

**THESIS OF THE DOCTORAL (Ph.D.) DISSERTATION**

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

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## **1. INTRODUCTION, RESEARCH OBJECTIVES AND HYPOTHESES**

In the past three decades, electronic commerce (e-commerce) has grown steadily and exponentially hence changing how business are contacted businesses across the globe. This has been enabled by Information Technology Communication advancement (ICT). TÄUSCHER-LAUDIEN (2018) defined e-commerce as a marketplace that adds value addition to the supply chain and enabling digital environment for online shopping. Most of the big and successful firms in the world are involved in e-commerce platforms. DUCH-BROWN ET AL. (2017) in his studies stated companies have strategized and concentrated on enormous advantages in e-commerce. REINARTZ ET AL. (2019) cited that internet and e-commerce have enabled globalization and digitalization hence the way to go for competitive advantage.

E-commerce benefits include cross border trading, breaking the geographical barriers, distance, imports, and export tariffs. Now anyone can sell or buy goods and services via the e-commerce platform internationally despite location of the customer (DENG-WANG, 2016). E-commerce operates with no timeline. One can shop online 24 hours a day, 7 days a week. Therefore, allowing consumers to do online shopping at a convenient time. Whether at home, in a car, or an office without interrupting normal duties. Similarly, business organizations, are tapping into the various advantages of the internet to sell, distribute, and advertise through their social network page to reach a larger market share. Simultaneously, keeping up updated with dynamic and changing behaviours, attitudes, and preferences of customers. Due to numerous benefits in e-commerce will continue grow day by day.

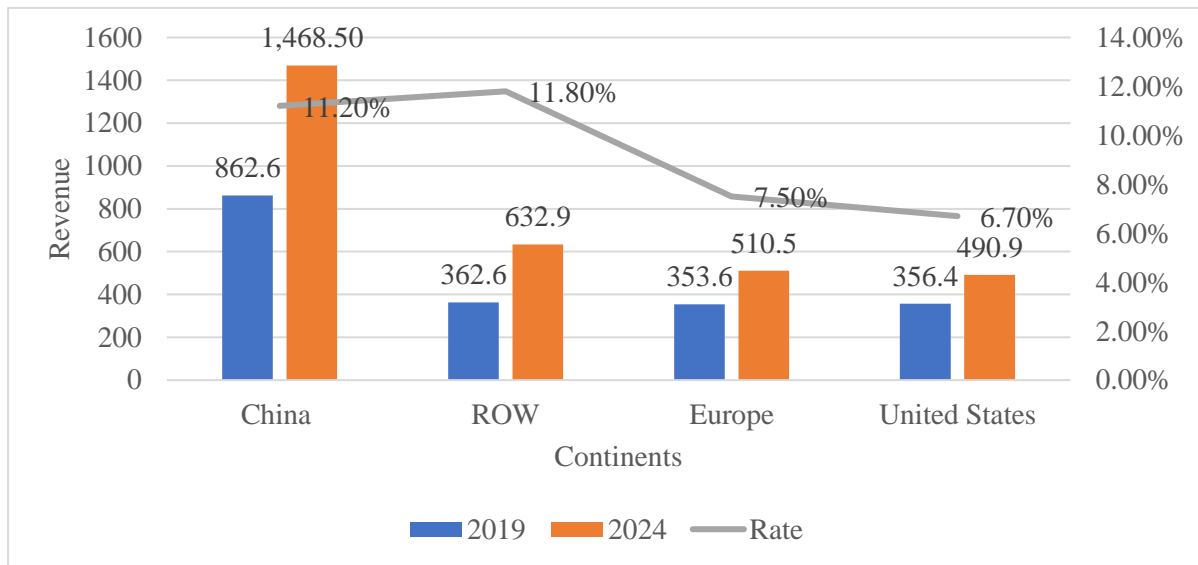
This study intends to investigate, how to integrate environmental, social, and economic dimensions and mitigation of e-commerce risks issues; trust, privacy, and security to enhance e-commerce sustainability. Sustainability offers firms competitive advantage and remain in business for the long-term while making a profit with less cost for businesses. IGWE (2014) pointed 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. FRISHAMMAR EL AL. (2018) mentioned that e-commerce can be a good platform that can enhance sustainability and solve above problems. JUN-JAAFAR (2011) mention that trust influences online consumer shopping behaviour to purchase, re-purchase. DENG-WANG (2016) indicated besides trust, data protection promotes e-commerce sustainability through privacy and security enhancement. The following studies stated that the above challenges can be solved through e-

commerce and numerous benefits can be enjoyed by firms, consumers and society at large when three dimensions of sustainability are integrated and mitigation of e-commerce risks (RAHI ET AL. 2017; ABOOBUCKER-BAO, 2018).

E-commerce has emerged globally. Statistics show that e-commerce is experienced in almost every country. The United States is one of the country's 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 western part to east Asia. Also, in Europe, Germany, United Kingdom, and France follow suit too. Africa is not left behind; South Africa is leading followed by Nigeria and Kenya.

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 2019-2024 U.S. is 6.7%, Europe 7.5%, China 11.2%, and the rest of the world (ROW) 11.8% respectively. China, U.S., and Europe are estimated to be US \$1.48 trillion, US\$495.8 billion, and US\$373.5 billion, respectively 2024 compared to the year 2019. The Middle East and Africa following closely with US\$ 355.6 billion but are expected to double, with an increase of internet connection and penetration due to cheaper mobile phones from China in the year 2020. The total outlook of e-commerce forecast in 2020 total sales of US\$ 6.05 trillion, with more than 249600 companies involved in e-commerce and expected to either double or triple turnover of the same by 2024 (Statistics 2020). Especially with coronaviruses restrictions by the governments and WHO to contain the spread. Now 90% of the sales 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 below shows e-commerce revenue growth and forecasts for 2019-2024.

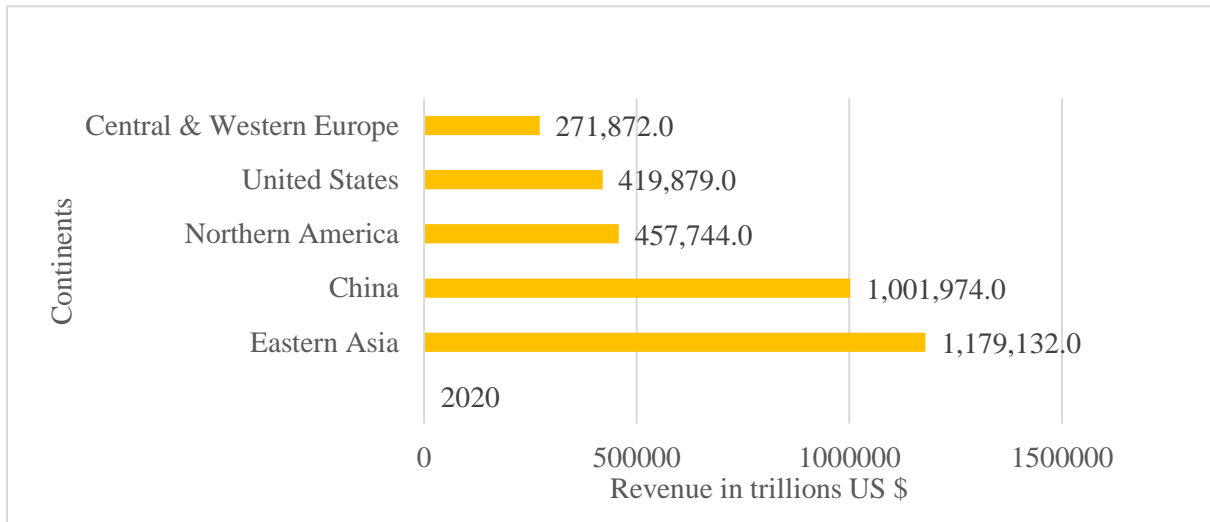
**Table 1: Total e-commerce revenue forecast in US \$ billions**



*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 the mortar and brick shopping is brought about by the various benefits of e-commerce, as there is a high awareness of online shopping. Ability to do a price comparison in different e-shops or webs like Amazon, eBay, AliExpress, among others. Also, e-commerce was influenced and multiplied by the impact and restrictions by different governments to combat coronavirus spread (2020) giving even high sales online shopping. Taking e-commerce to another level that will outstand most of the industries for nearly a decade. The e-commerce platform is also seen as a valuable sales channel boosting retail sales worldwide. Other businesses should follow to experience growth and competitive advantage. This is also influenced by social media; many companies are creating a page for their online consumers. In the 2024 e-commerce growth forecast between continents, predicts move from western to Asia markets, China being the most beneficiary of this since about to 95% of revenue is generated from the e-commerce platform. Followed by the Middle East, and Africa, the U.S., Europe, and the remainder of the world. Table 2 below depicts the revenue growth projections of different continents of 2024 in US dollars.

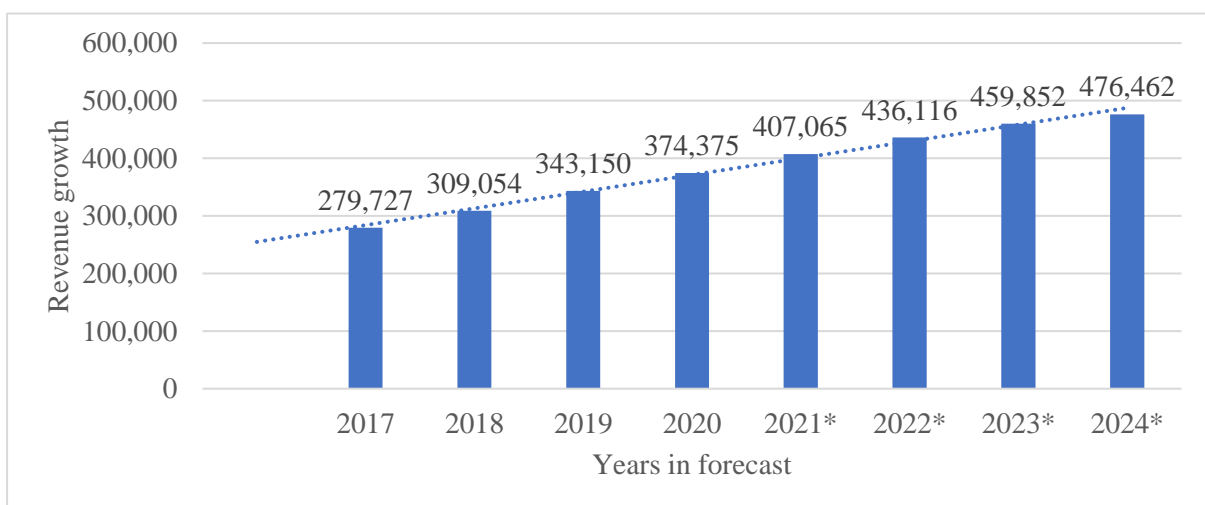
**Table 2: Revenue growth projections of different continents of 2024 in US dollars**



Source: Statista.com and author editing (2021)

The Middle East and Africa have shown growth in e-commerce over the recent years, South Africa, Nigeria, and Kenya, respectively. 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 below shows the projections of e-commerce growth sales in Kenya 2017-2024 (in million U.S. dollars).

**Table 3: Kenya retail e-commerce 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 the coronaviruses will boost the growth of e-commerce and surpass other industries. This is because of digital transformation that 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 to keep the sparing growth of e-commerce. Consumers have grown their consciousness towards the green environment and sustainable products. Therefore, the demand for sustainably sourced, produced, and packaged with recyclable or re-use materials, products are more inclined to by online customers.

This gives online companies a competitive advantage by producing higher-quality products thus identifying a niche market. As consumer behaviours and purchasing, intentions are currently pegged on integrated sustainability dimensions in environmental, social, and economic aspects. Thus, studies show retailers and consumers perceive sustainability as a major benefiting factor to win/win solutions for all stakeholders for the long-term.

It is with no doubt, the evidence and impact of e-commerce have been felt in every country. Continuous innovation and advancement of ICT has transformed business operations. Such as retailers, consumers, businesses to a green and digital environment. Through innovations, artificial intelligence, and big data analytic have enabled and spurred the growth and development of e-commerce globally. Therefore, everyone is engaging e-commerce for a competitive advantage including cost reduction, fast delivery of goods, improved productivity, availability range of products, and a large customer base.

However, consumers are becoming more aware of the importance of green products hence asking for more sustainable ways in consumption and production. However, despite the growth of e-commerce, consumers in developing countries are still faced with trust, privacy, and security risks. Therefore, a high concern on how online sellers can avert such risks and assure their customers secure online environment. Likewise, the world is faced with most problems of high pollution, unfair business practices, and unemployment, in environmental, social, and economic dimensions. After a careful and thorough study of literature review, no combined research on how to integrate environmental, social, and economic dimensions and mitigation of online risks such as trust, privacy, and security to achieve sustainable e-commerce, thus, led to the research gap this study.

## **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 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 risks issues such as 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.

## 2. METHODOLOGY

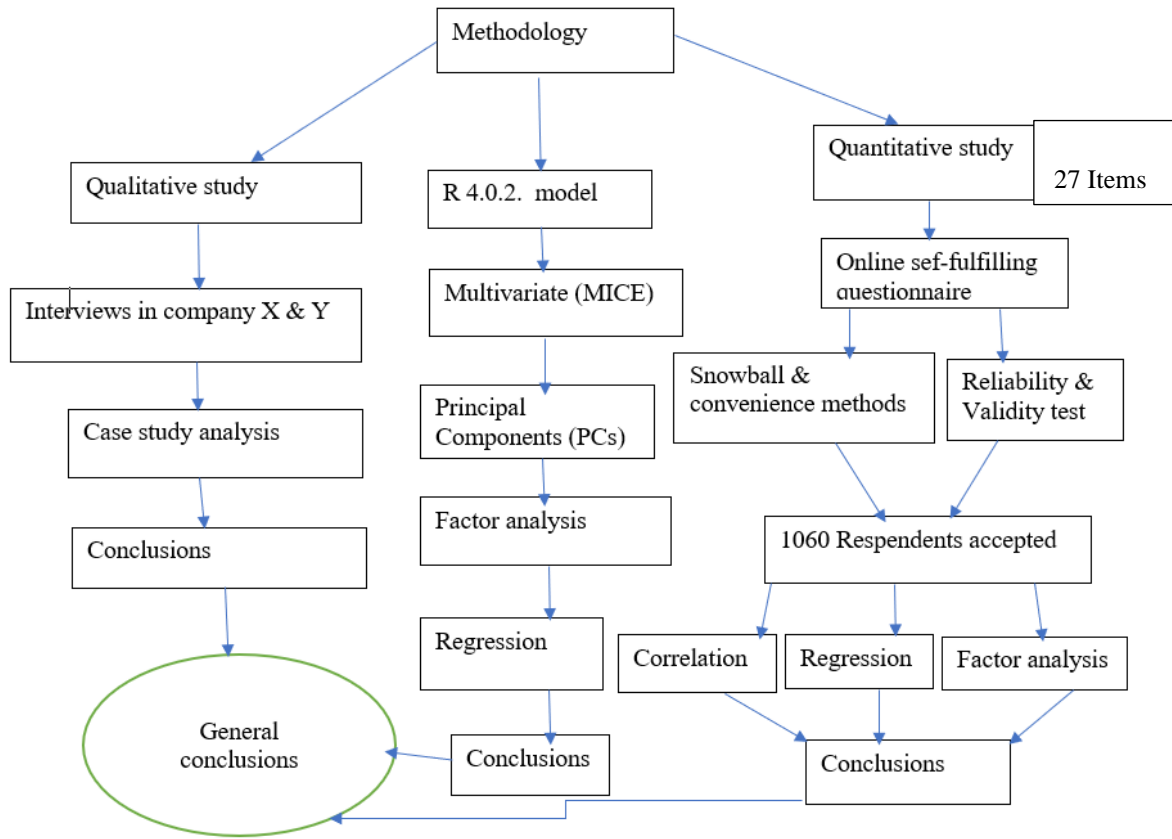
This research adopted a cross-sectional time horizon, survey questionnaire in quantitative analysis and case study interviews for qualitative strategies, mixed simple method approach. MANDY-ARCHIBALD (2015) noted that mixed methods accord the research all the opportunities to be able to explore, examine, and investigate independent, dependent, moderator, and mediating variables to give a broader perspective with a better understanding. This study examines relationships between independent variables; environmental, social, and economic dimensions with the mediating effect of trust, privacy, and security on the e-commerce sustainability as dependent variable.

A deductive approach in quantitative research is applied starting from theories, collecting, and analysing data to respond to the hypotheses hence from general to specific perspective. The research employed statistical package for social sciences (SPSS) that was developed by IBM and Microsoft excel to analyse the data. The reason for choosing to use the program is the fact that is most used statistical data software program in quantitative data analysing. Also, is easily used and convertible with Microsoft excel.

Reliability and validity tests were conducted to verify if the data instrument tool used was reliable. Cronbach's Alpha is used to test reliability and validity. Factor analysis was used to compress many item questions to principal compound 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.

Inductive approach in qualitative study is necessary when one wants to discover individual perspectives, observations to theories hence from specific to general dimension. Multiple case studies are regularly stronger and more convincing since it has 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 hence was used. 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. Besides, R model is performed to analyse the independent, mediating, and dependent variables independently and determine their influence on each other. 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 1 below shows a methodology flowchart on data collection.

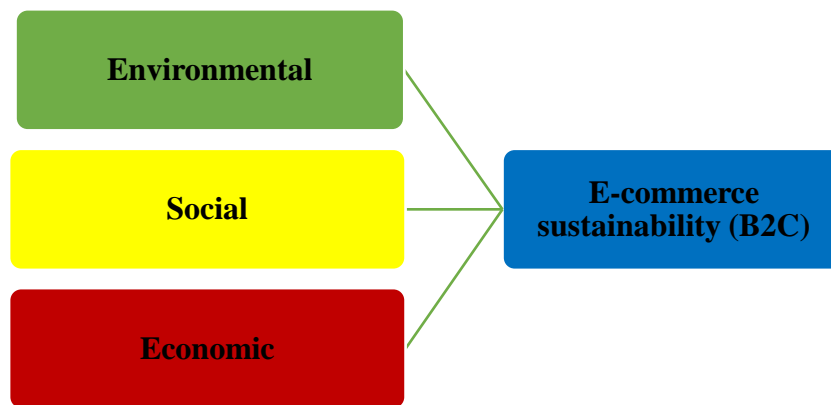


**Figure 1: Methodology flowchart for data collection**

*Source: Author' research (2021)*

### 3. SCIENTIFIC FINDINGS

The dependent variable is the goal of the research that the author 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 issues, such as trust, privacy, and security on e-commerce platforms. This research developed conceptional framework of integrating environmental, social, and economic dimensions, to e-commerce sustainability on a B2C business model. Thus, a model seeking how to balance three dimensions to e-commerce sustainability is shown in Figure 2: Independent and dependent variables on sustainability.



**Figure 2: Independent and dependent variables on sustainability**

*Source: Author' research (2021)*

Sustainability can be attained in three; environmental, social, and economic dimensions. Therefore, long-term goals can be achieved for the companies to attain efficiency and effectiveness and realize growth, cost savings, profits, and investment more in research and development activities towards green and sustainability. Thus, firms become economically viable and attractive to consumers. Social dimensions offer the society better standards of living, jobs, education, and equal opportunities. Likewise, will support the environment in terms of better use of natural resources, pollution reduction, and biodiversity conservation. When sustainability is prioritized it is not only achieved but make world better place to be.

Integration of environmental, social, and economic dimensions and e-commerce sustainability can be achieved through taking possible trade-offs benefits. For example, between social-

economic aspects better business ethics, fair trade, and high workers benefits are realized. Thus, employees and consumers will enjoy green products and services at a fair price. The companies will enjoy cost savings in terms of production cost and minimum waste. Social-environmental conservation policies, environmental justice, and global stewardship. So, society will be more aware of the need to protect the environment and ensure the regeneration of natural resources. Environmental-economic will result into more energy efficiency, use of renewable fuels, subsidized incentives, and green technology. Sustainability in e-commerce and taking possible trade-offs in the triple bottom line will offer a win/win solution. Figure 3: show the impact of sustainability on ESE dimensions and trade-offs.



**Figure 3: The impact of sustainability on ESE dimensions and trade-offs**

*Source: Author' research (2021)*

The results confirmed that computing the partial correlation on environment, social, and economic (ESES) dimensions while holding the control factors constant reveal that the constructs were significantly and positively correlated among each other at a 95% confidence level. The results of the test are as follows;  $r_{ESE, MMF} = .785$ ,  $r_{ESE, ESUS} = .673$ ,  $r_{MMF, ESUS} = .716$ .

The test between independent (ESE ) and mediating effect (MMF) indicated to have a strong positive association value .785. and  $r_{MMF, ESUS} = .716$  while  $r_{ESE, ESUS} = .673$  moderate association  $r_{ESE, ESUS} = .673$ . 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, accepting all the 3 hypotheses of the three constructs confirmed significant and positively correlated. Spearman’s partial correlation value +1 shows 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 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. Table 4 below show spearman’s non-parametric partial correlation.

**Table 4: Spearman’s non-parametric partial correlation analysis**

<b>Control factors</b>			<b>ESE-mean</b>	<b>MMF-mean</b>	<b>ESUS-mean</b>
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)

Similarly, Spearman's spatial autocorrelation parametric emphasize the importance of mediation process. Give more advantages and a better understanding than Spearman's non-parametric partial correlation analysis. It was noted that using Spearman's spatial autocorrelation without the mediation process would reduce 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, including mediating variable factors increased the strength and relationship between the independent and dependent variables. Figure 4 below show spearman's spatial autocorrelation variables without control factors. The reduction effect on the independent and dependent variables without and with mediating factors categorized as direct and indirect, respectively.

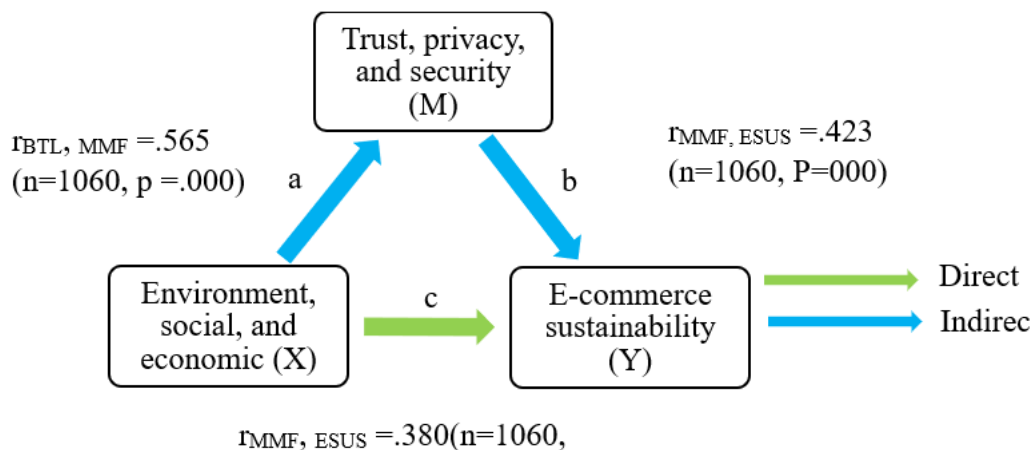


Figure 4: Spearman's spatial autocorrelation variables without control factors

Source: Author' research (2021)

Likewise, parameters estimate for H1, ordinal regression was performed. The output results showing the impact by use of parameter estimates for H1 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 to influence e-commerce sustainability. Hence accepting the hypothesis H1 confirmed to have a strong association and relations between independent and mediating variables, significantly with sig. 000. At the significance level of  $p\text{-value} = .000 < \alpha = .05$  of all ESE and MMF are confirmed. Table 5 below show the parameter estimates for H1, ordinal regression.

**Table 5: 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 <sup>a</sup>					5.728	15.422
Link function: Logit.								
a. This parameter is set to zero because it is redundant.								

*Source: Author' research (2021)*

Also, there was a high association influenced by the mediating factor between ESE and MMF variables. Portraying similar characteristics as 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, of which is confirmed to be high.

Furthermore, this research also performed 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. On a significance level of p-value  $.000 < \alpha = .05$  for mediating effect implying positive and significant interaction on ESUS. These results are illustrated in Table 6 parameter estimates for H2, ordinal regression.

**Table 6: 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
	[MMF-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 <sup>a</sup>	.	.	0	.	.	.
Link function: Logit.							
a. This parameter is set to zero because it is redundant.							

*Source: Author' research (2021)*

Table 7 show 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 7: Correlation analysis on independent, mediating, and dependent variables**

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

*Source: Author' research (2021)*

### **Hypothesis regression analysis on independent, mediating, and dependent variables**

Table 8 show a regression model analysis on the 3 hypotheses, indicating all the hypotheses are accepted with the interpretation of strong regression, beta and R-square values that have a significant and positive impact on e-commerce sustainability.

**Table 8: Hypothesis regression analysis on independent, mediating, and dependent**

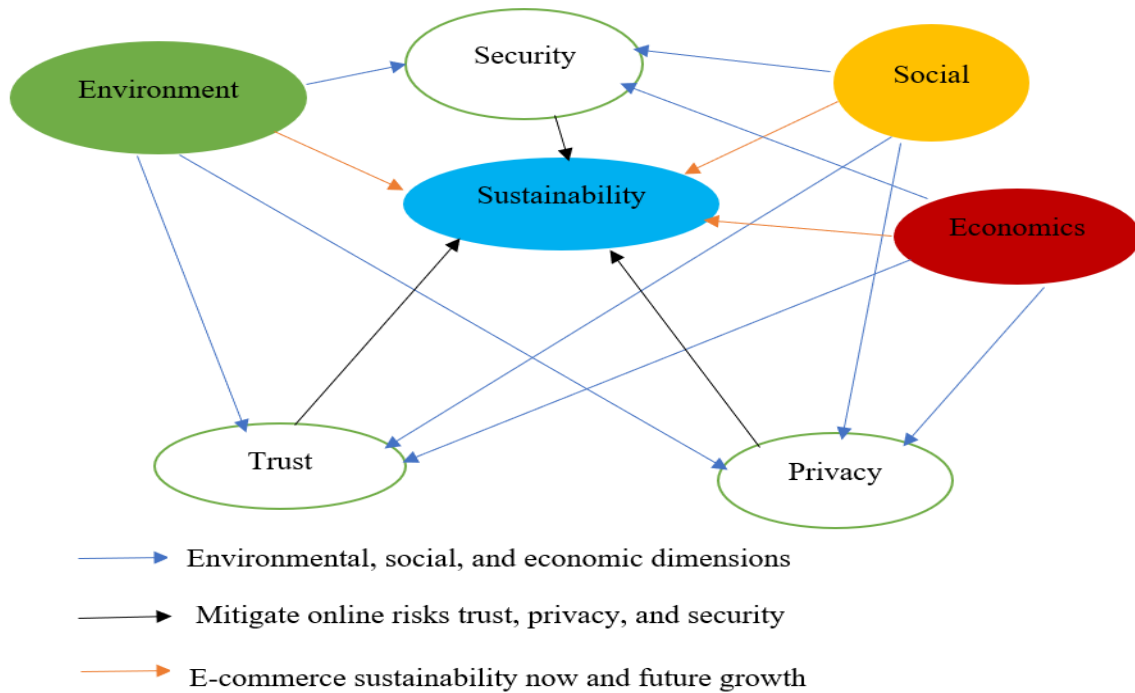
<b>Hypothesis</b>	<b>Regression</b>	<b>Beta</b>	<b>R-square</b>	<b>Significant</b>	<b>Results</b>	<b>Interpretation</b>
<b>H<sub>1</sub></b>	ESE-ESUS	<b>0.778</b>	<b>0.606</b>	0.000	Accepted	Strong
<b>H<sub>2</sub></b>	MMF-ESUS	<b>0.769</b>	<b>0.592</b>	0.000	Accepted	Strong
<b>H<sub>3</sub></b>	ESE-ESUS	<b>0.824</b>	<b>0.680</b>	0.000	Accepted	Strong

*Source: Author' research (2021)*

In conclusion, there is 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.

Besides the statistical package social science and case study, R 4.0.2. statistical software (R Core Team, 2020) was used. Using the data collected from interviews to determine the connection and relations between the environmental, social, and economic dimensions. To mitigate online risks issues; trust, privacy, and security on e-commerce sustainability influence each other independently. The truth is that 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) psych package was applied. The independent variables (social, environmental, and economic), mediating factors (trust, security, privacy), and their relationship with each other on e-commerce sustainability. In each variable, a principal component was made to reduce the information. In every reduction over 70% of the variance was being 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 applied bootstrap simulation to calculate the Confidence intervals and p-values of the parameter estimations. Also, 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. Figure 5 show Mediating path regression model for 6 Principal Component variables



**Figure 2: Mediating path regression model for 6 Principal Component variables**

*Source: Author' research (2021)*

Using the R model, the author performed a test on the direct effects of the 6 variables on sustainability. Trust, privacy, and security each of the independent dimensions but separately. The results R-square value of 0.817, 0.636, 0.549, and 0.332, respectively. This is to determine the influence of the direct effects on each of the variables independently. It means sustainability is ranked first by all the variables, to be positive and significant variable confirming the same as in qualitative and quantitative results. followed by trust, privacy, and security. This is how can retailers and customers prioritize ranking to ensure sustainable e-commerce. Table 9 model coefficients (direct effects) for sustainability on trust, privacy, and security with all dimensions.

**Table 9: Model coefficients (direct effects) for sustainability, trust, privacy, and security**

Factor	Estimate	Std Error	t-value	p-value	R-square
<i>Effect on sustainability</i>					<b>0.817</b>
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	7.029	<0.001	
Security	0.028	0.009	3	0.003	
<b><i>Effect on trust</i></b>					<b>0.636</b>
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	
<b><i>Effect on privacy</i></b>					<b>0.549</b>
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	
<b><i>Effect on security</i></b>					<b>0.332</b>
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 environmental, social, and economic dimensions. Regarding the direct effects of Trust and Privacy, it can be stated that the role of trust is more important than that 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, privacy, and security on the three independent dimensions. Table 10 show the summary of the direct and indirect model effects and the proportion mediated.

**Table 8: Summary of the direct and indirect model effects and the proportion mediated**

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

*Source: Author' research (2021)*

The environmental, social, and economic dimensions have significant influence on e-commerce sustainability. The interaction effect was even meaningful. Regarding the mediators on direct effect (.426, .204 and .299) on the economic, social, and environment, was low compared to indirect effect through a trust that has the highest (.837, .278, .887) respectively, meaning with mediating effect e-commerce sustainability can be more achieved. While the proportion mediation effect highest was (42.8%, 33.6%, and 25.7%) on 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 19 above. The of proportion independent variables is low without mediating interaction (29.3%, 21.3%, and 18.1%) was in the relation to the environment, social and economic on e-commerce sustainability, respectively. However, when it came to the interaction of security only environment had a positive and significant influence on e-commerce sustainability. In conclusion, all independent

and mediating effect showing a positive and significant influence on e-commerce sustainability. Thereby accepting all the hypotheses.

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 11 show the distribution of variable influence (%) concerning indirect and direct effects on trust, privacy, and security as a mediating effect.

**Table 11: Distribution of variable influences (%) regarding indirect and direct effects**

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

*Source: Author' research (2021)*

Regarding indirect effects, 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 environment, social and economy 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 social dimension 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.

#### **4. CONCLUSIONS AND RECOMMENDATIONS**

Theoretical and practical implications

On 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 research has gained much attention in the current world due to its theoretical and practical interest use of the internet and transforming businesses into a digital environment. However, most research missed the opportunity to study how to make e-commerce can become more sustainable with the various three constructs in this research. After deep study of the literature review, most research were done based on a case study and using descriptive statistics only. In this context, e-commerce platform, and its sustainability on the three-bottom line. Answering hypotheses of this study, it 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 trust, privacy, and security on e-commerce sustainability now and future growth.

By investigating this topic there is new knowledge onto existing literature. As to past studies were done on single dimension in separate manner while in this study a combination of the three constructs was performed. This is carried out by following the recommendation of other studies such as DAN ET AL. (2006) and PERKINS (2015) who studied connection between the ESE variables on tourism and education online. His further research mention sustainability of e-commerce can be done in 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. New knowledge in the literature and the overall had the impact of a positive 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 that there is no similar research has been published in connections explicitly on the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability. This study, open new avenues for further research that can be conducted on new emerging and related areas with connections to the internet, e-commerce, and sustainability on areas such as Industry 4.0 in manufacturing industries, internet of things, artificial intelligence, big data analytics, circular and bioeconomy on relation to e-commerce. This will outline the importance and better understanding use of e-commerce platforms in more sustainable ways to guarantee the co-existence of the business organizations and society in harmony without the depletion of natural resources. Likewise, a conducive environment to stay, work, and live-in practical implications.

The theoretical implication using the case study for the two companies. Company Y recognize the importance of sustainability but do not implement in its strategies? Which is a shortcoming for many companies that are in the e-commerce platform. 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 that has synchronized, aligned with sustainability strategies in its core values. By the fact that, show care to her customers by producing green sustainable products. Also, constant open communication to customers have yielded fruits hence more sales with a large customer base countrywide. Therefore, lesson to other companies that are on the e-commerce platform, should align their core values with sustainability policies and implement to them later.

Equally was evident to the quantitative approach, leading diverse statistical tests contributes to theoretical and empirical proof that the results depicted on a positive relationship from integrate the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security. Thus, e-commerce sustainability now and future growth. Enhancing customer satisfaction and loyalty in the e-commerce platform. This adds new knowledge and understanding of how important to monitor changing behaviours and attitudes of online customers (ILIEVA ET AL, 2002).

In addition, results from R model, are helpful to all stakeholders' online businesses and customers to work in collaborations and in partnerships to support sustainable strategies and policies. The constructs benefit much more on testing each dimension independently. But, cross analyzation between independent, mediating effects, and dependent variables was very important. It indicated that the mediating effects has more impact indirect than a direct relation at .678 and .322, respectively. The results in R model and quantitative agree with the previous studies that mediating effects is of great significance to achieve sustainable e-commerce platforms (WASSERSTEIN, 2016; EVIDENCE, 2010). Mediating and mitigation of online risks are important to both the retailers and customers. By applying privacy, security measures that guaranteed data protection, 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 hence reducing related risks and leads to e-commerce growth and sustainability.

The results in integrating the environmental, social, and economic dimensions indicated significant and positive influence on e-commerce sustainability. Of which can be achieved by taking trade-offs between the dimensions. This was similar to the study of MOORE (2014) that emphasized protecting and conserving the environment provides a clean environment to the society hence health life's. Also, e-commerce gives an enabling environment economically on cost reduction and maximize profits, thus, providing green products to the customer at a cheaper price. Besides, e-commerce allows people to do sustainable business and earn income hence better living standards (LEONTITSIS-PAGGE, 2007). Therefore, by integrating the three dimensions of sustainability, benefits all the stakeholders involved in a win/win solution and solving most world challenges (TAVAKOL-DENNICK, 2011).

From previous studies we found out that online risks' having been the 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 secure environment for online transactions. TRIZANO ET AL. (2016) stated build trust in the minds of customers and data protection increases urge of online shopping. Therefore, this study gives out a clear direction on how e-retailers can ensure data protection on privacy and security. Consequently, contributes new findings to the scientific knowledge. However, this study paid more attention to end-users and not businesses. To be precise was confined to business to customers (B2C) sustainability, but not other business models such as B2B model.

## **Limitations and directions for further research**

Like other previous studies in social business and science, 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 could have been subjected to these limitations. In quantitative and qualitative techniques, predominantly identified the study sample that might not be adequate representative of all online shopping customers using an e-commerce platform. Also, this study chosen convenience and purposive sampling. As a result, the representativeness of the sample was diminished. A few presumptions of measurable statistical tests could not be met as could have be with a random sample. It could be also 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 B2C model probably it would have been more beneficial to include other models of e-commerce such as B2B, G2C, and C2C. Similarly, choosing well-known companies in case studies would have given a better picture. For example, eBay, Amazon, or AliExpress among other online platform retailers, other than companies X and Y which are only known in Kenya. This would give 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. Only consumer survey was used but also company questionnaire could have shed more insight. The shortcoming of the questionnaire sometimes cannot be avoided completely. Since different respondents might not have in-depth understanding of the research topic, misinterpreting the questions otherwise. In addition, other research design and strategy such as longitudinal would have been used. Thus, would reduce the limitation of time-specific contributing to better results, thus more stable analysis with the better interpretation would have been reached.

Moreover, the absence of a customized instrument of measurement tool and the exclusion of control factors could be termed as a limitation. While performing relation to environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability now and future growth could have influenced by other dimensions, hence giving different results.

Ultimately, this study is restricted to investigations in connection, relation between environmental, social, and economic dimensions and mitigate online risks trust, privacy, and

security on e-commerce sustainability and growth. Maybe could have given better results if the scope were extended to Africa and Europe instead of Kenya and Hungary. Literature review established, there are additional factors related to e-commerce sustainability. For example, the use of circular and bioeconomy to apply the 3Rs re-use, recycle, and more efficient energy use would be promising to be investigated. Besides, Industry 4.0., the internet of things, big data analytics, and artificial intelligence among many other emerging topics that support sustainable e-commerce sustainability platform should be carried out on 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 has no negative health risks, pollution reduction and cost reduction to increase e-commerce sustainability in future.

In terms of online risk issues such as trust, privacy and security are major concerns to online customers. But this study found out 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 e-retailer's websites that will create confidence and promoting e-commerce growth. The study was majorly tested on how to integrate the environmental, social, and economic dimensions and mitigate online risks trust, privacy, and security on e-commerce sustainability to online retailers and customers, B2C segment. Other studies may be conducted on B2B, C2C using the same framework model and dimensions, should be tested and find out the results will reach the same conclusions as in this thesis.

Similarly, only case study was 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 it would have more impact on online customers from e-commerce platforms across the globe. Besides, further research can apply a longitudinal approach that eliminates the issue of time specific. Since most of the previous studies used a cross-sectional approach, that has a limitation on time specific.

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.

Additionally, 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.

## 6. 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 risks issues such as 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 realized 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 risk issues, such as trust, privacy, and security. That their information being stolen or misused thus hindrances to the full realization of e-commerce in developing countries. Therefore, because of this gap, this has propelled the author with the urge and motivation to undertake this study on how to integrate the environment, social, and economic dimensions, and mitigation of online risk issues on trust, privacy, and security. As a mediating effect to enhance e-commerce sustainability, Kenya. The author perceives if e-commerce platforms would adopt more sustainable ways towards environmental, social, and economic dimensions and mitigation to online risk issues 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. So, 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. Also, for the reason of 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. 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, the qualitative analysis in the case studies, noted that both companies are agreeing on the importance of sustainability. This is as result of the consumers become more aware of the benefits of sustainability. Henceforth, 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 as it failed to implement a department that supports the sustainability strategies and policies in her e-commerce platform. This had a significant and negative impact on solving environmental pollution, social injustices, and economic dimensions for company X. Also, mitigation of the online risk issues such as trust, privacy, and security provided data protection for the consumers and retailers thus 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 policies that support integration of the three dimensions to sustainability are adopted. Therefore, sustainable e-commerce is a digital environment platform that offers both retailers and customers empowerment economically, socially, and environmentally. By 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, hypothesis H1 Supported.

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), for data protection from unauthorized access, use, alteration. Therefore, 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. By this will foster sustainable e-commerce and hypothesis H2 is supported.

R model was consistent with SPSS data analysing tool, and case studies. Supported by previous studies. 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 Supports hypothesis H3 directly.

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 factor. The effect security on the environment was moderate. Regarding the direct effects trust and privacy is key to consumers. However, the author cannot state that the role of trust is more important than that of privacy and security from this study.

By mitigating online risk issues 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. Move to green, eco-friendly products and have a positive environmental impact. Benefits of sustainable e-commerce are convenience, time, and money-saving, relaxed and efficient mode of online shopping. With secure e-commerce online payment environment that offer data protection to both retailers and consumers will guarantee e-commerce growth and development. As well as a good experience, satisfaction, and loyalty to online customers in developing countries like Kenya now and in the future as was depicted in the results.

## 7. REFERENCES

- ABOBUCKER, I., & BAO, Y. (2018). What obstruct customer acceptance of internet banking? Security and privacy, risk, trust and website usability and the role of moderators. *Journal of High Technology Management Research*, 29(1), 109–123. <https://doi.org/10.1016/j.hitech.2018.04.010>
- BLOME, C., & SCHOENHERR, T. (2011). Supply chain risk management in financial crises - A multiple case-study approach. *International Journal of Production Economics*, 134(1), 43–57. <https://doi.org/10.1016/j.ijpe.2011.01.002>
- DENG, Z., & WANG, Z. (2016). Early-mover advantages at cross-border business-to-business e-commerce portals. *Journal of Business Research*, 69(12), 6002–6011. <https://doi.org/10.1016/j.jbusres.2016.05.015>
- DUCH-BROWN, N., GRZYBOWSKI, L., ROMAHN, A., & VERBOVEN, F. (2017). The impact of online sales on consumers and firms. Evidence from consumer electronics. *International Journal of Industrial Organization*, 52, 30–62. <https://doi.org/10.1016/j.ijindorg.2017.01.009>
- EVIDENCE, M. (2010). Research into questionnaire design : a summary of the literature. *International Journal of Market Research*, 52(2), 2017.
- FRISHAMMAR, J., CENAMOR, J., CAVALLI-BJÖRKMAN, H., HERNELL, E., & CARLSSON, J. (2018). Digital strategies for two-sided markets: A case study of shopping malls. *Decision Support Systems*, 108, 34–44. <https://doi.org/10.1016/j.dss.2018.02.003>
- IGWE, A. (2014). Examining the Effect of E-Commerce on Business Performance in A Business Environment. *Developing Country Studies*, 4(26), 154–159.
- ILIEVA, J., BARON, S., & HEALEY, N. M. (2002). Online surveys in marketing research: Pros and cons. *International Journal of Market Research*, 44(3), 361–376. <https://doi.org/https://doi.org/10.1177/147078530204400303>
- JUN, G., & JAAFAR, N. I. (2011). A Study on Consumers' Attitude towards Online Shopping in China. *International Journal of Business and Social Science*, 2(22), 122–132. <https://doi.org/10.1108/QMR-06-2013-0041>

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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.

**Total IF of journals (all publications): 5,152**

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The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on the basis of the Journal Citation Report (Impact Factor) database.

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