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The Moderating Effect of E-Commerce Relationship on Export Marketing Strategy and Performance

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Abstract:
This study examines exports marketing and strategy through global exports' monetary value and e-commerce through global e-commerce retail sales in order to find out whether there exists a moderating effect of the latter on the former. In order to do so, quantitative data is critically analyzed by statistical tests, such as Pearson's correlation, Durbin-Watson statistic, and regression analysis. Descriptive statistics are also used under literature to find out the relationship between the two variables. For statistical analyses, variable for global exports is dependent and the same for e-commerce retails is explanatory. Findings exhibit a directly proportional relationship with a positive moderating effect of e-commerce on global exports. The contribution to compendium of literature on the subject is quantitative evidence of the relationship and effect, and a direction for further research as conclusion.

Keywords: *e-commerce, export marketing, statistical analysis, global trade, moderating effect*

1. Introduction

When a company wants to export its products to another country, export marketing is used. It may utilize similar approaches as local marketing; however, export marketing may be more challenging since it must appeal to a customer base from a separate culture, choice, and taste. Many a times, legal obligations are different from region to region. Therefore, export marketing may ascertain more risk for the success of the product in a new market, and require special effort and financial resources in order to be successful. E-Commerce on the other hand is a business model that allows firms to do business activities over the internet. While the most common is B2C, it can be B2B, C2C or even C2B[i] (Bloomenthal, 2019). While a sound marketing strategy is pertinent to export marketing, an organization's worldwide field-tested strategy is reflected in the realization of its export's growth; the medium of e-commerce upholds a specific branch of such strategies in order to maximize exports using technological solutions.

This study emphasizes on the relationship and effect of e-commerce with export marketing strategy performance by taking into account the global statistics of both, and quantitatively finding statistical relationships between the two in order to make qualitative conclusions based on the findings. In particular, through this research we, (a) critically analyze how e-commerce affects exporting marketing strategy, (b) by ascertaining the nature of the relationships of the two (directly proportional or positive, inversely proportional or negative, or no relationships at all), and (c) provided that there is a relationship, how does the moderating effect of e-commerce affect the relationship between export marketing strategy and performance.

In order to assimilate the answers to such question, the fundamentals of this research must be aligned with the theoretical background by literature on the topic. Before which, the basics are briefed. For a global organization, it is imperative to characterize where it stands compared to potential markets, as benchmarks, and then assign goals achievable by using export marketing utilizing e-commerce, and strategies that impact usefully for both, traditional and technological means. A key activity plan centers marketing focuses by gathering and breaking down applicable data, representing limitations, and spreading out the means for an activity approach. An organization must detail realistic destinations, just as a comparing timetable to make them reality, and keep up the adaptability to modify goals if conditions change. As for E-commerce to use for online marketing for export marketing, it is imperative to utilize it to the maximum because most countries in today's era have some magnitude of internet access and online shopping have been a successful trend already and appear to be growing more nevertheless; online marketing may include advertisements on the websites, social media sites, and may even include e-mail newsletters and e-mail marketing. Internet based business has helped organizations build up a more extensive market nearness by giving less expensive and progressively effective conveyance channels for their items or administrations. While Facebook, Google, Instagram, etc. are useful, however profiling for the audience is a useful technique used as well as keywords are an important way to attract the right demographic of audience for the category of product that they should be exposed to, in order to increase efficiency of E-commerce based business and may be a simple strategy for maximization of export marketing.

In this study, to differentiate export marketing strategy utilizing e-commerce to the fullest, we ought to speculate other parts of export strategies as well. Export marketing strategies that emphasize the objective nation's social contrasts can build the main concern. Research is essential with these plans, beginning with studies and examinations to discover

how customers in different nations see your items or administrations. Some MNCs utilize this strategy changing marketing and creating an impact for each nation they offer to; it may also be termed as selective regional marketing strategies by intently changing the product to reflect regional perspectives. This research attempts to analyze global exports and e-commerce-based exports separately, find relationships between them, and explain why the said effect of one may be on the other, if any.

This attempt as to why this study is imperative also tends to expand on the contribution it makes on the subject. With basics, we comprehend export marketing strategy, crucial for business expansion, however, with modern technology the connectivity and business decisions of strategies approaching to several locations based on respective market analysis from a central business headquarter brings out many new aspects to global trade unexploited before. The use of IT, at one side, would make connectivity and approach to many new locations is easier; on the other hand, it would require new research, planning, and strategy to use technology in the properly channelized fashion.

While the importance of the study is crucial contemplating the growing need of utilizing technology fully to business expansion, required fundamentally to increase number of customers for any organization; however, the significance of this particular study may also be reasoned by reaching the following objectives, described as three key points; (a) by determining the effect of e-commerce on marketing strategy and its performance, (b) by examining the relationships between them, and (c) by investigating the performance of e-commerce in relation to marketing strategy.

As research maintains, in today's world, almost everything can be bought through smartphones, tablets, computers, etc. (Bloomenthal, 2019). Therefore, the temporal scope must be contemporaneous keeping up with most recent technological innovations. Similarly, e-commerce and access to internet has become rampant in developed as well as growing rapidly in developing nations as well, therefore, the spatial scope covers the global market.

We continue with the theoretical background and literature review on the subject, followed by methodology, results and discussion, and we conclude with a summary.

2. Background and Literature Review

Theoretical background and literature on the subject have been deeply studied in order to facilitate concepts and hypothesize before analyzing the quantitative data to form conclusions. To begin, exporting is considered the most well-known component by which firms draw in with universal markets, understanding the drivers of export showcase execution is vital to clarifying firms' global competitiveness (Morgan, et al., 2012). Stressing further, the developing internationalization of world economy allow expanded exports which provide advantages to society; which invigorated research on this topic. Much of the time, the developing exchange deficiency is the most significant factor behind the enthusiasm for the theme. Therefore, one of the most significant open strategy targets in numerous nations has been discovering approaches to build exports (Suárez & Valenzuela, 2006). Narrowing down to the connection of e-commerce with exports, the progression of web-based business advancements is one of the significant patterns that portrayed the cutting-edge business scene (Gregory, et al., 2007).

Empirical observation of internet penetration validates that, with natural influence to the business world, and as one study describes it as; online business advancements (e.g., the internet) have prompted completely new conceivable outcomes for exporters to get to new markets and improve their effectiveness regarding getting client requests and dealing with business requests (Bennet, 1997) and the scale for business is naturally global (Hamill, 1997). The correlation of e-commerce and online marketing to export marketing is positive and there is a direct path from online marketing to export marketing. (Prasad, et al., 2001).

While technology made available many communication solutions more than two decades before Web 2.0, and large businesses and organization had been utilizing those, but the reception of it in common consumers' lifestyle commenced later on and the revolution and advancement of e-commerce exhibited the cutting-edge business scene (Gregory, et al., 2007). Positive effects from consumers' semantic show through a survey that 60% of consumers believe that usage of e-commerce reduces the number of middlemen or distribution channels. (Nasah, et al., 2012) This is particularly of use to our research because it displays the consumer inclination towards e-commerce and the growing trend which is expected to be visible in data as well, thus this allows us to hypothesize.

While cross-border exports are often connected with larger corporations, SMEs[ii] play an important part in global exports as well. Successful SMEs have certain cutting edge and modern exercises and that incorporates exports (Devins, 1994) and governments in many developed, recently industrialized and developing nations have recognized exporting as a pure need, to the point of being crucially important for country's economic growth (Morgan, 1997). Regarding advancement of cross-border trade, the degree of imports a nation can bear is limited (Lages & Montgomery, 2004) and this limit is eased off by increasing exports (Diamantopoulos, 1998). Exporting performance brings numerous macroeconomic benefits. The outcome of microeconomic level activities collected together benefits the macroeconomic level. Exporting furthermore serves as a vehicle to job creation, improves business openings, adds to improved ways of life and energizes better working conditions and encourage more productive business (Lages & Montgomery, 2004). As mentioned earlier about microeconomic scale of exporting that causes several effects, at a small-scale level, exporting assists firms with decreasing their reliance on local market and appreciate quicker deals, employment growth, business development and a higher success rate and long-term viability (Lages & Lages, 2004). Export performance is associated to the standard that the marketing levels are attached to (Suárez & Valenzuela, 2006) and based on Suarez & Valenzuela's study, analysts and researchers must form the scientific methodology to measure it.

Since exporting is the most well-known system by which firms connect with worldwide markets, understanding the drivers of export advertisements and their execution is vital to clarifying firms' universal seriousness (Morgan, et al., 2011). E-commerce has actually revolutionized the scope and origin of international business. While taking orders,

processing them, taking in money, processing the transaction, sending the order to the warehouse department in order to let them know what is to be done. These processes are actually done in a second, completely automatically now. Then the warehouse staff dispatches it, but dispatching it often refers to a third-party courier, transportation or logistics company that deals with it in the same way that the order taking process did, completely automatically. So far, the processes where humans are involved are still performed by humans, but the data being sent to them and from them to the next station has completely been automated. This process is information technology in business, and this has made the system absolutely rapid. The way Bennet had explained it, that online business has come up with ideas which are completely innovative and modern giving the exporting firm new solutions in order to help them to introduce their products to new markets and connect them to new range of customers, improving their effectiveness with-respect-to getting client requests and how to deal with them (Bennet, 1997).

The purpose of this study to analyze the use of e-Commerce, especially for the effect it may have in the ever-so-changing world which requires constant technological expansion in congruence to work along businesses that are ever-expanding in the cutting-edge business world where growth is a constant requirement. Based on theoretical background and literature, we propose the following hypotheses:

- H1: E-commerce does have a significant effect on export marketing and its performance
- H2: A significant relationship between e-commerce and global exports exists
- H3: The relationship being e-commerce and global exports is positive

3. Methodology

In this study, we use quantitative as well as qualitative analysis for our research, in order the identify and measure the pattern and the effect of e-commerce on export marketing strategy and its performance. Linear regression is used to model the relationship between dependent and explanatory variables, or to find the dependency of one variable over other(s). For this study, linear regression will be used. Furthermore, we use Pearson's correlation to find the coefficient of correlation between the two variables. We will also utilize Durban-Watson statistic method to find the relationship between the residuals of the two variables, i.e., the dependent and independent variable; in order to find out whether there is a presence of autocorrelation at lag interval (at the granularity level of the data, which is one year in our dataset) in the residuals based on the regression analysis.

Since our study depends on two variables and their quantitative data, we use two variables for our dataset. Global e-commerce retail sales values will be independent variable and global exports sales value will be the dependent variable. For tests, we use the same data set that will be acquired from reliable online sources with references in order to reach the results. Since global e-commerce retail sales values is our independent variable, it will be denoted by X and global export sales value is our dependent variable, it will be denoted by Y.

Sampling data is acquired from Statista. For global e-commerce sales value, data is from 2014 to 2023. The data regarding the future is their calculated forecast, therefore, we are deeming it reliable. On the other hand, data for global exports value will also be acquired from Statista, however we have data from 1950 till 2018. All the values are in US billion dollars therefore there is no requirement of changing currency or balancing the decimal points, etc. As same temporal range is required in order to perform any logical statistics calculations, therefore, we must select the range which is mutually available in both the variables. Since data for global e-commerce sales value is only from 2004 therefore, we will begin the dataset for global export sales value from 2004 as well. On the other hand, as data for global exports finishes at 2020, we will not use the forecasted 2020 to 2023 years and only use the values which are adjacent to the years for both the variables, i.e., 2004 to 2020. Therefore, our dataset is finalized and displayed in Table 1. In order to analyze the data, simple linear regression is performed and based on the result sheet, standard error, goodness of fit, regression, etc. is analyzed.

$$\gamma = \beta_0 + \beta_1 X + \epsilon$$

Equation 1 Linear Regression Equation

Where,

γ = dependent variable for Global Export Sales

X = independent or explanatory variable for Global E-Commerce Sales

β0 = intercept

β1 = slope of explanatory variable X

ϵ = residual or error

The formula for intercept β0 and β1 is calculated as per below:

$\beta_0 = (\Sigma y)(\Sigma x^2) - (\Sigma x)(\Sigma xy) / n(\Sigma x^2) - (\Sigma x)^2$

$\beta_1 = n(\Sigma xy) - (\Sigma x)(\Sigma y) / n(\Sigma x^2) - (\Sigma x)^2$

Where,

n = number of observations

The sample size of seventeen observations is used to fit the population which is emerging since the use of E-Commerce commenced and can be used as a trend to make projections for the unknown. Therefore, through the explanatory variable (Global E-Commerce Sales), the dependent variable (Global Export Sales) is predicted, as well as insight for a relationship is found, whether it exists or not.

Along with that, a scatter plot for the same dataset is constructed to form a straight line using simple linear regression by using the best fit to find the predictive value or function.

Durbin Watson statistic is used in this study as a test to check autocorrelation in the residuals of the statistical regression analysis. Correlation is also calculated, however, if it exists then it undervalues the standard error which is important to be

noticed to know that predictors or indicators are significant or not. For this purpose, Durbin-Watson test will be performed, using following formula:

$$DW = \frac{\sum_{t=2}^{T}(\quad_t - \quad_{t-1})^2}{\sum_{t=1}^{T} \quad_t^2}$$

Equation 1 Durban Watson Test Equation

Where,

e_t are residuals from OLS regression.

e_{t-1} are first order differences of residuals.

The DW statistic d lies between 0 and 4.

DW = 2 means no autocorrelation

0 < DW < 2 means positive autocorrelation

2 < DW < 4 means negative autocorrelation

Furthermore, the value acquired from Durban-Watson test will be verified in the 5% critical values of DW corresponding to alpha of 0.05 with k as 2 (since there are two parameters). Moreover, the result will be validated by upper and lower critical values, dL and dU respectively, to conclude if there exists any correlation between the two given variables or not.

Statistically, there are limitations to research methodologies utilized. There are advantages and disadvantages to adapted techniques. For regression analysis, an attempt is made to model the relationship between the two variables (independent variable, Global E-Commerce Sales or X, and dependent variable, Global Exports Sales or Y). The estimation whether the association is linear or non-linear, cannot be answered by regression equation alone. To suffice for this limitation, scatter chart has been created, especially with a trend line, finding the best fit with linearity or non-linearity of the sample data plotted.

Similarly, for Durbin-Watson test, certain scenarios, it may be inconclusive. In time-series analysis, when lagged dependent variables are included in the predictor variables, then it is inappropriate to use this test. A statistical limitation, to which first the autocorrelation test is performed and once there is a correlation found, then Durbin-Watson test is performed.

In statistics, the autocorrelation of a random process is the Pearson correlation between values of the process at different times, as a function of the two times or of the time lag. The Durbin-Watson test is a measure of autocorrelation in residuals from regression analysis. Therefore, based on the time lag (t-1 as a standard as well as for our study), the current residuals are seen to be related to the past state. For our study, Durbin-Watson test is performed after regression analysis followed by autocorrelation, to concur most plausible results. This helps in enhancing results based on step-by-step findings.

4. Results and Discussion

This study heavily relies on data which is thoroughly analyzed empirically as well as statistically to draw conclusions. Data is collected from reliable sources, which are cited. Data spatially belongs to the global scale, and, developed and developing countries scale. Exports in 2018, according to the report by World Trade Organization, ten major trading countries stayed unaltered in 2018, in comparison to the previous year. China, USA, and Germany were in the top. By and large, the main ten economies depicted 53.3 percent of world trade. The top five economies importing and exporting represented 38.1 percent of complete trade. Economies from fifth to tenth spot representing 15 percent. For the second year straight, China remained the major trader regardless of growth in trade around the world has been facing a lot of ups and downs. With a portion of 13 percent of total exports, China's share remained at 2.49 trillion US dollars. (World Trade Statistical Review, 2019) This can be viewed in Table 1.

Region	Volume 2018	Share In World 2017	Share In World 2018	Annual % Change 2017	Annual % Change 2018
World	18919	100	100	11	10
Developed Economies	10056	53.8	53.2	9	9
Developing Economies	8223	42.2	43.5	12	11

Table 1: Exports Volume in Billion US Dollars and Percentage
(Self Selected Data)
Source: World Trade Statistical Review, 2019

The difference between the developed and developing economies is not too much, and that may be because the developing nations must rely on exports in order to take foreign exchange, whereas, the developed nations have strong economies and they have a strong money velocity within the country as well. Regardless of the reason, it is a very promising figure. As for the developed nations, the 53.2% share in the world exports is a very startling figure concluding to 10,056 billion US dollars. Figure 1 displays that ('Others' mean the commonwealth of independent states, including associate and former member states).

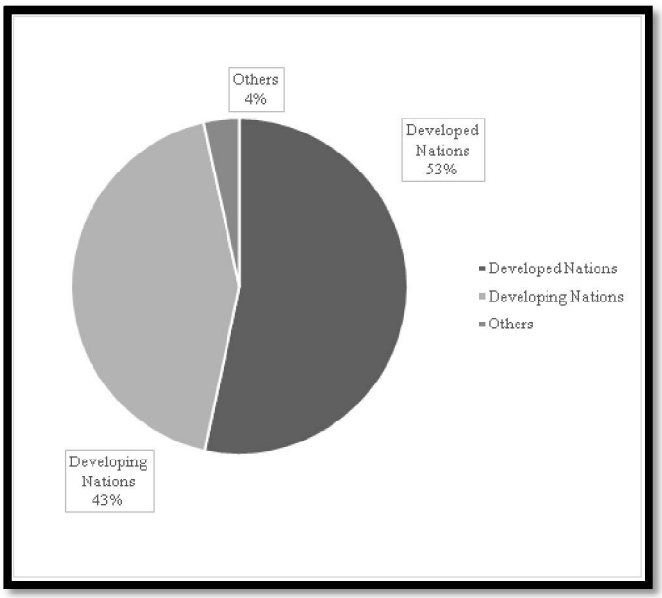

Figure 1: Share of Developed and Developing Nations in World Export – 2018

In order to better equip ourselves with the export value of the world and see the evidential proof of the effect e-commerce brought to it, we must first see the global export volume of trade in good from 1950 to 2018, that is detailed in Table 2.

Year	Value
1950	61.81
1955	93.92
1960	130.09
1965	189.62
1970	318.02
1975	876.89
1980	2049.41
1985	1964.84
1990	3495.69
1995	5176.2
2000	6452.32
2005	10502.74
2006	12128.03
2007	14021.16
2008	16149.3
2009	12556.2
2010	15302.68
2011	18339.81
2012	18513.19
2013	18590.64
2014	18986.54
2015	16539.16
2016	16021.98
2017	17731.08
2018	19453.36

Table 2: Global Volume of Exports in Trade in Goods, 1950 to 2018 (Billion UD)
Source: Statista (Statista, 2019)

The argument made earlier about the upshifting trend in the aforementioned values in Table 3 can be visually seen if analyzed that the global export volume in a monetary fashion seems to rise rapidly as the technology gains momentum in Figure 2.

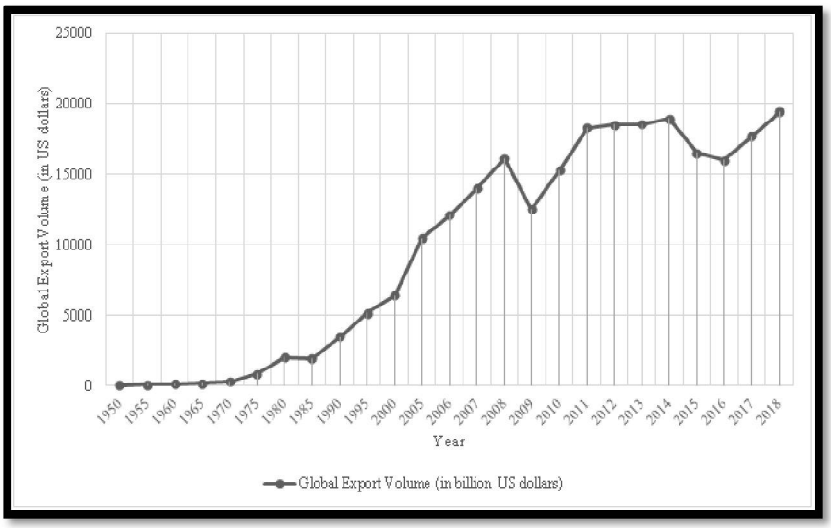

Figure 2: Global Export Volume (in billion US dollars)

For example, the rise of international consumer airlines and TNCs[iii] in the mid-seventies of 20th Century can be seen as the first peak and then the gradual rise in 1990s with a small slowdown in the last years of the millennium due and the revival due to Web 2.0, we see a sudden upshift in the first decade of the second millennium, and the peak before 2008's global financial crisis. The financial crisis hit the global export volume very hard and it dropped down to a mere 12556.2 billion US dollars by 2009. It gradually recovered in the coming years, crossing the peak of pre-crisis in 2011. Gradually increasing steadily until 2014 it dropped and from 2016 onwards it has been on the rise as well. Of course, the data is until 2018 only, where the global volume of exports in monetary value was 19453.36 billion US dollars. Observing Table 3 is recommended.

Year	2017	2018	2019	2020	2021	2022	2023
E-Commerce Sales	2.282	2.928	3.535	4.206	4.927	5.695	6.542
Share from Total Retail Sales	10.4	12.2	14.1	16.1	18.1	20	22

Table 3: Global E-Commerce Retail Sales (in trillion US dollars)
Source: E-Marketer (Andrew Lipsman, 2019)

It is imperative to observe the global export volume in congruence with the e-commerce retail sales volume in monetary values to understand the effect it has on the global exports and also to see the market share that information technology-based business has taken over traditional brick-and-mortar based business. The most interesting is the rise that has been non-stop and according to the researcher mentioned above (Andrew Lipsman, 2019), the forecast that he made depicts the rise in the coming years as well, which is very promising for e-commerce-based business. On the other hand, it also speaks volumes about the change that is inevitable and massive in magnitude that the global business market is witnessing as the turn of events is shifting from traditional brick and mortar business style to an all-encompassing technology based one. Figure 3 is presented, for a visual display.

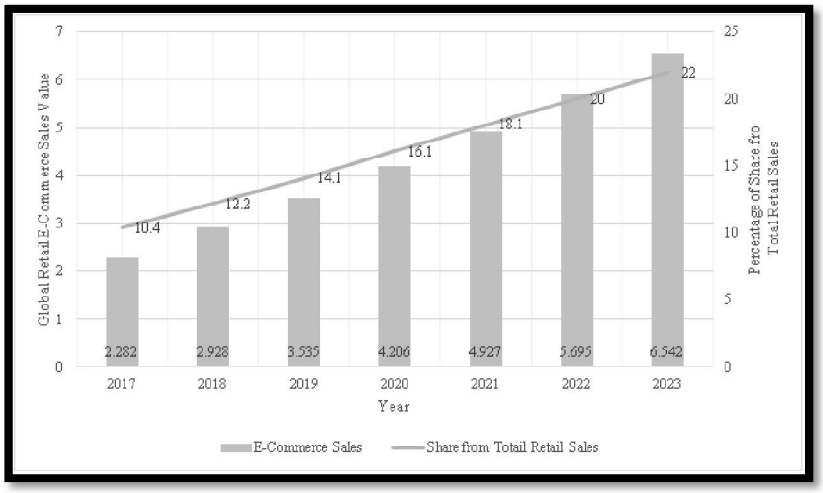

Figure 3: Global E-Commerce Sales with Share from Global Total Sales

While the data mentioned above and displayed in tables and figures relates to export volume and e-commerce volume, but it depicts an all-encompassing global view of the world. While, we know that countries with higher business activity and a higher GDP per capita value would naturally have a different relationship of e-commerce to consumers and in extension to export value because the general trade value between such countries would be greater. Let's analyze the developed countries specifically through Table 4.

	Year	2017	2018	2019
USA	E-Commerce Sales	449.88	514.84	586.92
	Percentage of Total Retail Sales	8.9	9.7	10.7
Canad	E-Commerce Sales in CAD	45.1	54.31	64.56
	E-Commerce Sales in USD	34.276	41.2756	49.0656
	Percentage of Total Retail Sales	7.5	8.6	10
UK	E-Commerce Sales in GBP	83.55	96	106.46
	E-Commerce Sales in USD	109.4505	125.76	139.4626
	Percentage of Total Retail Sales	22.3	20.7	18.8
Germa	E-Commerce Sales in EUR	58.87	64.35	69.37
	E-Commerce Sales in USD	64.757	70.785	76.307
	Percentage of Total Retail Sales	7.8	8.4	8.8
France	E-Commerce Sales in EUR	45.3	52.77	58.84
	E-Commerce Sales in USD	49.83	58.047	64.724
	Percentage of Total Retail Sales	7.6	8.6	9.5

Table 4: Five Developed Countries' E-Commerce Sales in Local Currencies and USD, & Share of Retail Sales
Source: Self reconstruction of data taken from E-Marketer (Andrew Lipsman, 2019)
Unit for currency (USD, CAD, GBP and EUR) is billion.
Currency conversion was done by taking currency quotations from http://www.xe.com

US purchasers spent almost $586.92 billion on web-based business in 2019, exhibiting an expansion of 14% versus 2018 and 10.7% of total US retail spending. Retail online business reached 64.56 billion Canadian dollars this year. That is up 21.1% from a year ago and comes to 10.0% of all retail sales. On the other hand, in UK, growth in retail sales is easing back in the midst of Brexit concerns and an ever-testing retail condition. This year, total sales reached 476.65-billion-pound sterling. Physical retail is having the hardest time, however, with non-e-commerce deals posting development of simply 0.4%. Internet business deals growth goes to 10.9 percent this year, to reach 106.46-billion-pound sterling and 22.3% of complete retail. Internet business spending in Germany arrived at a 69.37 billion euro this year, a yearly ascent of 7.8%. That represents only 8.8% of all retail sales, however. Total sales deals are relied upon to 785.77 billion euro in 2019. Retail e-commerce spending arrives at a 58.84 billion euro this year, rising 11.5% year over year. That shows 9.5% of total retail sales in France. By 2023, we expect e-commerce outlays to top 79 billion euro. The curious demographic here is that of the United States because the total spending through e-commerce has been the highest in comparison to other developed nations per se. On the other hand, what is surprising is the statistic from United Kingdom regarding the percentage of share that their online industry takes from the total retail sales from all over the country, which amounts to be 22.3% in 2017, far more than any other country; nevertheless, it is seen to be dropping as the years' progress in the last three years falling down to 18.8%. While the difference in the economic sizes of the countries (USA vs UK) is naturally huge, as per their land area as well. Other countries such as France and Germany appear to be presenting same values as that of UK and as that of each other, being geographically close as well as sharing a similar economic size as well as a similar area of land. Figure 4 is presented.

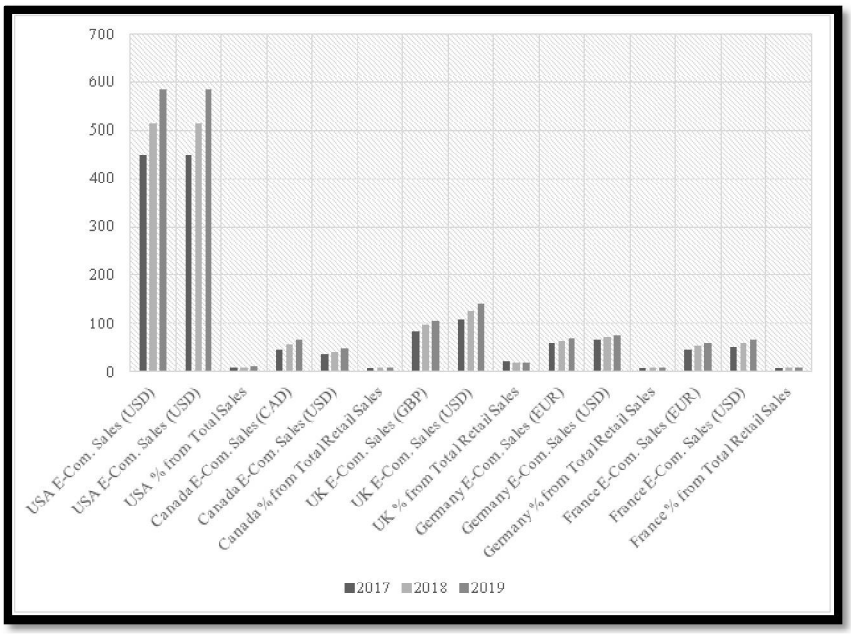

Figure 4: E-Commerce Sales and Total Sales Share for USA, Canada, UK, Germany and France (2017 to 2019)

As mentioned earlier, countries with higher business activity and a higher GDP per capita value would have a different e-commerce and export value in comparison to the countries that are still developing. The trade volume between these countries in accordance with the other group may differ as well, therefore, we need to analyze this group of countries and their numbers and figures separately.

As seen in data mentioned earlier, according to World Trade Organization's 2019 report, we can further categorize Asia into developed and developing Asia and Europe into developed and developing Europe, therefore, we see the statistics presented in Table 5.

	World	**Developed Economies**	**Developing Economies**	**Developing Europe**	**Developing Asia**
Value 2018	18919	10056	8223	205	5314
Share in world 2017	3	53.8	42.2	1.1	28.4
Share in world 2018	3.4	53.2	43.5	1.1	28.1
Annual % change 2017	11	9	12	11	11
Annual % change 2018	10	9	11	9	9

Table 5 Export Volume in Billion USD Dollars and Percentage (Self Selected Data)
Source: (World Trade Statistical Review, 2019)

While we see that exports are running in competition with the developed nations, however, since e-commerce works on technology and the technological conditions in the developing countries are less than satisfactory. The access to internet in developing countries is not as much available to common population as it may be in developed countries. The following figures displays the internet usage in developing nations, except for China and Russia, because while they're still developing countries, they have an unusual character with regards to trade, especially China. The trade volume and e-commerce market share coming from China is rather huge, and can be easily compared to developed nations, as is done in Figure 5.

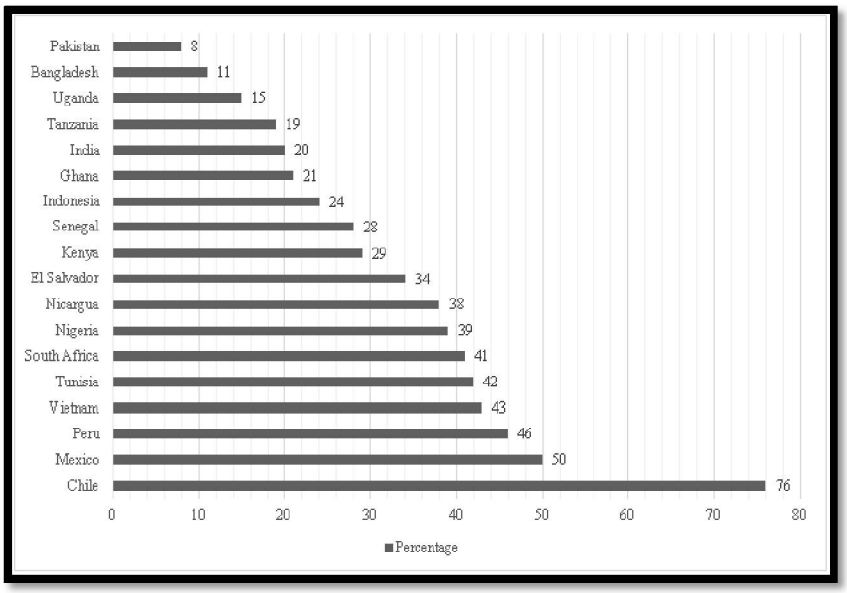

Figure 5: Access to the Internet in Developing Countries
Source: (Pew Research Center, N.D.)

With poor access to the internet, it is not surprising that the e-commerce market is clearly smaller in scale than that of the developed nations. However, developing countries also still include China and Russia according to Investopedia (Investopedia, 2019). The e-commerce market of China is magnanimous. The e-commerce market in China produced a revenue of 1,001,974 million US dollars in 2020. This is still expected to show an annual growth constituting to 6.9 percent and that end up bringing a market volume of 1,309,535 million US dollars by 2024. China's trading and e-commerce market value is so huge that the trade war between United States and China is actually caused by this extra-large exporting power that it has gained over the years and the e-commerce industry is its route to reach out to its business-to-business and business-to-consumer customers. The market's biggest section however is fashion and related products which amount to 348,700 million US dollars in 2020. As mentioned, the internet access in the developing countries is not that much in comparison to the developed countries, however, China was kept out of that list because the user penetration in China is 61.8 percent in 2020, which is expected to go about 70.3 percent by year 2024. While some other developing countries may have a better figure in this regard, but it is important in China's case because China has a population of 1.3 billion people. Moving on, China's ARPU[iv] currently reaches up to 1,121.04 US dollars.

For the purpose of this study, we have collected a dataset with mutual temporal scope with the per-year granularity of data with the final compilation of data with regards to global export sales and global e-commerce sales. The former being the dependent variable, and the latter being the explanatory variable. The dataset is presented in Table 6.

#	Year	Global Exports Sales (Y)	Global E-Commerce Sales (X)
1	2004	6452.32	159
2	2005	10502.74	210
3	2006	12128.03	273
4	2007	14021.16	352
5	2008	16149.30	428
6	2009	12556.20	481
7	2010	15302.68	627
8	2011	18339.81	846
9	2012	18513.19	1097
10	2013	18590.64	1220
11	2014	18986.54	1336
12	2015	16539.16	1548
13	2016	16021.98	1845
14	2017	17731.08	2382
15	2018	19453.36	2982
16	2019	19014.75	3354
17	2020	17582.99	4280

Table 6: Dataset for Further Data Modeling (in billion USD)
Source: Global Exports Sales(Y): (Statista, 2019) – Global E-Commerce Sales (X): 2004-2009: (Rao, 2011), 2010-2011: (Fang & Xu, 2020), 2012: (McGee, 2013), 2013: (Richter, 2013), 2014 to 2020: (J. Clement, 2019)

4.1. Statistical Analysis

In order to better understand the data set obtained from the collection of data above, Table 7 is presented for descriptive statistics of the dataset. Time ranges from 2004 to 2020 and counts for 17 observations in total, the granularity of data is per-year. Looking at the data set, it ranges on 17 years starting from 2004 and ending on 2020, however these years are included; that means that the dataset includes the year 2004 as well as the year 2020. Mean for Global Export Sales is 1,377.65 billion USD and median 1097 billion USD, whereas, Global E-Commerce's mean is 15,758 billion US dollars and the Median was 16539.16 billion US dollars. The difference is quite huge. Further details can be seen in the table.

Specification	Global Exports Sales (Y)	Global E-Commerce Sales (X)
Mean	15758.00	1377.65
Standard Error	870.02	296.66
Median	16539.16	1097
Standard Deviation	3587.20	1223.15
Sample Variance	12868028.68	1496106.74
Kurtosis	1.38	0.51
Skewness	-1.29	1.14
Range	13001.04	4121
Minimum	6452.32	159
Maximum	19453.36	4280
Sum	267885.93	23420
Count	17	17

Table 7: Statistics for the Dataset
Source: Own Calculations

	Global Exports Sales (Y)	Global E-Commerce Sales (X)
Global Exports Sales (Y)	1	
Global E-Commerce Sales (X)	0.617	1

Table 8: Correlation
Source: Own Calculations

Table 8 displays the Pearson's Correlation. Global E-Commerce Sales, independent variable denoted by X, and Global Exports Sales, dependent variable denoted by Y, express a positive correlation with a coefficient of +0.617. The positive value must be noticed here that it is an increasing function.

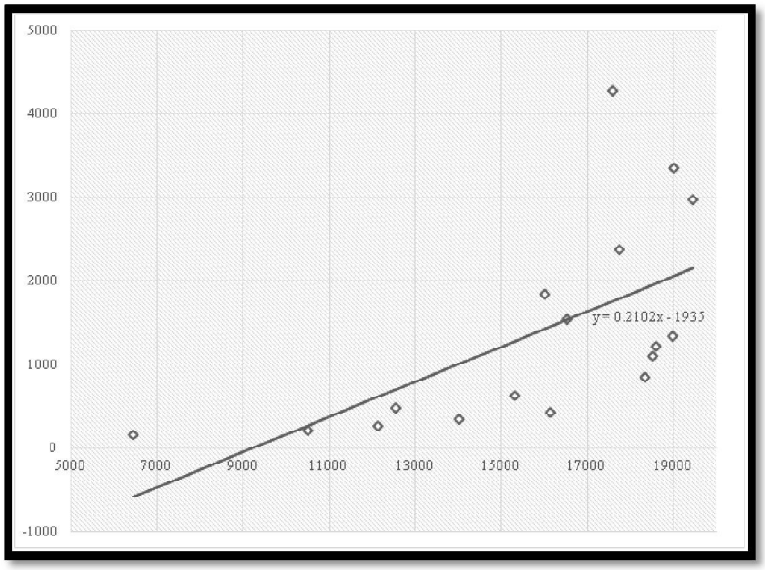

Figure 6: Correlation Scatter Chart (Y With X)
Source: Own Production

Figure 6 displays the scatter chart to form a trend line and an increasing trendline is observed, since global export sales as well as global e-commerce sales are both expanding over the time frame. We see the latest value to be decreasing for global export sales, possibly due to the COVID impact around the world, nevertheless, the growth has been so linear that the trend is not diminished.

Observation	$\hat{Y}^{v}$	$e=Y-\hat{Y}^{vi}$	e_{t-1}	e_t-e_{t-1}	$(e_t-e_{t-1})^2$	e^2
1	13554.54	-7102.2				
2	13646.76	-3144.02	-7102.22	3958.206	15667397	9884848
3	13760.67	-1632.64	-3144.02	1511.379	2284266	2665510
4	13903.51	117.6501	-1632.64	1750.289	3063512	13841.54
5	14040.93	2108.373	117.6501	1990.723	3962980	4445239
6	14136.76	-1580.56	2108.373	-3688.93	13608205	2498159
7	14400.74	901.9389	-1580.56	2482.495	6162784	813493.9
8	14796.72	3543.092	901.9389	2641.153	6975690	12553502
9	15250.55	3262.636	3543.092	-280.456	78655.79	10644792
10	15472.95	3117.688	3262.636	-144.948	21009.9	9719977
11	15682.69	3303.847	3117.688	186.1589	34655.13	10915403
12	16066.01	473.1467	3303.847	-2830.7	8012862	223867.8
13	16603.02	-581.043	473.1467	-1054.19	1111316	337610.8
14	17573.98	157.1003	-581.043	738.1432	544855.4	24680.52
15	18658.85	794.5124	157.1003	637.4121	406294.2	631250
16	19331.47	-316.716	794.5124	-1111.23	1234828	100308.8
17	21005.78	-3422.79	-316.716	-3106.07	9647688	11715481
Total					72816997	77187965

Table 9: Autocorrelation Using Durban-Watson Test
Source: Own Calculations

Table 9 displays the calculations for Durbin-Watson test. Number of explanatory variables (k = 1). Based on the Durbin-Watson Autocorrelation formula above, the value of DW =0.943372422. Looking it up in the 5% Critical Values Table[vii] , we achieve the following:

- Observations: 17
- Lower Critical Value (dL): 1.13
- Upper Critical Value (dU): 1.38

Since DW < dL (or that our Durban Watson test statistic lies outside the DW table range) at the significance level alpha which means that random components are not auto-correlated, and we have enough sufficient evidence to reject the null hypothesis of the Durban Watson test. In other words, there is a correlation among the residuals. Let's perform a detailed regression analysis to further understand the model.

Regression Statistics					
Multiple R				0.616525	
R Square				0.380103	
Adjusted R Square				0.338777	
Standard Error				2916.957	
Observations				17	
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	78258907	78258907	9.197585	0.008394
Residual	15	1.28E+08	8508637		
Total	16	2.06E+08			
	Coefficients	Standard Error	t Stat	P-value	
Intercept	13267.05	1084.029	12.23865	3.3E-09	
X Variable 1	1.808113	0.596196	3.032752	0.008394	
	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%	
Intercept	10956.5	15577.61	10956.5	15577.61	
X Variable 1	0.537352	3.078874	0.537352	3.078874	
Residual Output					
Observation	Predicted Y		Residuals		
1	13554.54		-7102.22		
2	13646.76		-3144.02		
3	13760.67		-1632.64		
4	13903.51		117.6501		
5	14040.93		2108.373		
6	14136.76		-1580.56		
7	14400.74		901.9389		
8	14796.72		3543.092		
9	15250.55		3262.636		

Residual Output		
10	15472.95	3117.688
11	15682.69	3303.847
12	16066.01	473.1467
13	16603.02	-581.043
14	17573.98	157.1003
15	18658.85	794.5124
16	19331.47	-316.716
17	21005.78	-3422.79

Table 10: Regression Analysis
Source: Own Calculations

Table 10 presents the detailed result sheet of the regression analysis performed on the dataset. We see intercept coefficient is 13267.05 and variable X's coefficient is 1.808, for 17 observations. Residuals are also further mentioned in the table above (used above in the Durban-Watson Correlation Test). Based on this the critical value (for alpha at 0.05, N at 7 and K at 2), p-value for X is 0.008 which is less than the alpha, which means that X is statistically significant in the model, however, since R squared is 38%, we can assume that it is not a good fit of sample to the population, assuming that the market fluctuated during Covid times, decreasing global exports (Y), however, the same reason increased global e-commerce (X), therefore, we see such discrepancies. Excluding anomalies from the sample, and performing the same regression analysis again, we notice R-square increasing significantly making the model a better fit.
Nevertheless, based on the p-value being less than 0.05, we reject the first two null hypotheses to claim and conclude the same as the result of Durban Watson test, that there is a significant effect and relationship between global exports and global e-commerce. Based on linear regression equation from the regression analysis output, we derive y = 13267.05 + 1.808X, which shows a positive relationship, as well as the trendline formed earlier is increasing as well, therefore, we reject third null hypothesis.

5. Conclusions and Summary

This study has been conducted in order to understand the moderating effect of e-commerce that it may have or have not with export marketing strategy and performance. In order to do that, we separately saw the global volume of e-commerce and the global volume of export sales. We start with the background of the study, understanding what export marketing strategy is, and how does e-commerce market work and has spread so fast. After the introduction, we define our problem and hypotheses and the scope of this study. In the literature view, first the concepts are made clear under scholarly work with references to the definition of the topic separating it into export marketing and e-ecommerce, and then understanding the magnitude of these two, conceptually, under cited qualitative intellectual studies. It is interesting to observe the effect of small and medium sized enterprises have on e-commerce industry in comparison to that of big corporations like Facebook, Google, etc. For the exports volume internationally, the difference between developing and developed countries was observed to be hardly 10% in 2018. We did witness the effect of 2008's global financial crisis on export volume, same as we witness the Web 2.0 effect on the e-commerce size. Similarly, the share of total exports that e-commerce has been taking seems very promising as it was witnessed to be continuously growing in the past years.
A detailed analysis of the developed and the developing nations was performed in order to understand the e-commerce and export scenario therein. Plausibly, the e-commerce sales of USA are significantly more than that of other developed nations even, however the growth rate seems to be the fastest in the UK. Moving on the developing countries, we see that the annual percentage change in global export volume in 2017 and 2018 of developing countries was 11% in 2018 coming down from 12% in the previous year as the volume stopped down from 43.5 to 42.2 billion US dollars in one year (the volume increased but the share percentage decreased). We further discussed the significance of China and keeping it aside for this discussion owing it to be the single largest entity in these countries to have such huge share in global exports. Speaking of internet access, we see that many countries still don't have it assuming the lack thereof infrastructure, in comparison to that of developed countries, for e-commerce. Later we build the dataset for correlation and regression analysis using the available data we have for both variables and perform the correlation test, then auto-correlation (Durbin-Watson) test and then regression analysis for parabolic model, concluding e-commerce not having a positive significance on exporting strategy and marketing.

After examining the quantitative data regarding exports and e-commerce worldwide, and putting it under the microscope under scholarly literature and then collecting sample data in order to perform statistical tests on it, we conclude that there is significance (specifically positive) given the moderating effect of e-commerce relationship on export marketing strategy and performance.

For this study, primarily, global e-commerce sales volume and global export sales volume were utilized, for further studies even more detailed indicators may be used to carry out a further in-depth study to analyze the precise factors of e-commerce having an effect or not on export marketing. One way of forging ahead would be to divide the global market into two, developed countries' e-commerce and export volume and developing countries' e-commerce and export volume, that way the generalizing effect of comparing technology from less technologically advanced nations vs. those which are, would not change the divergences in the model. Same applies on exports as well, for economies which are less export-based and focus more on internal revenues instead. Therefore, further studies in the direction are highly recommended.

This study has been an extensive in-depth knowledge pursuit to find out the effect of e-commerce that it may have on export marketing strategy and in order to purse that, quantitative data has been analyzed using econometric modelling. Similarly, theoretical concepts had been discussed under scholarly qualitative work as well. The results and the findings, qualitative as well as quantitative have been the contribution to knowledge, which in extension is going to mold further research and shape up the path to advance ahead with, in order to further understand the moderating effect of the said indicator (e-commerce) on to export marketing.

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Notes

[i] B2B, B2C, C2C and C2C stands for business to business, business to consumer, consumer to consumer and consumer to business, respectively.
[ii] Small and Medium Enterprises
[iii] Transnational Corporations
[iv] Average Reveue Per User
[v] Global Exports Volume – Predicted
[vi] Residuals
[vii] Source: N.E. Savin and K.J. White, 'The Durbin-Watson Test for Serial Correlation with Extreme Sample Sizes or Many Regressors,' Econometrica 45, 1977, p.1989-1996