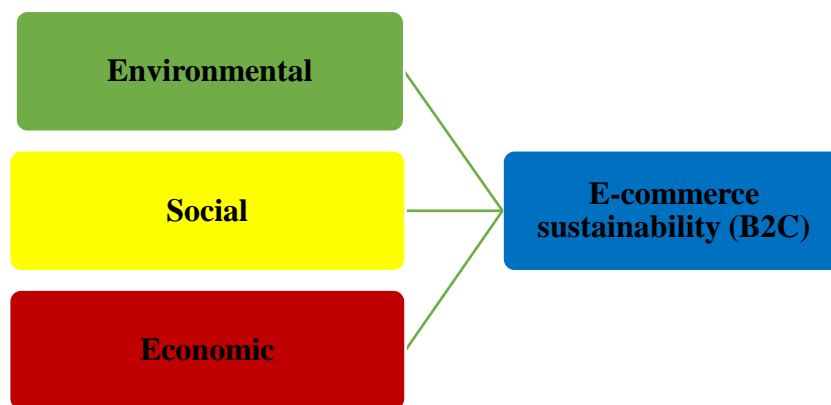


Figure 4: Independent and dependent variables on sustainability

Source: Author' research (2021)

Moderator and mediating factors

This is to determine whether mediating/moderator factors influence relationships and associations of the independent variables and dependent variables to enhance sustainability. TSAO (2014) shows the importance of the mediating and moderator effects between variables has a significant impact. Trust and privacy are used as mediating effects, while security is the moderator to e-commerce sustainability.

3.9 Summary

To summary, these are the methodological instruments considered in this study. The approaches applied include deductive-quantitative- cross-sectional and inductive-qualitative as a study case, to satisfactorily explore and address the research questions and hypotheses. Self-fulfilling, online survey questionnaires, and interview questions were conducted.

The questionnaire comprised four principal areas of data collection: the demographic segment, the control factors for the study, the independent variables environment, the social and the economic dimensions. Mediating factors were trust, privacy, and security. Finally, e-commerce sustainability as the dependent variable. The questions were answered by online customers of e-commerce evaluating e-commerce sustainability and a 5-point Likert scale coded as 1: strongly disagree, 2: disagree, 3: Neutral, 4: agree and 5: strongly agree was used.

Once the pilot-testing was performed and proved satisfactory, the survey was distributed via convenience, and snowball approaches. Total responses were 1100 but 1060 responses were accepted as valid after data cleaning. Data analysis and interpretation were done, using a measurable statistical tool widely known as the SPSS program by IBM. Statistical tests on research quality were performed, such as the reliability test on Cronbach alpha and confirmed to be satisfactory.

4. RESEARCH RESULTS AND DISCUSSIONS

This chapter is meant to analyse and discuss the result. It starts with a qualitative analysis of interviews for a case study. The quantitative analysis of the statistical tests is carried out on factor analysis, correlation, and regression analysis. Lastly, the R model. The aim of this study is how to integrate the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability.

The model was divided into three major parts. First, the impact of environment, social, and economic as independent on trust, privacy, and security as mediating. Second, the mitigation of online risks, e.g., trust, privacy, and security on e-commerce sustainability as mediating factors. Third, the influence of the three bottom-line environments, social, and economic dimensions on e-commerce sustainability directly. This can be summarised into the three hypotheses.

- **H1:** Environmental, social, and economic dimensions have a significant and positive influence sustainable e-commerce.
- **H2:** Trust, privacy, and security issues have a significant and positive influence on the indirect effect of sustainability of e-commerce.
- **H3:** Policies on environmental, social, and economic dimensions have a significant and positive effect on the direct effect of e-commerce sustainability.

Further, the relationship and correction of the independent and dependent variables were evaluated through correlation and regression analysis, shown in the methodology approach. Cronbach's Alpha to determine the validity and reliability of the instruments used to collect data for this research study. Cronbach's Alpha was used to test internal and external consistency, homogeneity, and fluctuations of the sampling population.

Factor analysis was performed to compress many questions to six simple straightforward themes. Correlation and regression were performed to show the relationship and connections between independent, mediating effects, and dependent variables. Specifically, ordinal regression was applied to address H1, H2, and H3, and a mediation process was performed H1 and H2 mediating effect. Also, non-parametric and parametric tests were applied to evaluate the ordinal scale. Consistently, the author was aware of the constraints of using Likert scale data as interval data, hence applied both tests to overcome their shortcoming.

4.1 Qualitative research

Data analysis

The interviews were performed to show how companies are engaged in e-commerce and sustainability. The selection criterion validated only two companies were successful and applied the open-ended method of interview patterns, Table 9 show time of interview per company and respondent.

Table 9: Time of the interview per company and respondent

Interviews	Company	Respondent	Date	Duration
Interview 1	X	Sustainability manager	26/03/2020	26 minutes
Interview 2	X	CEO	26/03/2020	24 minutes
Interview 3	Y	E-commerce manager	27/03/2020	32 minutes

Source: Author' research (2021)

The questions were simply relating to companies operating on e-commerce and integrate the environmental, social, and economic dimensions to enhance sustainability on e-platforms.

1. How are e-commerce companies working to ensure sustainability?
2. Why is important to integrate environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability now and future growth?
3. What are the advantages and disadvantages of firms implementing sustainability policies and strategies on e-commerce?

Data collected from each organization through the interview was independently analysed. Furthermore, all the data were cross analysed to strengthen better results and conclusions. Triangulation with website data from Company X on sustainability report and sustainability strategy report was performed to give a better evaluation of the study. Also, the literature

review validates multiple sources as evidence to give a better angle of analysis from all directions.

A comparison of the interview between the two companies was not possible. Since the interview in company X was face to face while the interview in company Y was over the telephone. Also, the two companies operated in different sizes and platforms. Company X being smaller and pure in e-commerce but company Y larger firm operating both offline and online stores.

Nevertheless, both companies had an active presence on the e-commerce platform. This led to strengthening validity and the interview questions were the same, lending high reliability. The focus being e-commerce sustainability on how to integrate the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainable practices now and future growth. This topic is of great interest to the environment, society, as well as businesspeople, to foresee sustainability in the environment, social and economic dimensions through e-commerce platforms for future generations. In conclusion, all ethical factors were properly observed.

4.2 Qualitative analysis case study (structured interviews; two e-commerce companies)

This part presents the data results from qualitative research. A small description of each of the two companies is given and a summary of the most highlighted points from the interviews.

E-commerce and sustainability in company X

Company X was established in South Africa and extended by opening a branch in Kenya in 2005. It is purely based on e-commerce and employed 5,000 employees with more than 30,000 various products that it sells online, but with pick up points in the major cities. Company X has different categories of products, such as fashion, electronics, food supplies, real estate properties, among others. Similarly, the company has a sustainability reporting strategy and sustainability policies on its website.

The mission, vision, and objectives of the company are well aligned with sustainability policies. Company X has an open communication channel via social media to get their views and feedback on how satisfied their customers are with the products they purchased. This has created more trust between the retailer and its customers.

Sustainability seems to be a core value for company X. This was well explained by the sustainability manager. “He mentioned that the company started doing well when it introduced the sustainability department.” Interview contacted on 26/03/2020. Previously, company X had experienced low sales and high return of goods, as the products did not meet the preferences of sustainable products (green products). Therefore, after a long discussion and by engaging customers, the key emerging problem factors they identified include high pollution from packaging materials that are not reusable, recyclable, and irreducible.

“At the same time, there was the issue of customers not receiving value for money, since most products were counterfeits and did not match the descriptions on displayed on the website, hence poor-quality products.” These factors were narrowed down to mean environment, social and economic dimensions. Also, quality dimensions emerged. It was noted that the sustainability manager emphasized “the importance of collaboration and partnership between all the stakeholders to achieve sustainability. Thus, the establishment of the sustainability department to deal with policies and strategies on e-commerce sustainability.”

The environmental dimension was to deal with the negative impact that e-commerce platforms might have caused, to protect and conserve the environment from high pollution and waste. There was a priority change in company X. “Started to partner with the suppliers and producers who uphold sustainability policies. Changing of logistics service providers that cared about environmental sustainability policies. This resulted in the use of electric cars, drones, and bicycles in the distribution of the products. The company also adopted United Nations sustainable development goals to reduce pollution hence a clean environment. “This aspect was embraced by most of the customers since it had become a nuisance on how to deal with non-re-recycle packages.” Therefore, clean environment becoming a solution for both social and environmental dimensions. Interview contacted on 26/03/2020.

On the social dimension, “Company X employed local people hence creating job opportunities for the community around. As well as having corporate social responsibilities for both employees and the community. The mission is intended for the well fair of the customers, suppliers, employees, and their family members hence touching the society at large. Company X developed a program to do the cleaning in the cities that it operates in once a month, planting trees and gives free shoes with minor defects to the community.” Interview contacted on 26/03/2020.

Thus, advocating for policies that contribute to a better world with less pollution, better living standards, and protection of the environment. Also, the e-commerce manager mentioned that “The last Saturday of the month, the company runs a project on educating children as it believes children are the future generation” interview contacted on 23/03/2020. One of the statements on their website is that long-term business success is to be involved in the welfare of the community.

“Consequently, once a year, company X contributes to a fund project that supports orphan children by donating clothes, foods, and shoes. Company X asked the community to collect the recyclable packaging materials and sell them back at a small fee.” Thus, being beneficial to society in e.g., job creation for youth, as well as economical savings for the company by reusing and reducing waste and reducing pollution reduction in the environment, have all assisted company X to build a customer base and be profitable. “These strategies have won the hearts of many people, reciprocating customer loyalty hence higher sales.” Interview contacted on 27/03/2020.

Every company utilizes assets and resources maximally for economical gain with minimum cost. It is the same for company X, even though the e-commerce manager stated categorically, “companies should not do this to the disadvantage of the customers and the society.” Consequently, he emphasized that creating a good image and reputation will earn the company goodwill. This is done by providing a stadium on the weekend to be used for awareness to the community on how to engage in small-medium enterprises through an e-commerce platform. Company X works at encouraging suppliers and consumers who have products and want to sell to subscribe to their website free of charge and post products for sale.

Likewise, invited students in higher education can exhibit and showcase ideas on how to make e-commerce more sustainable. In addition, company X offers internships and training programs to students in technical colleges. “When it comes to cost-cutting, the company advocates for circular and bio-economy for energy-efficient and recycling of waste materials hence sustainable practices and environmental conservation. To customers enjoy high-quality products at a cheaper price and worth of economic value to their money”.

The quality dimension is a pillar to strengthen customer and company relations, according to the sustainability manager. Key to excellent customer service is to be able to respond to customers' inquiries instantly. Company X has created a social media page that customers can

access additional information about products, on how to use them, and how to return packaging material to the company for a small fee. Through these page items, customers also can read reviews of other customers who had interactions with the company and write complementary notes expressing their good experience and satisfaction with the products purchased.

Also, they can educate the customers on how to increase the life span of the product after first use. Meaning that the product is not necessarily useless after the first use but can be repaired and used again for second and third time. This was mostly with shoes and clothes.

The e-commerce manager mentioned that “it is very important to build trust and guarantee the security and privacy of private information of our customers.” This is done in company X by including website features such as company profile and brand identity, security certification, good customer service, detailed product information, open communication about time and cost of delivery, data protection policies to safeguard private information, reviews, and website encryption.

The e-commerce manager emphasized that for e-commerce sustainability to be achieved, the following strategies are important: “Company X is aware that the customer is the king for the business. Therefore, company X is closely monitoring the changing preferences of customers towards and align strategies and policies to effect green products to ensure customer satisfaction and loyalty to the company’s services and products hence e-commerce sustainability.”

E-commerce and sustainability in company Y

Company Y is a Kenyan company, registered in the year 2000. It operates both online and offline stores. It mainly deals with clothes and shoes, and has more than 100 stores in Kenya, in major cities. An interview with the e-commerce manager revealed that company Y has not been performing as expected in sales on the online store and was like an offline store. However, company Y takes advantage of the offline store to showcase its products; for customers to see, feel the texture, and try them on. Customers visit the offline shops for window shopping and make orders from an online store. Thus, company Y is taking advantage of the online store to increase their sales.

The researcher introduced a new question: why and what were the reasons why this trend? He confessed online platforms have numerous advantages such as convenience, low prices, and most of the young people have turned to online shopping as the company would like to tap into the trend, although it was noted company Y has no intention to distinguish between the online store and offline store. Instead, both are meant to collaborate and work together, as one, while making more sales for the company.

Nevertheless, company Y feels that it is to their advantage to have both stores, as the company wants to maintain a personal touch with customers through offline shops. However, during the interview, the e-commerce manager stated that the company does not have sustainability policies in its mission, vision, and objectives. This could be another detrimental factor that could have led to low sales and poor performance of their online stores.

Regardless of the causes, both online and offline store sales were not performing as expected and therefore, the company struggled to break even. The e-commerce manager indicated the company is working to establish a sustainability department in the future. This prompted another question about whether company Y had corporate social responsibility (CSR) programs. The response was not yet in place, since company Y does not have a budget set aside for CSR.

However, it is clear to him and the company that sustainability is the way to go in the environment, social and economic dimensions, to be able to enjoy a competitive advantage and enhance e-commerce sustainability, as most of their customers are now inclined to choose companies that ascribe green products and sustainable solutions.

The manager emphasized that customers have become aware of sustainable practices and demand sustainable products and services from companies. The company has come up with alternative products, although with a difference in the quality and pricing of the goods. The focus is to attract more customers, but still, the trend is the same. The manager admitted reluctantly how change to high-quality products with low prices is a great challenge to company Y.

Furthermore, he noted the company depends on suppliers who are not endorsing sustainability policies and responding to a need to change the entire value chain to sustainable practices would take more time and resources. However, company Y plan to start CSR projects

immediately in the community and to create awareness to all stakeholders to adopt a sustainability approach, especially as concerns the employees of the company.

In conclusion, his parting statement was that for a company to remain competitive in this digital era, it does not only require having a presence on e-commerce platforms, but also to formulate and implement sustainability strategies and policies that enhance sustainable production and consumption patterns with the intension to save the planet, people, and businesses.

Company Y is greatly concerned about making profits. Therefore, it has no projects to support the community, neither has partnered with non-pollutant logistics service providers to reduce pollution. The interviewee accepts that there is a need for the company to collaborate with other stakeholders to achieve sustainability. All in all, the three dimensions of sustainability are not observed in company Y.

However, he mentioned that there is room for improvement, as from next year, the management is planning to set a budget aside that will incorporate the sustainability department. Table 10 shows factors influencing e-commerce sustainability on a factor loading with them on environmental, social, and economic dimensions, ranking them according to the order of company X and Y case study interviews of importance.

Table 10: Factors influencing e-commerce sustainability

	Factors influencing e-commerce sustainability	Factor loading
Environmental dimension	Environment protection (X1)	0.737
	Low carbon footprints(X2)	0.729
	Natural resource efficiency use (X3)	0.721
	Pollution reduction (X4)	0.690
	Reduce/limit climate change (X5)	0.688
	Use of renewable energy fuels (X6)	0.681

	Protection of biodiversity (X7)	0.661
	Green environments (X8)	0.647
	3Rs reduce, reuse, and recycle (X9)	0.615
	Adequate package material in use and recyclables (X10)	0.604
	Use of non-pollutants vehicles or alternatives (X11)	0.530
Social dimension	Social equality, equity, and inclusivity (X1)	0.734
	High-quality products at a cheaper price (X2)	0.673
	Create job opportunities – income (X3)	0.649
	Better living standards of e-shoppers (X4)	0.619
	Increase digital literacy and transform (X5)	0.600
	Green products with no negative impact (X6)	0.599
Economic dimension	Cost reduction in the production of high sales, profits (X1)	0.742
	Effective and efficient use of resources (X2)	0.604
	Growth and productivity in the economy globally (X3)	0.599
	More resources allocated to research development (X4)	0.568

E-commerce sustainability	Good experience leading to customer satisfaction (X1)	0.754
	Customer loyalty, repeated purchases (X2)	0.574

Source: Author' research (2021)

4.3 Quantitative research

General description of data

THOMPSON ET AL. (2005) state that demographic factors are considered crucial in determining key qualities of respondents which may be valuable for understanding buyer behaviour, attitudes, practices, and preferences. They explain why it is important to describe demographical factors in a sample. Therefore, this permits researchers to find how close the mixture of the sample is to influence the population. For example, in this research, the proportion of female to male ought to be as close as conceivable to the proportion of the tended population, end-shoppers who purchase items on the internet business platform.

Additionally, the sample demographic allows for a better understanding of the general population, as is alluded to by (ETIKAN, 2016). The fundamental reasons for understanding the demographic factors of respondents are to evaluate how influences e-commerce sustainability as a dependent variable. Demographic factors include gender, age, education level, last time to purchase online, and place of residence. From the questionnaire, the accepted responses are 1060, out of a total of 1100. 40 responses were not valid, 21 responses were not completed and 19 had missing data and therefore could not be included in our sample framework on data collected from the questionnaire.

Influence of control demographic factors

In this section, control factors are tested to determine their impact on the independent mediating effect and dependent variables. This is to say how the behaviours, attitudes, and preferences influence e-commerce sustainability.

From gender, of a sample of 1060 respondents, 40.6% were represented by 430 females, and 59.4% representing 630 males. The impact of the study sample indicated more males inclined

to e-commerce than female counterparts in gender factors. Figure 5 show gender of the respondents in the study.

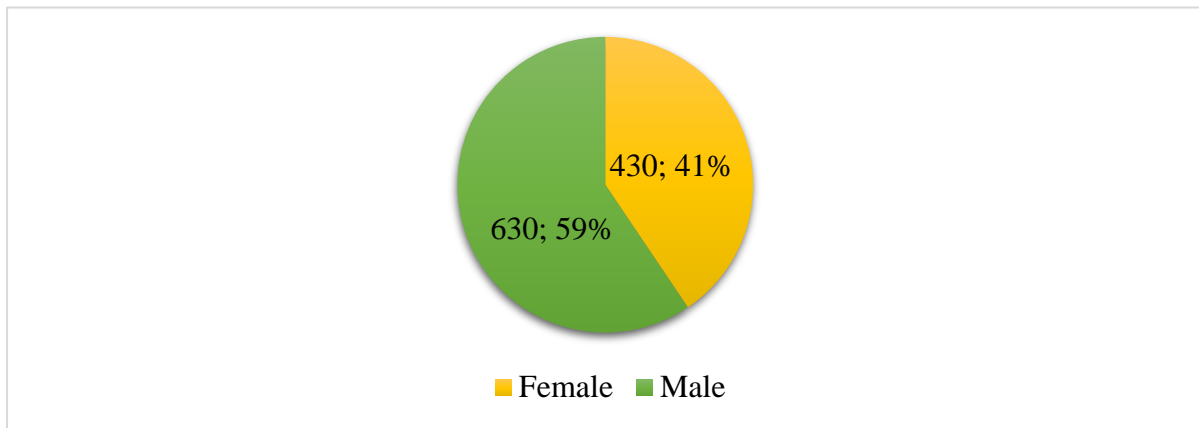
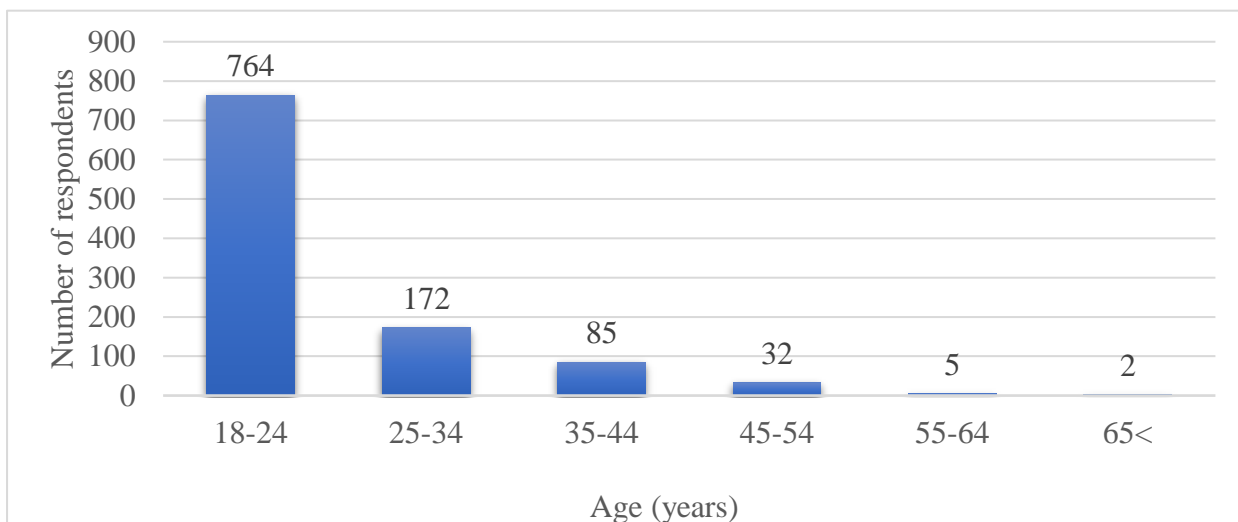


Figure 5: Gender of the respondents in the study

Source: Author' research (2021)

Table 11 show age of the respondents in the survey. The youth at the age bracket 18-24 accounted for the highest number of 764, representing 72.1% of the sample compared to the old generation. As age increased respondents seem to be a bit conservative when it comes to online shopping.

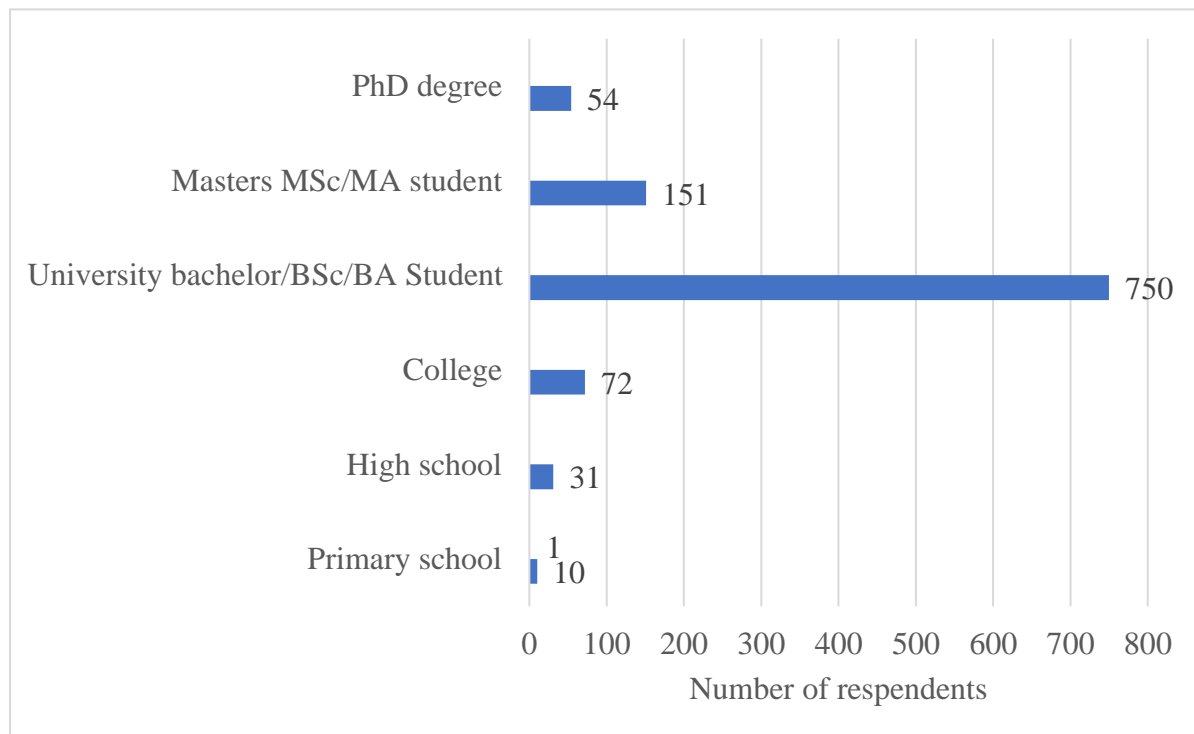
Table 11: Age of the respondents in the survey



Source: Author' research (2021)

Likewise, the same can be depicted in the education level, with the young generation taking the lead again. This finding can be associated with digital literacy, meaning that youths at the bachelor level spend a lot of their time and are more active in online shopping than seniors. Therefore, they account for 70.8% representing 750 of the sample. Table 12 show education level of the respondents in the survey.

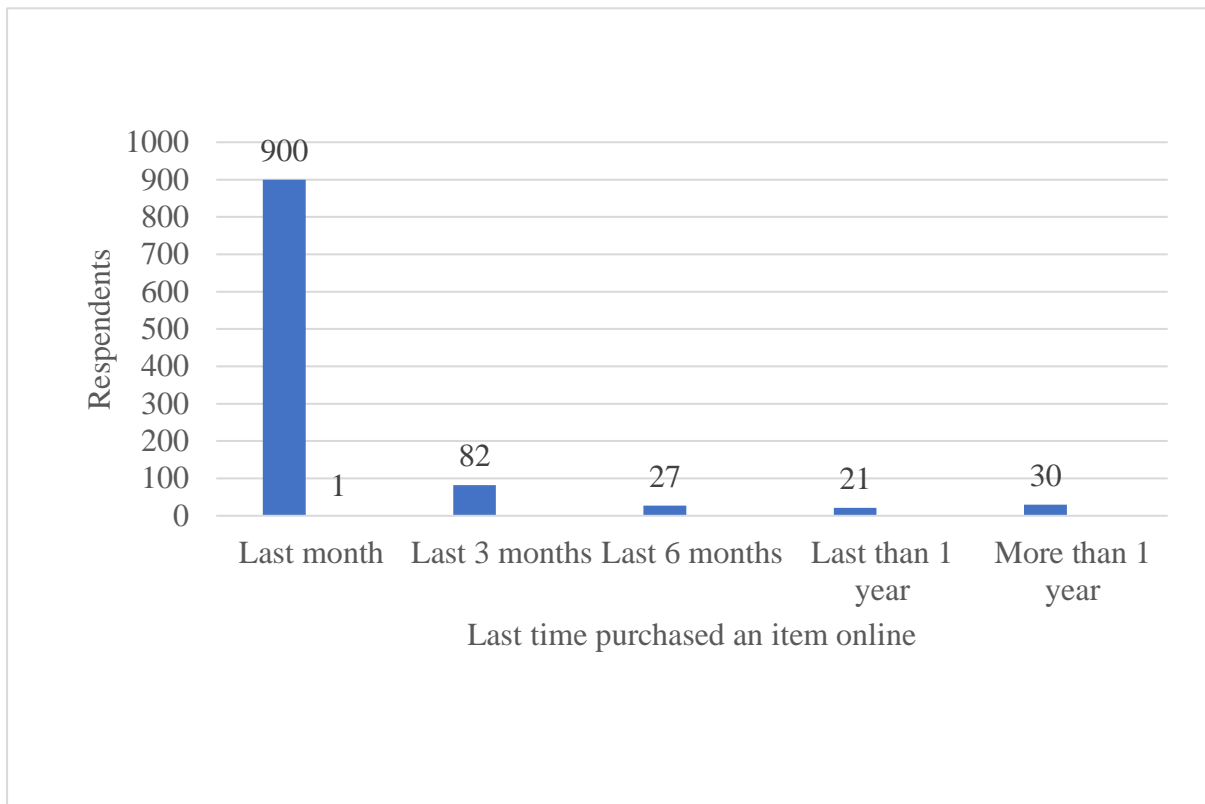
Table 12: Education level of the respondents in the survey



Source: Author' research (2021)

Also, the researchers had a question on when the last time was the respondent purchased a product or service online. 'Last month' accounted for 84.9%, translating to 900 of the sample who are frequently making online purchases within a month or less. This question alludes to the impression that online retailers can identify a market niche where to focus most of their promotions targeting consumers who do frequent shopping online to make more sales, contributing to sustainability. Table 13 show respondents and last time purchase online.

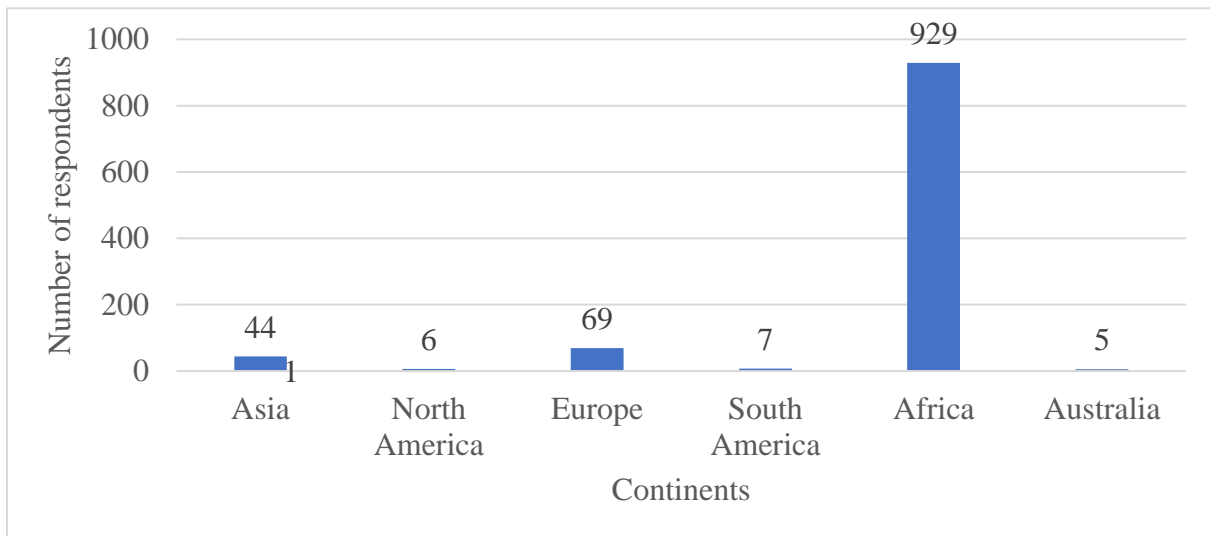
Table 13: Respondents and last time purchase online



Source: Author' research (2021)

Similarly, the data was collected from different institutions of education with focus on Hungary and Kenya. However, Africa and particular in Kenya, had the highest number of respondents: 929 at 87.60%. This skewness could have been influenced by the language barrier in Hungary. Table 14 show continents that participated in the survey questionnaire.

Table 14: Continents that participated in the survey questionnaire



Source: Author' research (2021)

Control factors are the demographics that are used to test if data influence the independent, mediating factors on the dependent variables in any way. In this research age, gender, education, continent, and the last time of purchase of a product online were used to determine the influence on e-commerce sustainability. The variance in the demographic was evident, young age (18-24) had a great influence on digital environment adoption, meaning that they are active in e-commerce platforms.

In terms of education level, there was also a high impact of young people in colleges and universities at the level of bachelors and masters, who are more involved in online shopping than Ph.D. students, academic teaching, and non-teaching members. This can be associated with digital literacy, to mean young people are more acquainted with how the internet and its technologies facilitate e-commerce platforms.

Also, this finding could be because generations X, Y, and Z were born during the current era of digitization; thus, the results on demographics should be interpreted with caution. Otherwise, it would mean that young people are more inclined toward sustainability than the old generation, which might not be true. Therefore, statistically, the data results show that young people shop more in e-commerce than offline shopping.

4.4 Quantitative technique (structured questionnaire 1060 valid respondents)

Gender proved to be the factor with the least scale of measurement which is nominal categorical. To measure the degree of independence, the Chi-square test was applied. To test the nominal category, non-parametric tests are used due to their common, simple, and suitable for nominal data for the significance level. ZIN (2017) urges that nominal data observations be categorized into discrete categories and regarded as frequencies while dealing with control factors.

A non-parametric test was chosen rather than a parametric test, where a Chi-square is not meant to fulfil certain underlying assumptions of the distribution. For this reason, the Pearson Chi-square adheres to at least one observation where it assumes a random sample, per category. Comparing the Pearson chi-square and p-value, it is determined to be valid when 80% of the expected frequencies exceed 5 and all expected frequencies exceed 1.

Alternatively, the opposite is true with less than 20% that must have less than 5 observations of the categories. This was important as at first 44% of the classifications of ESE and 26% of the categories of mediating factors showed under five values. For ESE dimensions "2.1" to "2.6" and "4.2" to "4.6", and for SUS "2.4" to "3.2" were consolidated.

Furthermore, failure to meet the random assumptions satisfactory, it is important to bear in mind the disadvantages of a Chi-square test. Because Chi-square has a sensitivity to sample size. Convenience and snowballing were adopted for this research hence random sample assumption was not met. Therefore, data for the independent, mediating effect and dependent variables were compressed and re-categorised for the Chi-square test which was confirmed to be valid. In conclusion, this means there is significant independence of the observations within the controllable factors and therefore significant characteristics of independence statistically.

Reliability and validity analysis

Reliability means the state and quality of an instrument are reliable. Thus, it is crucial for a research instrument to be used accurately and repeatedly produce similar results using the same data by different individuals. Therefore, that instrument is said to be reliable. Then, it implies that the same data used by a different person in a different environment should result in the same outcome.

A pilot-testing was performed to increase reliability. Subsequently, for every test that was performed the p-value was compared with that of Cronbach Alpha and would indicate to be statistically significant if the p-value were lower or equal to Cronbach Alpha 0.5. A reliability test, Cronbach's alpha, was performed. The rule of thumb states that if the value is equal to or above 0.7, then the reliability test is statistically significant. All the variables had a higher value than 0.7, threshold, proving that all are statistically significant and were acceptable. Table 15 show reliability test on instrument tools of measurement.

Table 15: Reliability test on instrument tools of measurement

Reliability instrument					
No.	Variables	Code	No of items	Cronbach's alpha	Conclusions
1	E-commerce sustainability	ESUS	15	.933	Reliable
2	Trust	TRT	9	.958	Reliable
3	Privacy	PVY	10	.938	Reliable
4	Security	SEC	11	.930	Reliable
5	Environment	ENV	13	.928	Reliable
6	Social	SOC	11	.926	Reliable
7	Economic	ECO	11	.927	Reliable

Source: Author' research (2021)

Independent, mediating factors, and dependent variables

There was a need to group the independent, mediating factor, and dependent variables into a simple model that could be analysed using a statistical package for the social science program. Later, the R complex model was also used to analyse the same data and the results were compared with those of SPSS; both methods should conclude with the same results. Data transformation and factor reduction to create principal component analysis were performed, since every variable had many sub-questions that discussed the challenges and solutions that can be solved by e-commerce sustainability.

As can be seen from the questionnaire, all questions on environment, social, and economic dimensions were categorized to form a single independent variable, just as all questions on trust, privacy, and security factors formed a mediating factor. Likewise, all questions on customer satisfaction and experience were grouped and formed e-commerce sustainability (ESUS) as a dependent variable. Total sub-question items are 35, 30, and 15 on independent, mediating effects, and dependent variables, respectively.

4.5 Factor analysis

Factor analysis is very important in identifying the components/factors by reducing many variables to less or one and create a super variable through a process known as principal component analysis (PCA). Kaiser-Meyer-Olkin (KMO) was performed to measure sampling adequacy and if the data was suitable for factor analysis, higher values close to 1 indicate that factor analysis is useful. Also, Bartlett's test of Sphericity was performed to compare the correlation matrix to the identity matrix for the reason for testing homogeneity across the variables and items of data in the research.

KMO desires values above .5 while Bartlett's test is acceptable if the p-value is greater than the significance value ($p\text{-value} < \alpha = .5$) otherwise rejects the hypothesis. From both tests, the results were significant since KMO had a value of .875 and Bartlett's p-value of .42. Thus, the factor analysis was acceptable and was performed. Additionally, the KMO test was performed, and the results are as follows: 35 items of $\alpha_{ESE} = .926$, 30 items of $\alpha_{MMF} = .938$, and 15 items of $\alpha_{ESUS} = .933$ for the independent, mediating effects, and dependent variables.

4.6 Sampling bias

Sampling bias means that there could a probability that some respondents' members had a higher chance of selection than others. Therefore, it is vital to test sampling bias and determine if the sample selected reflected a true value for all the parameters in the population. Having collected the data for 3 months, it was important to test if the first answers of respondents in the first month had similarities with the answers of the respondents in the third month. The questionnaire responses were divided into two ($n_1=530$, $n_2=530$) and a test of homogeneity was performed, and the results indicate similarity in each group therefore, no sampling bias.

4.7 Theoretical model testing

Correlation of the independent and dependent variables

The main aim of this research is to investigate the connection between independent, mediating effects and dependent variables and their variations on how influence e-commerce sustainability. Environment, social, and economic dimensions were the independent variables; trust, privacy, and security were the mediating/moderator effect factors. E-commerce sustainability is the dependent variable. Where X is the independent, Y denotes the dependent variable. Correlation analysis uses values between -1 and +1, meaning that if the results show -1, this indicates there to be a strong negative correlation, while if the results assume +1, then this indicates there to be a strong positive correlation. Likewise, if the results are 0 value, then this indicates that the variables have no association or correlation.

A correlation statistical test was performed to determine whether to accept or reject the hypotheses. Correlation analysis measures the strength of the relationship between two variables while controlling the effect of one or other variables. BURNS, P. (2008) notes the importance to include the control variable/factors in the test of correlation analysis. A partial correlation approach was suitable and the chosen test for the linear relationship between independent, mediating effects, and dependent variables (DAVID ET AL. 2008).

Similarly, when a partial correlation is performed, it assumes a Spearman's ranking order of correlation coefficient to take values from -1 to +1; thus, this will indicate a perfect negative or positive correlation. HAUKE-KOSSOWSKI (2011) indicated that Spearman's Rho (r_s) would be the most efficient test when ratio to interval data has been used. Therefore, the research adopted Spearman's Rho (r_s) for the correlation test.

BURNS P. (2008) argued that assumptions of the partial correlations must be recognized. The association must be depicted from one variable to another on the same respondent. The data having been collected via a survey and use the Likert scale level of measurement fulfil the requirement of Spearman's coefficient of both variables to have an ordinal scale. To eliminate outliers and ensure linearity variables that are related to each other, the questions were arranged in the sequence of the independent variable, mediating/moderator, and dependent variables.

- **H1:** Environmental, social, and economic dimensions have a significant and positive influence sustainable e-commerce.
- **H2:** Trust, privacy, and security issues have a significant and positive influence on the indirect effect of sustainability of e-commerce.
- **H3:** Policies on environmental, social, and economic dimensions have a significant and positive effect on the direct effect of e-commerce sustainability.

Table 16 show Spearman’s non-parametric partial correlation analysis.

Table 16: Spearman’s non-parametric partial correlation analysis

Control factors			ESE-mean	MMF-mean	ESUS-mean
Gender Age, Education level, Continent 3 months, Last time purchase online	ESE-mean	Correlation	1.000	.785	.673
		Significance(2-tailed)	.	.000	.000
		df	0	1060	1060
	MMF-mean	Correlation	.785	1.000	.716
		Significance (2-tailed)	.000	.	.000
		df	1060	0	1060
	ESUS-mean	Correlation	.673	.716	1.000
		Significance (2-tailed)	.000	.000	.
		df	1060	1060	0

Source: Author’ research (2021)

The test confirmed that computing the partial correlation on the environment, social, and economic (ESES) dimensions while holding the control factors constant reveals that the constructs were significantly and positively correlated among each other at a 95% confidence level. The results of the test are as follows; $r_{ESE, MMF} = .785$, $r_{ESE, ESUS} = .673$, $r_{MMF, ESUS} = .716$. Thus, ESE and MMF proved to have a strong positive association of value .785. while $r_{ESE, ESUS} = .673$ moderate association, as $r_{ESE, ESUS} = .673$. Thus, the results indicate that the mediating/moderate factor increased a high strong association between the two variables.

Therefore, a high-value effect shows the importance of including a mediating factor between the independent and dependent variables hence a higher linear correlation. Consequently, the results accepting all 3 hypotheses of the three constructs were confirmed to be significant and positively correlated. Spearman's partial correlation value +1 shows a strong correlation. Therefore, the strength between the variable's ESE, MMF, and ESUS, were classified as follows: H1: There is a significant and positive correlation between environmental, social, and economic dimensions and trust, privacy, and security as mediating effect. Indicated strong correlation value of .785. H2: There is a significant and positive correlation between trust, privacy, and security as a mediating effect on e-commerce sustainability. Indicated strong correlation value of .716. While H3: There is a significant and positive correlation between environmental, social, and economic dimensions on e-commerce sustainability. Indicated moderate correlation value of .673, respectively.

Spearman's spatial autocorrelation parametric excludes control factors and emphasizes the importance of the mediation process, giving more advantages and a better understanding than Spearman's non-parametric partial correlation analysis. It was proved that using Spearman's parametric partial coefficients correlation (r) on conducting the non-spatial autocorrelation only mediation process reduced the impact values of the relationships between the variables as follows: $r_{ESE, MMF} = .565$, $r_{MMF, ESUS} = .423$ and $r_{ESE, ESUS} = .380$ (n=1060, p=.000) respectively. Thus, it was evident that including mediating variable factors increased the strength and relationship between the independent and dependent variables. The reduction effect on the independent and dependent variables without and with mediating factors categorized as direct and indirect, respectively. Figure 6 show spearman's spatial autocorrelation variables without control factors.

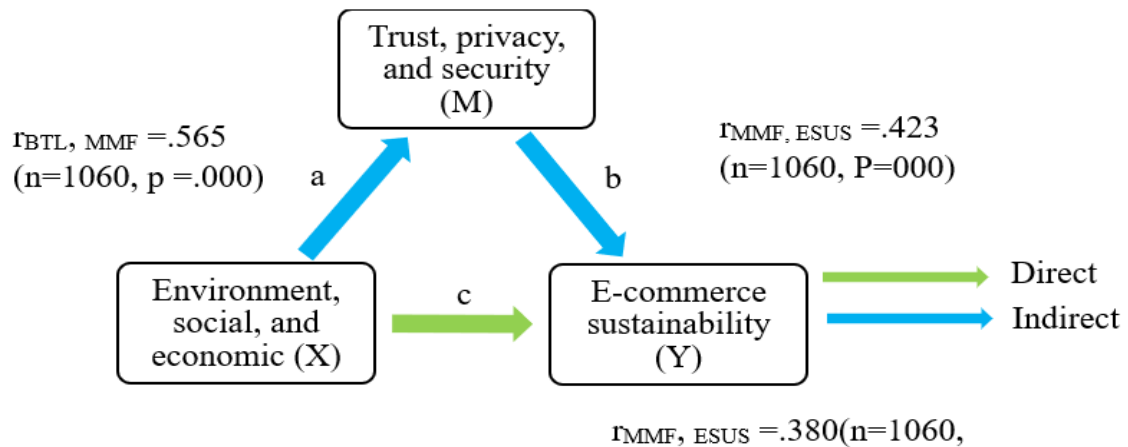


Figure 6: Spearman’s spatial autocorrelation variables without control factors

Source: Author’ research (2021)

Therefore, this research agrees with CHANG-WANG (2011) and other previous research that mediating factors influence variables as empirical evidence of a significant positive relationship in context with other studies. Conspicuously, correlation limitation was evident, since the statistical test of correlation analysis indicated a linear relationship between the variables. However, in some cases and previous studies, non-linear and asymmetric relationships between the ESE and ESUS would show in the mediating factors. However, according to BURNS, P. (2008), it would be recommended to try to identify linearity in scatter graphs.

Correlation analysis was meant to depict causality relation. It is used as a complementary quantitative approach to confirm the existence of the cause-and-effect relationships between the variables. Thus, this research is meant to show the influence of the mediating factors between independent and dependent variables was achieved and satisfactory to this analysis, and indeed, the 3 hypotheses were accepted.

A correlation analysis of independent, mediating, and dependent variables. After analysing all the variables on e-commerce sustainability, was clear that the coefficient of correlation showed a strong correlation with each other and with significant values except security on e-commerce sustainability which indicated a moderate value. Table 17 show correlation analysis on independent, mediating, and dependent variables.

Table 17: Correlation analysis on independent, mediating, and dependent variables

Correlation	Coef. correlation	Significant	Interpretation
ENV → ESUS	0.778	0.000	Strong
SOC → ESUS	0.769	0.000	Strong
ECO → ESUS	0.824	0.000	Strong
TRT → ESUS	0.832	0.000	Strong
PVY → ESUS	0.841	0.000	Strong
SEC → ESUS	0.654	0.000	Moderate

Source: Author' research (2021)

Regression analysis

LINA ET AL. (2014) defined regression analysis as a set of statistical tests and processes that are made in estimating the relationships between the dependent variable with one or more other variables whether independent or mediating variables. This mathematical procedure is done to estimate the relationships between dependent variables and with a variety of individuals who are available for a specific pattern, such as independent and mediating factors. To predict X from Y variables and explain their strength in relation to each other and the characteristics of the relationship. Equation formula is expressed as $Y = a + bX$, whereby Y is the dependent variable, X independent variable, a is constant, while b is that variation change. Therefore, regression analysis is performed to address the research questions to determine the hypotheses assumptions hold or false.

In this research, environmental, social, and economic (ESE) dimensions represent the independent variable, while mediating, moderating factors (MMF) represents mediating effects and e-commerce sustainability (ESUS) represents the dependent variable. Previous research

indicates simple and well-articulated regression model with simple analysis is more preferred and brings a wealth of information to the field of research.

Thus, the exclusion of the control factor in the regression analysis of this research gives a better analysis of the regression together with the mediating effects. GUIJO-RUBIO ET AL. (2020) indicated the importance of performing an ordinal regression analysis to determine if the variables are statistically significant to one another.

At the same time, it is important to determine how well your ordinal regression model predicts the dependent variable. The values of independent and dependent variables are considered as a covariate with the numeric format. Therefore, the polytomous Universal Model (PLUM) was used to bring the linear relationship model to effect using the ordinal data (IANNARIO, 2014).

Lastly, the ordinal scale of measurement values is indicated in a set of order e.g., 1 to mean strongly disagree and 5 to mean strongly agree, while measuring the extent to which the respondents agree/disagree with the question statement. According to PAUL ET AL. (2013), it is important to perform the goodness-of-fit test to determine how well a sample collected fit in the entire population before conducting the ordinal regression model.

Similarly, to determine if the model used is appropriate. Goodness-of-fit was applied and indicated that the model and sample are well fit, see table 14. Therefore, statistical proof that the tools used are valid. Likewise, it means that hypotheses were well formulated to correspond with the questions; therefore, the data collected had close relations to the dependent variable.

The assumption t (p-value $H_1 = .000$, p-value $H_2 = .000 < \alpha = .05$). Moreover, the assumption of the null hypothesis is that goodness-of-fit would indicate the frequency distribution of a sample or population would not be different from a frequency distribution of another sample or population with all chance expectations. The outputs are as illustrated as p-value $H_1 = .924$, p-value $H_2 = .901$, and p-value $H_3 = .912$, Indicating a good model was achieved in testing the goodness-of-fit test.

Thus, all three hypotheses were accepted expressing that the frequency distribution represents a total outcome of the entire population to be normally distributed in the model. However, the results should be interpreted with caution bearing in mind a larger sample would have a better effect on population distribution. Table 18 show the test of goodness of fit measures in ordinal.

Table 18: Test of goodness of fit measures in ordinal regression

Model fitting information								
	H1: ESE and MMF				H2: MMF and ESUS			
Model	-2log likelihood	Chi-square	Df	Sig.	-2log likelihood	Chi-square	Df	Sig.
Intercept	109.95				120.67			
Output	24.72	85.93	12	.000	80.57	43.36	11	.000
The goodness of fit measures								
	H1: ESE and MMF				H2: MMF and ESUS			
Model	-2log likelihood	Chi-square	Df	Sig.	-2log likelihood	Chi-square	Df	Sig.
Intercept	4.04	12		.901	23.23	22		.411
Output	4.43	12		.912	21.65	22		.924

Source: Author' research (2021)

A parallel lines test was also performed to determine if the hypothesis was characterized by the same cross meaning with the questions and deliver the same response as a feedback mechanism. This would prove that ordinal regression would match, then can be concluded that

the hypotheses should be accepted. This, therefore, means that there is linear regression resulted in achieving a replica of the same results as was attained in the goodness-of-fit measurement. In the category of analysis, the results output is as shown (p- value $H_1 = .924$, p-value $H_2 = .411 < \alpha = .05$) and thus fulfil and agree that ordinal regression was adequately attained, as is shown in Table 19 below.

This gives a clear picture of linear regression on the independent and dependent variables was achieved. The R-square and the parameter estimates were significantly regressed and explained the slope of the coefficients. Table 19 show the test of parallel lines in ordinal regression.

Table 19: Test of parallel lines in ordinal regression

	H1 ESE and MMF				H2 MMF and ESUS			
Model	-2log likelihood	Chi-square	Df	Sig	-2log likelihood	Chi-square	Df	Sig.
Accepted	41.1				86.5			
Regression	21.65	4.43	12	.924	58.60	21.65	21	.411

Source: Author' research (2021)

Likewise, parameters estimate for H_1 , ordinal regression was performed. The output results showing the impact by use of parameter estimates for H_1 of ESE on MMF were analysed. The lower and upper bound values are all positive, indicating that the respondents perceived ESE and MMF had a strong connection in influencing e-commerce sustainability. It follows that accepting hypothesis H_1 confirmed the strong association and relations between independent and mediating variables, significantly with sig. 000, with the significance level of p-value $= .000 < \alpha = .05$ of all ESE and MMF. Table 20 show the parameter estimates for H_1 , ordinal regression.

Table 20: Parameter estimates for H1, ordinal regression

		Estimate	Std. error	Wald	df	Sig.	95% Confidence interval	
							Lower bound	Upper bound
Threshold	[MMF-mean = 2]	202.539	35.737	32.120	1	.000	132.496	272.583
	[MMF-mean = 3]	203.062	35.738	32.285	1	.000	133.017	273.107
	[MMF-mean = 4]	203.697	35.741	32.482	1	.000	133.646	273.748
Location	[ESE-mean =2.0]	1.552	.260	35.595	1	.000	1.042	2.062
	[ESE-mean =2.5]	40.832	7.291	31.361	1	.000	26.542	55.123
	[ESE-mean =3.0]	10.579	2.125	24.774	1	.000	6.413	14.744
	[ESE-mean =3.5]	8.202	1.761	21.695	1	.000	4.750	11.653
	[ESE-mean =4.0]	6.002	1.404	18.269	1	.000	3.250	8.754
	[ESE-mean =4.5]	14.397	2.848	25.551	1	.000	8.815	19.979
	[ESE-mean =5.0]	0 ^a					5.728	15.422
Link function: Logit.								
a. This parameter is set to zero because it is redundant.								

Source: Author' research (2021)

There was also a high association influenced by the mediating factor between ESE and MMF variables. Portraying similar characteristics R-square in a linear regression model. The variation can be explained using the coefficient of determination between the independent variable and the mediating factor on ordinal regression to be high.

Furthermore, this research also performed a parameter estimate for H2, on ordinal regression. The result has positive values on lower and upper bounds, indicating that the mediator was of great influence to attaining e-commerce sustainability, found to be on a significance level of p-

value $-.000 < a = .05$ for all means, which implies a positive and significant interaction on ESUS. Table 21 show parameter estimates for H2, ordinal regression.

Table 21: Parameter estimates for H2, ordinal regression

		Estimate	Std. error	Wald	df	Sig.	95% Confidence Interval	
							Lower bound	Upper bound
Threshold	[MMF-mean = 1.00]	186.133	35.828	26.990	1	.000	115.912	256.355
	[MMF-mean = 1.50]	188.594	35.830	27.705	1	.000	118.369	258.819
	[MM-mean = 2.00]	195.210	35.752	29.812	1	.000	125.137	265.283
	[MMF-mean = 2.50]	197.053	35.744	30.391	1	.000	126.995	267.111
	[MMF-mean = 3.00]	198.550	35.742	30.859	1	.000	128.497	268.603
	[MMF-mean = 3.50]	199.730	35.740	31.230	1	.000	129.680	269.780
	[MMF-mean = 4.00]	200.399	35.740	31.441	1	.000	130.350	270.447
	[MMF-mean = 4.50]	201.054	35.739	31.648	1	.000	131.007	271.100
	[MMF-mean = 5.00]	204.517	35.751	32.726	1	.000	134.447	274.587
Location	[MMF-mean = 1.00]	1.552	.260	35.595	1	.000	1.042	2.062
	[MMF-mean = 1.50]	40.832	7.291	31.361	1	.000	26.542	55.123
	[MMF-mean = 2.00]	26.599	5.753	21.377	1	.000	15.323	37.875
	[MMF-mean = 2.50]	20.650	5.067	16.610	1	.000	10.719	30.580
	[MMF-mean = 3.00]	18.941	4.703	16.222	1	.000	9.724	28.159
	[MMF-mean = 3.50]	20.656	4.157	24.695	1	.000	12.509	28.803
	[MMF-mean = 4.00]	19.134	3.749	26.042	1	.000	11.785	26.483
	[MMF-mean = 4.50]	16.162	3.324	23.642	1	.000	9.647	22.677
	[MMF-mean = 1.00]	15.037	3.505	18.411	1	.000	8.169	21.906

[MMF-mean = 1.50]	13.689	2.917	22.019	1	.000	7.971	19.406
[MMF-mean = 2.00]	11.899	2.512	22.443	1	.000	6.976	16.822
[MMF-mean = 2.50]	10.579	2.125	24.774	1	.000	6.413	14.744
[MMF-mean = 3.00]	8.202	1.761	21.695	1	.000	4.750	11.653
[MMF-mean = 3.50]	6.002	1.404	18.269	1	.000	3.250	8.754
[MMF-mean = 4.00]	3.345	1.013	10.910	1	.001	1.360	5.330
[MMF-mean = 4.50]	.526	.865	.370	1	.543	-1.170	2.223
[MMF-mean = 5.00]	0 ^a	.	.	0	.	.	.
Link function: Logit.							
a. This parameter is set to zero because it is redundant.							

Source: Author' research (2021)

In conclusion, there is a high linear and strong between the mediating factors with independent and dependent variables. The simple linear and ordinal regression was performed to respond to the hypotheses. All the hypotheses are accepted and indicate a significant positive impact on ESE, MMF on ESUS.

Hypothesis regression analysis on independent, mediating, and dependent variables

A regression model analysis on the 3 hypotheses, indicating all the hypotheses are accepted with the interpretation of strong regression and beta and R-square values that have a significant and positive impact on e-commerce sustainability. Table 22 show hypothesis regression analysis on independent, mediating, and dependent variables.

Table 22: Hypothesis regression analysis on independent, mediating, and dependent

Hypothesis	Regression	Beta	R-square	Significant	Results	Interpretation
H₁	ESE-ESUS	0.778	0.606	0.000	Accepted	Strong

H₂	MMF-ESUS	0.769	0.592	0.000	Accepted	Strong
H₃	ESE-ESUS	0.824	0.680	0.000	Accepted	Strong

Source: Author' research (2021)

Mediation analysis

To determine the influence of mediating factors between environmental, social, and economic dimensions as to whether they have a significant mediating effect on e-commerce sustainability, a mediation analysis was performed. First, to include the mediator factors in the research model, this research adopted (BARON-KENNY, 1986) approach in his suggestion of testing a mediator or moderator.

Second, the ANDREW (2018) suggestion approach was applied to ensure the outcomes were double-checked and a certain level of significance and influence of the mediation is significant. The influence and relationship were to be tested on hypotheses H1 and H2 the independent (X) and dependent (Y) variables to depict the cause and causal effect of the mediation process (ANDREW, 2018).

BARON-KENNY (1986) suggest evaluating the following two constructs to test the intervention effect on mediation. To start with, the Independent variable is mediated with the interceding variable and demonstrates a connection. Second, the mediation between the mediator and the dependent variable and shows a positive impact on the result. Third, a direct analysis without the mediator between the independent and dependent variables is performed.

ANDREW (2018) proposes a basic intervention and mediating model in his book, which was also applied to this investigation to bring about the conceptional framework with the causal effect ESE (X), the mediating variable MMF (M), and the result variable ESUS (Y). Figure 7 show Andrew Hayes (2018) simple mediation model.

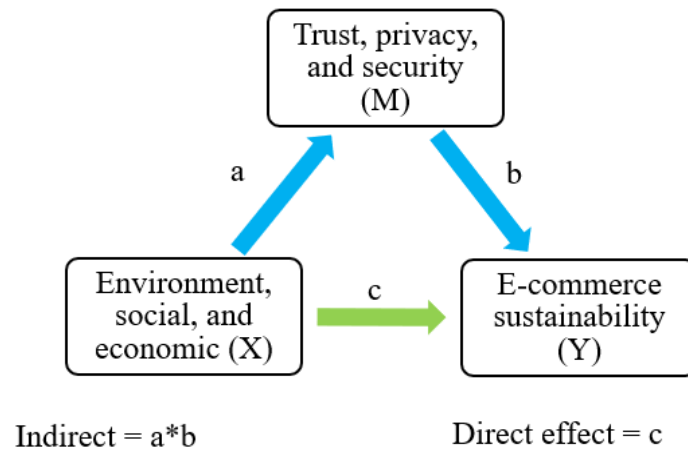


Figure 7: Andrew Hayes (2018) simple mediation model

Source: Author' research (2021)

An immediate impact c from X to Y and an apparent impact $a * b$ from X to Y through M were recognised. The absolute impact was determined by including the indirect and direct impacts bringing about absolute impact = $c + (a * b)$. The reason for this mediation process was to see the cause and relation effect perceived by this intercession/mediation model, the impact of the mediating effect between the independent and dependent variables. Even though the presumptions of directionality or causality of the three construct dimensions have been realized from academic literature and previous studies, research indicated the results should be interpreted with care (ANDREW, 2018).

Baron and Kenny's procedure to mediation

BARON-KENNY (1986) gives various steps to testing the mediation relationship. First, the immediate effect of the independent variable on the dependent variable was analysed, without the mediating variable (path c). As per Baron-Kenny (1986), the main aim is to be able to determine the impact of the mediating effect between the two variables. The results confirm that a low significant and positive correlation relationship was found among both the variables. As indicated as follows ESE on ESUS ($p\text{-value} = .000 < a = .05$). Therefore, the direct impact is low ESE-ESUS influences a significant amount of the change in ESUS by ($R\% = .29, (1,153) = 62.658$). In a second step, the same technique was applied for the independent variable, and the moderating variable (path a).

In the regression model, a strong linear relationship between ESE and MMF(H1) was discovered while performing an ordinal regression. The mediation process outcomes confirm the same. ESE predicts a strong connection with the mediating factor (MMF), which was treated as a dependent variable ($p\text{-value} = .000 < \alpha = .05$, $R^2 = .67$, $F(1,234) = 240.102$). In addition, a regression was conducted between the mediating factor and the dependent variable and strong connection was depicted ($p\text{-value} = .000 < \alpha = .05$, $R^2 = .42$, $F(1,243) = 88.395$) in path b. This affirmed the outcomes that were found already when performing an ordinal regression among the mediating with independent and dependent variables. Therefore, H1 and H2 values in the mediation process are high than the direct analysis between the variables, depicting the importance of mediating effect in this study.

In the last advanced stage, a regression was performed among ESE and ESUS excluding path a+b, and therefore it was confirmed that there was a low significant correlation relationship without the mediating factor. The outcomes illustrate relation of ESE on ESUS ($p\text{-value} = .000 < \alpha = .05$, $R^2 = .46$, $F(2,252) = 56.69$), and thus depicted a decline effect and impact on ($= .187$).

This result therefore demonstrates that the mediating factors account for the connection and relationship among the ESE, the independent variable, and the ESUS dependent variable with high certainty degree, if not fully. Therefore, MMF acted as a major factor and with partial mediating effect between the two variables, independent (ESE) and dependent (ESUS). The outcomes of the mediation process can be seen in Figure 8 Baron and Kenny's (1986) mediation model.

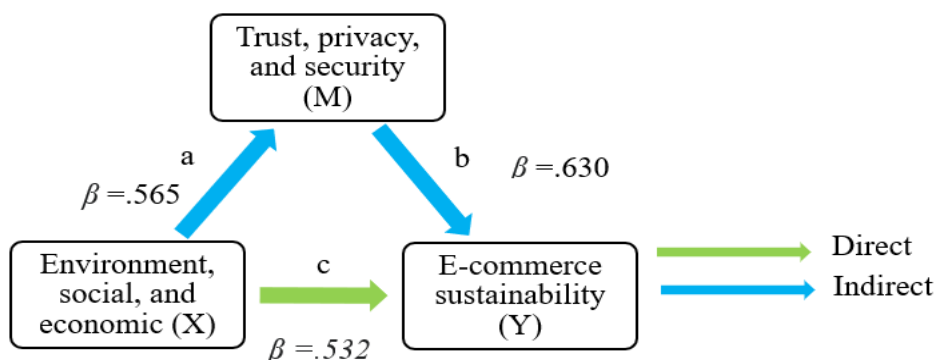


Figure 8: Baron and Kenny's (1986) Mediation Framework model

Source: Author' research (2021)

Further analysis was performed to determine whether the mediation impact was significantly crucial. The bootstrap technique as per (ANDREW, 2018) was applied.

Andrew Hayes PROCESS Test of Mediation

To start with, the mediation model was assessed concerning how much it can influence and impact the changes in the result variable ESUS. With the degree significance level and p-value as, $p\text{-value} = .000 < \alpha = .05$, $n = 1060$. Furthermore, it was revealed that the MMF factor had a significant positive influence on e-commerce sustainability. As predicted using unstandardized coefficients (coefficient $_{MMF} = .895$, $p = .000$; coefficient $_{ESE} = .353$, $p = .908$: at the same time, standardized coefficients were performed, and the results are as follows .847 for the ESE and .5454 for the MMF.

For the mediation process analysis, the total impact was realized on ESUS is given by $c + (a*b) = .7989$, as the direct impact value being $c = .5454$ and the indirect impact values as $a*b = .6854$. The results implied a high and significant positive indirect relation between ESE on MMF and MMF and ESUS. The results are 69% and 74% compared with a direct relation without the mediating effect of 38.65%. In summary, both stages of mediation process testing show that mediating factors increased the relationship between the independent and dependent variables. Therefore, accepting H1 and H2 creates a strong relationship, and demonstrate that the mediating factors enhanced e-commerce sustainability.

A relation was analysed between the connections on ESE, MMF, and ESUS. The tests performed on correlation revealed that there was a moderate relation between ESE and MMF, but a strong correlation but mediating factors and ESUS. However, there was a low correlation relation between ESE on e-commerce sustainability (ESUS) as follows, respectively. ESE and MMF ($r_{ESE, MMF} = .459$); MMF and ESUS ($_{MMF, ESUS} = .423$); ESE and ESUS ($r_{ESE, ESUS} = .212$) average on Pseudo R-square. That confirmed that hypotheses H1 and H2 have a significant and positive influence on each other's variables, with the mediation process mitigating the associated risks. With higher average values of Pseudo R-square compared to the low average value of independent and dependent variables without the mediating effect was according to ANDREW (2018). Figure 9 show theoretical framework model for regression analysis.

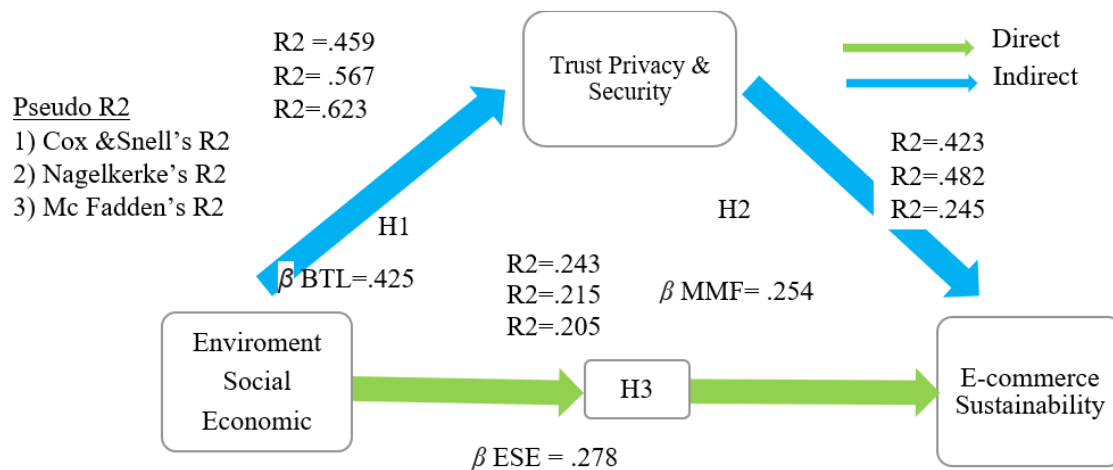


Figure 9: Theoretical framework model for regression analysis

Source: Author' research (2021)

The results show that sustainability in e-commerce can be achieved through a mediation process that mitigates the risks associated with online shopping. Increasing trust, privacy, and security improvements affect whether customers perceive online shopping to be a secure and sustainable platform. The mediation process can be adopted in many other industries. This is because it was noted that the world is moving from traditional methods of doing things to the digital environment.

Specifically, the internet has become the norm for most business sectors to use to set up and use online stores for sustainability and to gain a competitive advantage over offline traditional retail competition. Therefore, mediating effects have a significant and positive influence on sustainability in the e-commerce industry. The results confirm there are significant and positive connections and relationships between the independent and mediating factors on dependent variables.

4.8 R 4.0.2. statistical software (R Core Team, 2020)

In addition to SPSS and the case study, R 4.0.2. statistical software (R Core Team, 2020) was used, as well as the same data, to determine the connection and relations between the environmental, social, and economic dimensions and how the mitigation of online risks through trust, privacy, and security affect e-commerce sustainability influence and each other independently. The results draw the same conclusions.

For handling missing values, the Multivariate Imputation by Chained Equations (MICE) package was used, for the calculation of Principal Components (PCs), a psych package was applied. The independent variables (social, environmental, and economic), with mediating factors (such issues with trust, security, privacy), and their relationship with each other on e-commerce sustainability was determined.

In each variable, a principal component was made to reduce the information. In every reduction, over 70% of the variance was kept. After creating the 6 PCs (each for every variable), the author performed a mediator-moderator path regression on the Principal Components using the mediation package of R 4.0.2. software.

Causal mediation analysis was also performed to measure the proportion of the mediated and moderated effects. The author(s) applied bootstrap simulation to calculate the Confidence intervals and p-values of the parameter estimations. Also, we calculated the indirect and direct effects of the studied factors on e-commerce sustainability. Simple Ordinary Least Squares (OLS) estimation was used in the regression modelling.

Trust and Privacy were built into the model as mediators, as they turned out to mediate (channel) the effect of the other factors towards sustainability, while security was a moderator variable, as it strengthens the effect of the given factor. The conceptual model to determine the influence of the mediating effect on the independent and dependent variables and each other. Figure 10 show Mediating path regression model for 6 Principal Component variables.

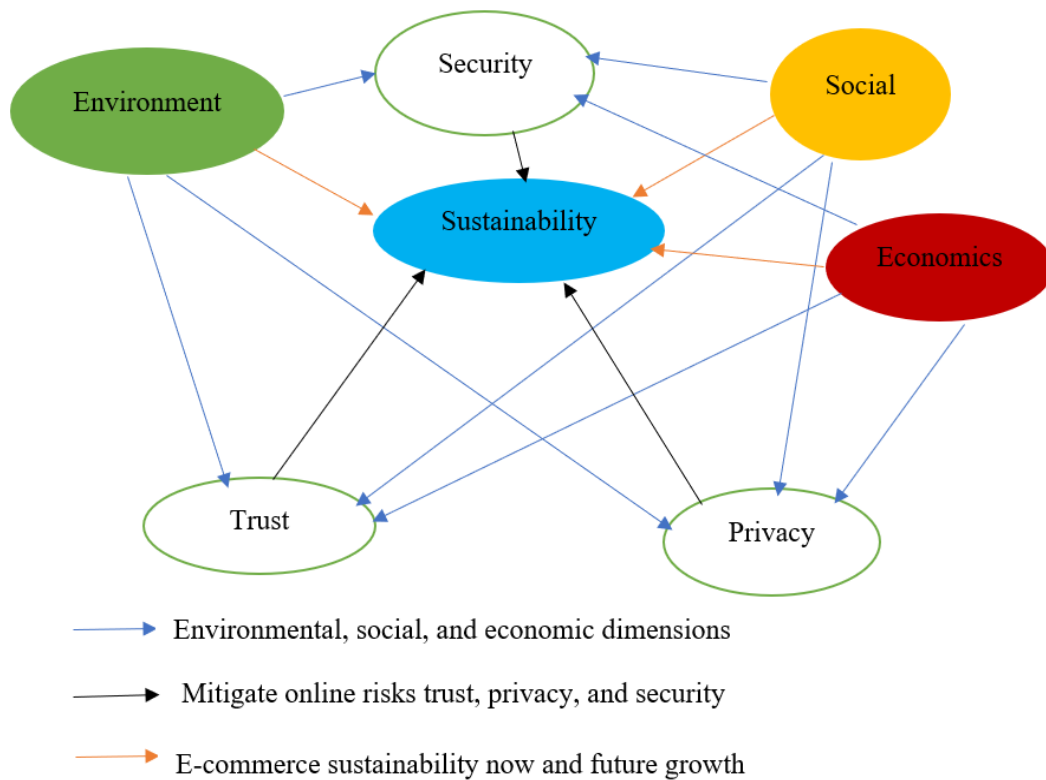


Figure 10: Mediating path regression model for 6 Principal Component variables

Source: Author' research (2021)

R model

Using the R model, the author was able to perform a test on the direct effects of the mediating factors of trust privacy and security on e-commerce sustainability, but separately, with each of the independent dimensions. This model is to determine the influence of the direct effects on each of the independent variables separately. Table 23 Model coefficients (direct effects) for sustainability, trust, and privacy.

Table 23: Model coefficients (direct effects) for sustainability, trust, and privacy

Factor	Estimate	Std Error	t-value	p-value	R-square
<i>Effect on sustainability</i>					0.817
Environment	0.293	0.046	5.658	<0.001	
Social	0.883	0.203	4.349	<0.001	

Economic	0.849	0.217	3.913	<0.001	
Privacy	0.230	0.024	9.786	<0.001	
Trust	0.462	0.021	22.029	<0.001	
Security	0.028	0.009	3	0.003	
<i>Effect on trust</i>					0.636
Environment	0.443	0.062	7.151	<0.001	
Social	0.971	0.316	3.071	0.002	
Economic	0.666	0.334	1.984	0.047	
<i>Effect on privacy</i>					0.549
Environment	0.537	0.054	9.981	<0.001	
Social	1.048	0.275	3.813	<0.001	
Economic	0.764	0.292	2.619	0.009	
<i>Effect on security</i>					0.332
Environment	0.322	0.107	2	0.302	
Social	0.243	0.100	1.981	0.034	
Economic	0.213	0.107	1.643	0.245	

Source: Author' research (2021)

All effects regarding the moderation and mediation were significant and the R-square values are indicating a proper model fit regarding the regressions on e-commerce sustainability. Privacy and Trust had the highest indirect influence on social factors and the effect of the environment is less on both mediators. Regarding the direct effects of Trust and Privacy, it can be stated that the role of trust is more important than those of privacy and security.

Subsequently, the author performed two tests on one of the direct and indirect effects of the mediating effect to determine their percentage and proportion influence on e-commerce sustainability. Separately, trust and privacy on the three independent dimensions. Table 24 show the summary of the direct and indirect of the mediator effect and the proportion mediated.

Table 24: Summary of the direct and indirect model effects and the proportion mediated

Effect	Direct	Indirect	Total	Proportion mediated (%)
<i>Through trust</i>				
Social on sustainability	0.426	0.837	1.264	33.6
Environment on sustainability	0.204	0.278	0.482	42.8
Economic on sustainability	0.299	0.887	1.179	25.7
<i>Through privacy</i>				
Social on sustainability	0.238	0.872	1.11	21.3
Environment on sustainability	0.124	0.293	0.417	29.3
Economic on sustainability	0.187	0.855	1.041	18.1
<i>Interaction of security</i>				
Environment on sustainability	0.297	0.726	0.323	8.21

Source: Author' research (2021)

The environmental, social, and economic dimensions have a significant influence on e-commerce sustainability. The interaction effect was also meaningful. Regarding the mediators on direct effect (.426, .204, and .299) on the economic, social, and environmental dimensions, they were low compared to an indirect effect through trust, which has the highest (.837, .278, .887) respectively, meaning with mediating effect, e-commerce sustainability can be more easily achieved. Meanwhile, the proportion mediation effect was highest (42.8%, 33.6%, and 25.7%) on the environmental, social, and economic dimensions, respectively.

The proportion of mediation effect direct and indirect relation on e-commerce sustainability, through privacy, had relatively lower mediating effects than trust but almost the same trend, as can be seen in Table 23 above. The percentage proportion of independent variables is low without mediating interaction (29.3%, 21.3%, and 18.1%) in the relation to the environment, social and economic on e-commerce sustainability, respectively. However, when mediating effect to the interaction of security is introduced, only the environmental dimension had a

positive and significant influence on e-commerce sustainability. In conclusion, all independent and mediating effects show a positive and significant influence on e-commerce sustainability. Therefore, all the hypotheses are accepted.

We also performed a distribution test of the environmental, social, and economic dimensions with the influence of the direct and indirect effect to determine their overall effect on each of the mediating variables. As pertains to the environmental, social, and economic dimensions on e-commerce sustainability, only trust and privacy were included. Table 25 show the distribution of variable influence (%) concerning indirect and direct effects.

Table 25: Distribution of variable influences (%) regarding indirect and direct effects.

Effect	Indirect (%)			Direct (%)
	Trust	Privacy	Security	
Environment on sustainability	35.80%	33.40%	30.80%	42.2%
Social on sustainability	37.80%	31.50%	30.70%	14.2%
Economic on sustainability	38.50%	30.50%	30.50%	43.6%

Source: Author' research (2021)

Regarding indirect effects and the mediator influences on the social, environmental, and economic variables, trust had approximately 35.80%, 37.80%, and 38.50% of the influence, respectively, while privacy has 33.40%, 31.50%, and 30.50%, and security showed 30.80%, 30.70%, and 30.50% on economic, environmental, and social variables, respectively. This shows how the indirect variables contribute closely to the effects of the independent variable.

Analysing the direct influence of the economy and the environment on sustainability, we can observe that social and economic factors have almost the same influence - around 43.6% - and the environment has 42.2%, respectively. However, the social variable shows 14.2%, meaning that there has been not enough inclusion of the respondents in sustainability. Therefore, again the results indicate the importance of combining all the independent variables and mediating factors as one and not separately will yield higher results in e-commerce sustainability than if taken individually.

5. CONCLUSIONS AND RECOMMENDATIONS

This chapter draws attention to conclusions, limitations, and recommendations for future research that are emerging in connection with this study on e-commerce sustainability.

From the literature, there has been exponential growth in e-commerce that has brought more benefits than negative implications, especially in developed countries. However, at the same time, e-commerce in developing countries has been faced with online shopping risks, such as those related to trust issues, privacy and security, high pollution, unemployment, high cost of production, high energy use, and low profits. These factors have adversely affected the retail industry in the environmental, social, and economic dimensions.

Therefore, this study examined how the integration of environmental, social, and economic (ESE) dimensions with mediating effects on trust, privacy, and security might enhance e-commerce sustainability now and in the future in developing countries, such as Kenya. According to the results, this study confirms that if e-commerce platforms adopt sustainability strategies, they would lessen the adverse negative effects on the environmental, social, and economic dimensions conducting business offline brings with it. Similarly, the results show that through the mediating effects, e-retailers would mitigate the associated risks with online shopping such as trust issues, privacy, and security, thereby promoting the growth of e-commerce sustainability in developing countries.

Qualitative

How do the online firms work with environmental, social, and economic dimensions to promote e-commerce sustainability?

Previous studies indicated that the development of web-based business has changed the way retailers are conducting business. Customers and retailers are moving from traditional or brick and mortar to e-commerce platforms to gain a competitive advantage. According to NAIR (2017), e-commerce sustainability is one of the best methods of solving most of the world's challenges, as it is the customers themselves who are demanding sustainable products and services. Competition has become stiff within the retail industry, as buyers are inclined to choose those retailers promoting sustainability strategies. This behaviour was reflected in

company X as opposed to company Y, as well as in reports found in the previous studies (PIRIS ET AL. 2004).

As company X practices sustainability as core values, it solves environmental, social, and economic problems. This study's results indicated positive and significant connections with a linear relationship between the independent and dependent variables, which will only grow in importance in the retail sector as sustainability itself grows in significance. Thus, our findings stand in agreement with those from previous studies, e.g. (MACCHION ET AL. 2017) on the importance of sustainability.

Sustainability strategies were not implemented in company Y, and the company experiences low sales, with profits affected by high costs. This finding reflects many studies which report that not all e-commerce companies engage in sustainability (GLAVIČ-LUKMAN, 2007). While interviewees in company X agree with NISAR-PRABHAKAR (2017A) that sustainability is one prerequisite towards becoming successful in e-commerce, company Y has faced a decline in sales volume. Company X is flourishing and taking advantage of e-commerce sustainability strategies.

Company X has a sustainability reporting and strategy department committed within its daily workforce to ensure e-commerce sustainability, which is effectively displayed through their website and open communication channels in social media dialogues with customers. Also, company X has realized the importance of integrating the environmental, social, and economic dimensions of e-commerce sustainability.

Its commitment is giving the company the opportunity to do well not only in sales, but also in brand reputation and in maintaining a good image, as it works to mitigate online risks involving trust, privacy, and security. Customers feel safe and secure while doing online shopping on their website, reporting good customer experience, satisfaction, and becoming loyal patrons. There are elements all contribute to e-commerce sustainability.

On the other hand, company Y experiences low sales, whether operating offline and online stores. The reason for such performance may be attributed mostly to the company's not adopting sustainability strategies and policies, as was the case with company X. What does this mean? Online businesses which do not pay attention to the changing needs of their customers in their demands for sustainable businesses will find it difficult to break even.

The CEO of company X said that the e-commerce platform has transformed how businesses are operating. It has become more apparent that such a platform is not only going to increase sales online, but its use is going to push companies to integrate sustainability into their core values and to implement relevant changes effectively.

Furthermore, the company implemented the fourth dimension of service quality, by collecting feedback from the community and customers. Such feedback includes how they feel about their products and services, for further improvement. Instant communication with customers creates more confidence and trust that the company cares for its customers. To say the least, this has created a very good image and reputation, even though its size is smaller than that of company Y.

Company X is the most popular in Kenya, and enjoys high sales with a large customer base compared to company Y. It is evident sustainability has been well exemplified by company X, unlike company Y. As seen in the results of its activities, by moving the market towards sustainability, a company can gain a competitive advantage, without much effort to advertise their products. E-commerce and sustainability for management mean bringing down most operational costs, as well as production expenses. Company X became more aware of the importance of sustainability and then allocated resources to a sustainability department. The decision led to company X's gaining a competitive advantage.

Quantitative

What is the connection and relationship among the environmental, social, and economic dimensions with a mediating effect on e-commerce sustainability?

To be able to address the question adequately, as the main purpose of this study, a conceptual and theoretical model was established. Data collected using the survey questionnaire was validated through reliability and validity tests from online customers of e-commerce and retail industry platform. Also, factor analysis, correlation, and regression tests were performed through statistical tests to the main constructs, in order to answer the following hypotheses of the study.

- **H1:** Environmental, social, and economic dimensions have a significant and positive influence sustainable e-commerce.

- **H2:** Trust, privacy, and security issues have a significant and positive influence on the indirect effect of sustainability of e-commerce.
- **H3:** Policies on environmental, social, and economic dimensions have a significant and positive effect on the direct effect of e-commerce sustainability.

In addition to Pearson non-parametric, partial correlation, and ordinal regression was used to test the relationship between the variables. Results confirmed a significant and positive influence on the connection with correlation and ordinal regression relationship that integrate the environmental, social, and economic dimensions and mitigate online risks, such as trust, privacy, and security, on e-commerce sustainability now and future growth. Further, it is important to mention that the mediation process added value to the connection between the independent and dependent variables expressing its significant and positive role as a mediation independent, mediating effects, and dependent variables hence e-commerce sustainability.

Control factors

The descriptive statistics indicated that in terms of age, most young people in the age bracket 18-24 have adopted e-commerce platforms as their way of shopping compared to older groups who still have not engaged in online shopping fully. These slow adoption of online shopping by other groups could have been contributed by the risks associated with e-commerce platforms, such as issues with trust, privacy, and security or digital literacy. Among college and university students at bachelor's level, especially in Kenya, there seem to be a high number of respondents claiming to be active on e-commerce platforms, at a ratio of 42% females and 58% males, respectively.

Environmental social and economic dimensions to sustainability on correlation and regression analysis

The results show a low moderate connection between the independent and dependent variables in a direct aspect. However, the mediating effect proved to add value and is of great significance to ensure e-commerce sustainability. Also, the results confirm a linear relationship between the independent, mediating effect, and dependent variables to be significant and positive. By analysing the results, e-commerce sustainability could be stated that sustainable e-commerce can be a solution to most of the world's challenges on triple bottom line dimensions.

E-commerce would reduce pollution and therefore protect and conserve the environment and its biodiversity. E-commerce would be a source of job opportunities, fair treatment, justice served in the same platform for all. Customer demand will be met by offering sustainable products and services conforming to sustainability objectives in the short and long terms. Consequently, sustainability will be the link and goal among the producers, retailers, and customers.

Mediating effects

The results show that risks can be mitigated and addressed by e-retailers by ensuring the creation of a website with security features that will make e-buyers have confidence and become comfortable with online shopping. E-retailers should subscribe to companies that offer data protection, thereby creating confidence between the e-commerce platforms and online shoppers. Examples of security features include applying security certified marks, e.g., VeriSign, and compliance with international security requirements, such as stands for secure sockets (SSL) layer digital certificates. Also, policies stating that retailers guarantee the privacy and security of the customer's private information should be clearly visible on the website.

For the issue of trust, projections from retailers can be promoted through a certificate of quality assurance on their services and products. This means that retailers have met certain requirements and thresholds, from which higher trust can be ascertained. The risk aspects of privacy and security are mitigated using a firewall for network-level security and assure customers will not incur financial loss, damage, or distortion of their private information. The results confirmed a high mediating effect influences secure e-commerce platforms and have high significant and positive influence on e-commerce sustainability.

Theoretical and practical implications

Upon a thorough study of the literature review, a link was missing on how to integrate the environment, social, and economic dimensions with a mediating effect on e-commerce sustainability. Therefore, a research gap was identified and capitalized on the relationships and connections of the three constructs that were decided to be investigated, as the previous studies had investigations on consumer changing behaviours, attitudes, and preferences in other contexts but not with sustainability in the e-commerce platform.

E-commerce sustainability research has gained much attention of late, due to its theoretical and practical use of the internet, transforming businesses into digital environments. However, most research missed the opportunity to study how to make e-commerce become more sustainable with the various three constructs aforementioned in this research. After a deep study of the literature review, most research was done based on a case study and using descriptive statistics only and one single dimension but not integrated to triple bottom line.

This led the author to identify a research gap - in this context, the e-commerce platform, and its sustainability on the three-bottom line. Answering the hypotheses of this study contributes to the literature by determining and testing connections, relationships between independent, mediating effects, and dependent variables. This was possible by analysing and comparing different previous studies on literature. It became clear that a similar conceptional framework, methodologies, and approaches have been used before, but not on how to integrate the environmental, social, and economic dimensions and mitigate online risks such as issues of trust, privacy, and security on e-commerce sustainability, now and during future growth.

By studying this research, there is an increase of knowledge in the existing literature. While past studies were separately done on a single dimension, in this study, a combination of the three constructs is done. This was carried out by following the recommendation of other studies, such as DAN ET AL. (2006) and PERKINS (2015), who studied the connection between the environmental, social, and economic ESE variables on tourism and education online. In his research, he mentions sustainability of e-commerce can be areas that can researched for future studies.

Thus, the research added to the contribution and improvement of a multi-dimensional scale for integrating the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability growth. In conclusion, one may reason out and conclude that this study affirmed building data that can be used in the future for other studies related to e-commerce and sustainability.

Increased knowledge of the literature and the overall has indicated positive and significant connection between environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability now and future growth which was not explored in various previous studies. Therefore, this study stands out in that no similar research

has been published explicitly on the environmental, social, and economic dimensions and mitigation of online risks such as trust, privacy, and security on e-commerce sustainability.

This study opens new avenues for further research that can be conducted on emerging and related areas with connections to the internet, e-commerce, and sustainability, on areas such as Industry 4.0 in manufacturing industries, the Internet of Things, artificial intelligence, big data analytics, circular and the bioeconomy in relation to e-commerce. In addition, to new apps such as mobile commerce and social commerce. In conducting these areas will outline the importance and better understanding of how to use e-commerce platforms in more sustainable ways to guarantee the co-existence of business organizations and society, without the depletion of natural resources, by establishing a conducive environment to work and live in.

The theoretical and practical implication of using case studies for the two companies is that company Y recognize the importance of sustainability even though did not implement in her strategies. Therefore, illustrating shortcomings for many companies that are in the e-commerce platform yet do not have sustainability strategies. End up not having a competitive advantage and continue struggling to remain afloat, finally end up shutting down.

Practical implementation is manifested in company X, which has, aligned the sustainability strategies with their core values. By showing their customers that they care about them, by producing green sustainable products, and by maintaining open communication with them. Company X has yielded fruits, i.e., more sales with a large customer base nationwide. Therefore, a lesson to other companies that are on the e-commerce platform is that they should align their core values with sustainability policies and implement them.

Therefore, enhancing customer satisfaction and loyalty in the e-commerce platform adds more knowledge and understanding of how important it is to monitor the changing behaviours and attitudes of online customers towards green and eco-friendly products (ILIEVA ET AL, 2002).

Results from the R model may be helpful to all stakeholders' online businesses and customers to work in collaborations and partnerships to support sustainable strategies and policies. The constructs benefit much more from testing each dimension independently than cross-analysis between independent, mediating effects, and dependent variables. The results indicated that the mediating effects have more indirect impact than a direct relation at .678 and .322, respectively.

The results in the R model, qualitative and quantitative research are in agreement with the previous studies show that mediating effects is of great significance to achieve sustainable e-commerce platforms (WASSERSTEIN, 2016; EVIDENCE, 2010). Mediating and mitigation of online risks benefited both the retailers and customers by applying privacy and security measures that guaranteed data protection and e-commerce growth. Thus, no financial loss or theft of information that will affect both parties.

Trust of customers on e-retailers website builds more confidence by reducing related risks and leads to e-commerce growth and sustainability. The results in integrating the environmental, social, and economic dimensions indicated a significant and positive influence on e-commerce and sustainability which can be achieved by making trade-offs between the dimensions. This was similar to the study of MOORE (2014), which emphasized protecting and conserving the environment provides a clean environment to society and healthy lives to consumers.

Also, e-commerce, is one of the sectors that give a viable and competitive environment economically on cost reduction and profit maximization. Thereby providing green products to the customer at a cheaper price. Additionally, e-commerce allows people to do sustainable business and earn income, promoting better-living standards (LEONTITSIS-PAGGE, 2007). Therefore, integrating the three dimensions of sustainability benefits all the stakeholders involved in a win/win solution, and solves most world challenges (TAVAKOL-DENNICK, 2011).

From previous studies, we found out that online risks have been hindrances to the growth of e-commerce in developing countries like Kenya. With the knowledge of this study, e-retailers will benefit by applying security features on their websites that will guarantee a secure environment for online transactions. TRIZANO ET AL. (2016) stated that building trust in the minds of customers and data protection increases the urge to online shop, thus e-commerce growth.

Therefore, this study presents a clear procedure on how e-retailers can ensure data protection on privacy and security aspects, as well as contribute to scientific knowledge. However, his study paid more attention to end-users and not businesses. To be more precise, the scope was confined to business to customers (B2C) sustainability, but not other business models, such as B2B or C2C.

Limitations and directions for further research

Like any other previous studies in social business and science limitations are unavoidable. When it comes to the tools and methods of data collection, this research could have been exposed to sampling bias. To start with, the limitations are grouped into two. Researcher were subjected to the limitations of quantitative and qualitative techniques, predominantly identified with the study sample that might not be adequate to represent all online shopping customers using an e-commerce platform. By choice of convenience and purposive sampling in this study.

As a result, the representativeness of the sample might have diminished, and a few presumptions of measurable statistical tests could not be met as could have been with a random sample. It could also be noted that quantitative data was collected most from students of the e-commerce platform probably not representative to the general online consumers.

This study focused on the B2C model. However, it may have been more beneficial to include other models of e-commerce, such as B2B, G2C, and C2C. Similarly, choosing well-known companies for the case studies would have given a better picture understanding, e.g., eBay, Amazon, or AliExpress, other than X and Y which are only known in Kenya. This would have given an elaborate structure of the value chain from the manufacturer, distributors (LSPs), suppliers, wholesalers, retailers, and end-user who is the ultimate customer of the products and services online.

A survey questionnaire takes a lot of time in the preparation and data collection, so only a consumer survey was used but also company questionnaire could have shed more-light. The shortcoming of the questionnaire sometimes cannot be avoided completely since different respondents might not have an in-depth understanding of the research topic or otherwise misinterpret the questions, thus answering incorrectly. Additionally, other research designs and strategies such as longitudinal could have been adopted, reducing the limitation of time-specific contributing to obtain better results and more stable analysis with a better interpretation could have been reached.

In conclusion, there may have been an oblivious inclination to organize and lean toward data that underpins three expressed speculations on the hypotheses. Moreover, the absence of a customized instrument of the measurement tool and the exclusion of control factors could be termed as a limitation. In addition to exploring the relation of environmental, social, and

economic dimensions and the mitigation of online risks related to trust, privacy, and security on e-commerce sustainability, present and future growth could have been influenced by other dimensions, thus giving different results.

Ultimately, this study could have given better results if the scope were extended to Africa and continents for comparison purposes instead of being limited to Kenya. Literature review established that there are additional factors related to e-commerce sustainability. For example, the use of M-commerce and S-commerce and application of 3Rs re-use, recycle, reduce and more efficient energy use would be promising areas to be investigated. Furthermore, Industry 4.0., the Internet of Things, big data analytics, and artificial intelligence among many other emerging topics that support sustainable e-commerce sustainability platforms should be carried out in future research.

Recommendations for future research

Based on research findings, the following recommendations were developed and suggested to be implemented in future research in line with changing customer behaviour toward sustainable and green products, that have no negative health risks, environmental impact, and cost reduction to increase e-commerce sustainability in the future.

The research used qualitative and quantitative approaches and methodological choices, even though the two methods are fit to eliminate each other's weakness, other techniques such as content analysis, and Monte Carlo simulation could be applied to stimulate more effect. Especially, when integrating the environmental, social, and economic dimensions in a single study. Also, the researchers chose convenience and purposive sampling so that could increase the number of response rates, otherwise, other sampling methods, such as random sampling would have given every customer on the e-commerce platform a chance to be selected and be part of the sample hence increase the representation of the sample.

Similarly, online risks such as trust, privacy, and security issues are major concerns to online customers. Yet, this study found out that using Secure socket layer (SSL) certificate and encrypted websites would ensure data protection. Still, there is a need to study other more security features on retailer's websites that will create confidence hence promoting e-commerce growth.

Furthermore, only two case studies were carried out in Kenya, only with local brands. This research recommends that future studies in case studies can be done on well-known companies around the world since this would have more impact on online customers from e-commerce platforms across the globe. Further research can apply a longitudinal approach that eliminates the issue of time-specific examination. Since most of the previous studies used a cross-sectional approach, that has a limitation on time-specific examination.

Similarly, it was noted that companies do not become sustainable just because they operate using e-commerce platforms do not necessarily promote sustainability. The example of company X emphasises that sustainability policies and strategies must be integrated into the core values of the company to enhance sustainable e-commerce. This will give the company a competitive advantage. Also, the use of the mediating effect has a greater influence between the independent and dependent variables. Thereby giving more robust results and more knowledge to the e-retailers on what to do to ensure more customers feel confident with e-commerce platforms.

Finally, it was noted that achieving e-commerce sustainability, requires collaboration and partnerships of all stakeholders in the value chain putting their mind in actions. Appreciate impact on the three dimensions of sustainability to realize the best trade-off benefits and advantages of e-commerce platforms. Therefore, results preventing negative impact to the environmental, social, and economic dimensions.

6. NOVEL FINDINGS OF THE DISSERTATION

1. Based on the results integration of environmental, social, and economic (ESE) dimensions have more impact on e-commerce sustainability when studied together than when done independently as was found in this study theoretically and practically hence e-commerce sustainability is increased.
2. Additionally, the mediating effect strengthens the connection and linear relation between the independent and dependent variables. Trust has been identified as the main moderator that makes consumers abandon shopping carts when buyers lack confidence on e-retailers.
3. Moreover, e-retailers to ensure security and privacy on consumers must subscribe to security certified features such as Secure socket layer (SSL) certificate, use of https, ask for card verification value number in case of card payment for protection from unauthorized access, use, alteration, or destruction and avoid financial loss to security and privacy of the online customers.
4. Furthermore, e-commerce is a digital enabling environment that influence both retailers and customers to be empowered economically, socially, and environmentally through taking the best possible trade-offs hence win/win solution from the most world challenges such as pollution reduction, protection and conservation of natural resources and biodiversity, employment, fair trade, equity and equality among all stakeholders.
5. Last but not the least R model results, it is possible to test each variable separately and on each other from independent, mediating effects, and dependent variables and how influenced by the mediating effects ranking them according to the order of in direct and indirect proportion.

7. SUMMARY

This study investigates e-commerce sustainability through the integration of environmental, social, and economic (ESE) dimensions, and the mitigation of online risks such issues as, trust, privacy, and security as mediating effects on e-commerce sustainability, to enhance sustainable e-commerce now and for the future. The objectives of the study are as follows:

Objectives of the research

- To investigate e-commerce sustainability through the integration of environmental, social, and economic dimensions.
- To investigate e-commerce sustainability through the mitigation of online risks, such as issues with trust, privacy, and security.
- To investigate e-commerce sustainability to enhance sustainable e-commerce through strengthening policy legislation and regulation.

The research questions.

1. How can one integrate the environmental, social, and economic dimensions into e-commerce to make it more sustainable now and future, both for customers and retailers?
2. What is the influence of issues such as with trust, privacy, and security on consumer behaviour to enhance e-commerce sustainability in the retail industry?
3. What are the recommendations for policy legislation and regulation formation that can strengthen e-commerce sustainability?

The hypothesis of the research

The following hypotheses were developed to determine the influence on connections, relationships between independent and dependent variables with a mediating effect. The assumptions of the study will be confirmed by accepting or rejecting the hypotheses. Thus, the hypotheses will address the research questions and objectives of the study.

- **H1:** Environmental, social, and economic dimensions have a significant and positive influence sustainable e-commerce.
- **H2:** Trust, privacy, and security issues have a significant and positive influence on the indirect effect of sustainability of e-commerce.

- **H3:** Policies on environmental, social, and economic dimensions have a significant and positive effect on the direct effect of e-commerce sustainability.

E-commerce growth and development have been enhanced through the advancement of information communication technology (ICT). Which is almost to be fully realized and change the way of doing business in the retail industry in developed countries. However, with customers becoming more aware of green products and sustainability. This has influenced the change of behaviour, attitudes, and preferences on consumers' online shopping habits and demand for more sustainable products and services. However, e-commerce in developing countries like Kenya is faced with unsustainable production and consumption by use of natural resources, environmental impact, unemployment, unfair trade, and high cost of production.

Likewise, customers have a worrying trend at the back of their mind on online shopping risks, such as trust, privacy, and security issues, of their information being stolen or misused thus hindrances to the full realization of e-commerce in developing countries. Therefore, because of this gap, has propelled the author with the urge and motivation to undertake this study on how to integrate the environment, social, and economic dimensions with trust, privacy, and security issues as a mediating effect to enhance e-commerce sustainability with special attention to Kenya. The author perceives if e-commerce platforms would adopt more sustainable ways towards environmental, social, and economic dimensions and mitigation to online risks would lead to solving most of the world's challenging problems.

A thorough literature review has been conducted on the previous studies to identify the research gap hence leading to the development of a research model based on the literature and author' previous works. Primary data for the research was collected from Hungary and Kenya via a well-structured online consumer questionnaire survey. A total of 1060 responses were accepted as valid with 27 question items on the survey. The questionnaire adopts a 5-Likert scale of 1-strongly disagree, 2-disagree, 3-neutral, 4-agree, and 5-strongly agree. Therefore, asking consumers to respond to agree how much to disagree with the statement accordingly.

The survey formed a deductive quantitative cross-sectional approach, and significance tests are performed on partial correlation and ordinal regression to determine the relationship and influence between the independent, mediating effect on e-commerce sustainability. Also, an

interview was carried out on two companies forming the inductive qualitative approach and creating two case studies on well-structured interview questions from the company managers.

Therefore, mixed methods were used for this study. Besides, the R model was used to test the impact of the mediating effect on the independent and dependent variables independently and the proportion of influence on each other. Also, google scholar was used as secondary data for the literature and collecting the references and citations in this study.

Factor analysis was conducted to identify principal components and compress the 27 question items into 6 variables. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were performed to determine if the factor analysis was viable and acceptable. For the reason for testing homogeneity, respectively. Thus, the tests confirmed factor analysis was very essential and was applied. Cronbach's alpha and composite reliability tests were performed to test the validity and reliability of the measurement tools, and the tools were found to be reliable and valid.

Chi-square and non-parametric tests were performed on determining the degree of significance of the correlation model. While polytomous Universal Model (PLUM) was used to test the fitness of the ordinal regression model. Further, this research adopted Andrew Hayes, Baron and Kenny for the mediation process, to test the significance of the mediating effect on independent and dependent variables.

Based on the results, of the qualitative analysis in the case studies, noted that both companies are agreeing on the importance of sustainability. This is a result of the consumers become more aware of the advantages of sustainability hence demanding green products and services. E-commerce firms are required to produce high quality, eco-friendly products with environmental impact. Company X has thrived through in all the three dimensions of sustainability, in addition to the quality service dimension.

Whereas company Y has experienced major challenges since failed to implement a department that supports the sustainability strategies and policies in her e-commerce platform. This has a significant and positive impact on solving environmental pollution, social injustices, and economic dimensions for company X and not Y. Also, mitigation of the online risks such as trust, privacy, and security issues provided data protection for the consumers and retailers hence promoting e-commerce sustainability.

Similarly, quantitative analysis, correlation and regression tests indicated significant and positive influence between independent, mediating effects, and dependent variables. For the independent variables, integrating the environmental, social, and economic dimensions are very keys aspects of sustainability both to the retailers and consumers. This was noted through data collected via the questionnaire.

All the respondents expressed experiencing challenges that could be solved via e-commerce platforms if only adopt policies that support integration of the three dimensions to sustainability. Therefore, sustainable e-commerce is a digital environment platform that offers both retailers and customers empowerment economically, socially, and environmentally through taking the best possible trade-offs to win/win solution from the most world challenges. Such as pollution reduction, protection, and conservation of natural resources and biodiversity, employment, fair trade, equity, and equality among all stakeholders. Supports hypothesis H1.

Correspondingly, mitigating online risks on trust, privacy, and security issues in e-commerce sustainability enable growth of online shopping now and future in developing countries like Kenya. E-retailers must ensure security and privacy on consumers by subscribing to security certified features such as secure socket layer (SSL) certificate, use of hyper-text transfer protocol (HTTP), that scan for malware, for protection data from unauthorized access, use, alteration, or destruction and avoid financial loss of the online customers. Trust has been identified as the main moderator that makes consumers abandon shopping carts when buyers lack confidence in e-retailers' website. Therefore, e-retailers must guarantee and provide a secure environment for online transactions to take place, hence fostering sustainable e-commerce. This agreed with hypothesis H2.

R model was consistent with SPSS data analysing tool, and case studies. Supported by previous studies, that the results indicated a significant and positive connection how to integrate the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security issues on e-commerce sustainability to promote growth. Results of R model coefficients (indirect effects) for sustainability, show that trust and privacy were more favourable to social and economic dimensions while security ranked the environment best. Meaning that retailers and consumers will enjoy more benefits if trust and privacy are provided whereas protecting the environment as a measure of security.

Similarly, this study was able to find similarities or connections between ESE, MMF, and ESUS confirming a significant and positive linear relationship between the variables under study. As was cited in other similar previous studies (MCDUGALL-LEVESQUE, 2000). Thus, it will be consistent and for one to make conclusions that the aims and objectives of this study were achieved according to the expectations. All the hypotheses were accepted.

The integration of environmental, social, and economic dimensions with the mediating effect enhanced e-commerce sustainability. The results confirm significant and positive connection and linear relation between independent variable on mediating effect though at a moderate level. So, it a source of new insights for all business enterprises on an e-commerce platform to adopt sustainability strategies and policy implementations as a competitive advantage. E-retailers must monitor closely the dynamic and changing behaviours, attitudes, and preferences of online consumers towards sustainability and implementation. Supports hypothesis H3 direct.

All effects regarding the moderation and mediation were significant and the R-square values in the R model are indicating a proper model fit regarding the regressions on e-commerce sustainability. Privacy and Trust had the highest indirect influence on social factors and the effect of the environment is less on both mediators. Regarding the direct effects trust and privacy is key to consumers, the author can state that the role of trust is more important than that of privacy and security from this study.

This will not only enable to keep the current customers but will extend to acquiring new customers thus a large customer base. The implications being high sales, high profits, and minimal costs, attaining economies of scale. Besides, customers would enjoy the benefits of e-commerce, more so to green, eco-friendly products and environmental impact. Benefits of sustainable e-commerce are convenience, time, and money-saving, relaxed and efficient mode of online shopping. With secure e-commerce environment that offers data protection to both retailers and consumers will guarantee e-commerce growth and development, as well as a good experience, satisfaction, and loyalty in online customers in developing countries like Kenya now and in the future as was depicted in the results.

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List of abbreviations

EC – Electronic commerce, online shopping, e-retail, e-commerce, e-web, online store

B2C – Business to consumers

B2B – Business to Business

C2C – Consumer to Consumers

G2C – Government to Consumers

ICT – Information Communication Technology

USD – United States Dollars

CAGR – Compound Annual Growth Rate

GMV – Gross Merchandise Value

ROW – Rest of the World

GDP – Gross Domestic Product

MMF – Mediating Moderating Factor

ESUS – E-commerce Sustainability

ESE – environment, social, and economic.

Declaration

I, undersigned Nicodemus Mutinda Kitukutha 23/02/1988 declare under penalty of perjury and certify with my signature that the dissertation I submitted in order to obtain a doctoral (Ph.D.) degree is entirely my own work.

Furthermore, I declare the following:

- I examined the Code of the Károly Ihrig Doctoral School of Management and Business Administration and I acknowledge the points laid down in the code as mandatory.
- I handled the technical literature sources used in my dissertation fairly and I conformed to the provisions and stipulations related to the dissertation.
- I indicated the original source of other authors' unpublished thoughts and data in the reference section completely and correctly in consideration of the prevailing copyright protection rules.
- No dissertation which is fully or partly identical to the present dissertation was submitted to any other university or doctoral school to obtain a Ph.D. degree.

Debrecen, 2021

Nicodemus Mutinda Kitukutha

Name

Signature.....

Questionnaire

I kindly invite you to fill out a questionnaire to help me collect data on e-commerce and sustainability. The data collected will purely be used for academic work to fulfil my dissertation requirements on Ph.D. only. The researcher is undertaking an audience survey to evaluate the impact of sustainable e-commerce on businesses, both currently and in the future in online shopping (go green). The survey aims to determine the influence of security, privacy, and consumer trust issues on e-retailer’s websites on sustainability. To evaluate sustainability in terms of environmental, social, and economic aspects and how these three aspects are integrated. Policies that may strength sustainable e-commerce. The survey will only take 15minutes. Please give us your feedback. All responses will be treated with the confidentiality they deserve and require. A 5-point Likert scale will be used in this questionnaire. 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree.

=====

Informed consent as a respondent

I am willing to fill out a research questionnaire on “Integration of environmental, social, and economic dimensions in e-commerce sustainability” voluntarily. I answer all questions honestly and as they are according to my opinions and feelings.

.....2020

Online consumer questionnaire

1. What is your gender?

Male Female

2. What is your age bracket?

18-24 25-34 35-44 45-54 55-64
64 and over

3. What is your level of education?

Primary school High school College University
bachelor/BSc/BA Student Masters MSc/MA student Ph.D. degree

4. Which continent you are living in now or in the past 3 months?

Asia North America Europe South America Africa Australia

5. When was the last time you purchased a product or a service online?

Last month Last 3 months Last 6 months Last than 1 year More than 1 year

6 To what extent would you rate online shopping compared to other forms of shopping?

Least convenient Less Convenient Average Convenient Very convenient

7 To what extent are you satisfied with your online shopping experience?

Very dissatisfied Dissatisfied Neither Satisfied Very satisfied

8 To what extent are you willing to participate in e-commerce sustainability activities (campaigning for green and health products)?

Never Not willing Neutral Willing Very much willing

9 To what extent are you satisfied with the after-sale support services (delivery, queries, and complaints) offered by e-commerce companies?

Very dissatisfied Dissatisfied Neither Satisfied Very satisfied

10 To what extent do you agree online shopping has improved e-commerce sustainability?

Strongly disagree Disagree Neutral Agree Strongly agree

11 To what extent do you agree the following factors are the reasons for your online shopping?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Saves money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saves time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shopping at comfort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varieties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timely delivery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12 How often do you use the internet for the following purpose?

	Never	once	Occasionally	Almost every time	Every time
Search product information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surfing (e.g., read news/articles)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicate (Facebook,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researching on academic work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet shopping (online shopping)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13 To what extent do you consider trust factors as important when making online purchases?

	Not important	Slightly important	Fairly important	Important	Very important
Price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Payment system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Genuine website	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free cybercrime/theft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eco-friendly products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14 How likely will you recommend the following people to online shopping as they trust you?

	Not very likely	Unlikely	Somewhat likely	Likely	Very likely
Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Friends

Relatives

15 To what level do you agree: online shopping provides privacy on consumer personal information?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Website	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User friendly interface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Payment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guarantee safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Credit card information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16 How do you make payments when doing online shopping?

Credit card Cash on delivery PayPal Bank transfer Mobile money

17 To what extent do you agree the following areas require improvement for e-commerce sustainability on privacy?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Client data protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Website security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Policy to compensate client if a data protection breach before use of client information seek permission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18 Which features do you value when visiting an e-commerce website and consider to be genuine to guarantee your security?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Company profile & brand identity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security certified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Customer service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detailed product information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Large selection of products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Terms and conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost and time of delivery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection of privacy of information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ability to track your shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Website encryption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. To what level do you agree that the following factors hinder environmental sustainability in e-commerce?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Higher consumption of resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased transportation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More packaging wastes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interference of biodiversity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High use of energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. To what level do you agree the following factors contribute to the solutions of environmental sustainability in e-commerce?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Optimization and consumption of resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To reduce carbon emissions and footprints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alternative transport with less pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of recyclable materials to minimize waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection and conservation of the environment and natural resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of renewable energy instead	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. To what level do you agree sustainable e-commerce can be a better solution for the environmental dimension problems on e-commerce sustainability?

Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Neutral	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
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22. To what level do you agree that the following factors hinder e-commerce social sustainability?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Unemployment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

High poverty and diseases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High consumption of goods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High commute to buy goods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. To what level do you agree the following factors contribute to the solutions of e-commerce social sustainability?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Create more jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gender equality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better working conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good health and reduction of poverty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To have better health and living standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. To what level do you agree: social aspects (better health and working conditions) can be improved by undertaking sustainable e-commerce?

Strongly disagree	<input type="checkbox"/>	Disagree	<input type="checkbox"/>	Neutral	<input type="checkbox"/>	Agree	<input type="checkbox"/>	Strongly agree	<input type="checkbox"/>
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25. To what level do you agree that the following factors hinder economic e-commerce sustainability?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
High use of energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High cost of production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High cost of goods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low demand of products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low profits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. To what level do you agree the following factors contribute to the solution of e-commerce economic sustainability?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
High efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lower maintenance cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Productivity increase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trade balance improved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Profitability increase

27. To what level do you agree sustainable e-commerce can be a better solution for the economic dimension of e-commerce sustainability?

Strongly disagree Disagree Neutral Agree Strongly agree

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Thank you note.

I appreciate much your valuable time in fulfilling my questionnaire, God bless you.

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I love you so much.

Debrecen,

Nicodemus Mutinda Kitukutha

Certificate of publications



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List of publications related to the dissertation

Articles, studies (4)

1. Oláh, J., Aburumman, N. M. A., Popp, J., Asif, K. M., Haddad, H., **Kitukutha, N. M.**: Impact of Industry 4.0 on environmental sustainability. *Sustainability*. 12 (1), 2020. ISSN: 2071-1050.
DOI: <http://dx.doi.org/10.3390/su12114674>
IF: 2.576 (2019)
2. **Kitukutha, N. M.**, Widyatama, R.: Impact of TV media on e-commerce growth and performance in developing countries. *Selye e-studies*. 11 (1), 42-54, 2020. EISSN: 1338-1598.
3. Oláh, J., **Kitukutha, N. M.**, Haddad, H., Pakurár, M., Máté, D., Popp, J.: Achieving Sustainable E-Commerce in Environmental, Social and Economic Dimensions by Taking Possible Trade-Offs. *Sustainability*. 11 (1), 1-22, 2019. ISSN: 2071-1050.
DOI: <http://dx.doi.org/10.3390/su11010089>
IF: 2.576
4. **Kitukutha, N. M.**, Oláh, J.: Trust and e-commerce, case study on Jumia Company. *The Annals of the University of Oradea, Economic Sciences*. 27 (1), 313-323, 2018. ISSN: 1222-569X.

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