How to Increase E-Commerce Incomes: A Correlation and a Cluster Analysis

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Abstract

Our objective in this study to reveal the relations between population size, e-commerce sales penetration, internet user, penetration of population with Internet, gross national income (Atlas Method), gross national income per capita, purchasing power parity gross national income, purchasing power parity gross national per income, networked readiness index and its environment, readiness, usage, impacts indexes, global competitiveness index, logistic performance index factors and which factor(s) should be prioritized by countries in order for a country to increase its e-commerce.   In the study, e-commerce sales penetration was used as dependent variable and others were used as independent variables. Relations among variants were studied with pearson correlation analysis. According to the result of Pearson Correlation Analysis, positive strong relations were found between e-commerce sales penetration and usage, gross national income per capita, penetration of population with Internet and purchasing power parity gross national per income. Variants with effect on e-commerce were analysed by using multi linear regression analysis and e-commerce description amounts were examined in %. When these values are taken in multi linear regression model; gross national income per capita and purchasing power parity gross national income per capita were found significant in the model. In addition, cluster analyses of 25 selected countries with different economic, social and geographic qualities with respect to these variants in order to reveal the similarity and differences of a country with other countries with respect to e-commerce structure. In cluster analyses, our analysis to differentiate one country from other countries demonstrated China and India with respect to population and e-commerce sales amounts, Norway with respect to e-trade sales penetration, Norway with respect to groups of national income per capita when divided into income groups using e-commerce sales penetration; and China and USA with respect to national income groups only. According to these results, it was found that logistic index has a lower effect than expected, that it is not sufficient merely to prepare the required infrastructure and increase number of internet users and that purchasing power should increase too and that the national income and therefore population of the country were effective. The most obvious example of that was revealed in this study as the similarities and differences between USA, China and Norway.

Keywords: E-commerce, Internet user, penetration of population with Internet, Gross National Income Atlas Method, Gross national income per capita, Purchasing power parity gross national income, Purchasing power parity gross national income per capita, Networked readiness index

1. Introduction

The Internet with a exponential speed growth first came onto scene as a computer network designed to gather scientists and assist in faster science production (Waldrop, 2008). Smart phones, smart TVs and tablets are now not only a tool used for entertainment; instead they represent a new emerging computing platform today (Burma, 2015:113). However, it was later understood that the Internet will be used in many different areas as well like in e-commerce. Only commercial applications were just in advertisement form in the beginning and soon many commercial applications started like direct sales over the Internet (Türen, Gökmen, Tokmak, 2011). In 1994, traditional bookstore paradigm and traditional book sales were changed with the introduction of amazon.com in the U.S., and the e-commerce system, which allows to review, choose and buy the products over the Internet and let them deliver to our homes, has been implemented.

It seems, the categories such as advertising, marketing, sales, purchasing products and/or services, order and payment processing, customer support services, security, delivery of goods and services, banking, online public services, customs procedures and foreign trade transactions performed over the Internet can be included in e-commerce activities (Laudon and Laudon, 2010:92).

As denoted by the Laudons, e-commerce covers various fields. Hence, it is affected by quite diverse fields. These impacts are mutual and, as a result, e-commerce affects many areas as well.

This study reveals the relations and effects between e-commerce and population size, e-commerce sales penetration (% of population with e-commerce sales), internet user, internet user penetration (% of population with internet), gross national income-Atlas method (GNI), gross national income per capita (GNP), purchasing power parity gross national income (GNI PPP), purchasing power parity gross national income per capita (GNP PPP), networked readiness index (NRI), four main indicators of NR (environment, readiness, usage and impacts), global competition index (GCR), logistic performance index (LPI) values which are all believed to

have impact on e-commerce. To provide ease of writing and distinguishing from other text, we used the abbreviation AFAe-c (all factors affecting e-commerce) for all factors other than e-commerce sales penetration (% of population with e-commerce sales). There are various studies in the literature with respect to some factors affecting e-commerce. These studies can be summarized as follows in categories.

Looking from the point of view of Gross Domestic Product (GDP); the total monetary value of all final goods and services produced in a certain period within the borders of a country is Gross Domestic Product according to Dinler (2007:322). In a study by Caselli and Coleman (2001) with international data, GDP was found to have a decisive effect on e-commerce trade volume while Gibbs et al. (2003) found a quite high correlation between GDP and e-commerce trade volumes.

It is believed that people's economic powers and usable income levels will increase as GNP increases. Income is one of the most important factors that affects consumption. According to the "consumption function" that was first used by Keynes, there is a functional relation between consumption and usable income. Accordingly, it is accepted that consumption will increase as income increases and consumption will decrease as income decreases (Seyidoğlu, 2006:480-481). Increase in consumption will provide direct increase in all kinds of trade. According to Caselli & Coleman (2001) and Wong (2003), the increase in purchasing power of the people of any country will also increase the e-commerce sales. In the light of these researches, in our article we included to the model the effects of e-commerce, not used together in a model before, with respect to population of countries, gross national income Atlas method (GNI), gross national product (GNP), purchasing power parity gross national income (GNI PPP) and purchasing power parity gross national income per capita (GNP PPP) which reflect the income and purchasing power of countries.

From the point of view of the number of Internet users; Gibbs et al. (2003) found that the number of internet users affects the e-commerce transaction volume in a country and that technological development, increase in the number of personal computers, investments in the internet access infrastructure and decrease in access to the Internet are factors that increase the number of internet users. Sumita & Yoshii (2010), especially an increase in mobile Internet access has a positive effect on the volume of e-commerce transactions.

In the light of these studies, we included in the model of our article the number of internet users and internet user penetration (% of population with internet) of the countries in addition to the components added above. The purpose of using both values at the same time is the fact that the indicator of the Internet use for a country is the number of Internet users in the total population, not merely the number of internet users in that country. Norway and China can be shown as an example. In the study, total number of internet users in Norway is 4,895,885 with an Internet user penetration of 96% which is the 4th in the country. Similarly, the total number of Internet users in China is 641,601,070 with an Internet user penetration percentage of 46.03%, being the 78th in the world with respect to internet user penetration rates.

From the view point of information and network technology; in a study on the factors affecting e-commerce, Wong (2003) mentioned that e-commerce will be improved by the information systems and communication infrastructure, national man power trained on information technologies, the existence of official institutions to provide regulation, adequacy of financial and legal legislation and e-commerce incentives of stated. Weixin (2006) mentioned in his study on the factors affecting the development of e-commerce about the importance of demographic qualities in the country, economic indicators, importance of investment on information technologies and level of readiness of consumers to this commerce type.

In the lights of these studies; we included in our model in addition to the previously added components the networked readiness index (NRI) that provides comparative measurement of readiness of countries to use Information and Communication Technologies (ICTs), its sub index values of environment, readiness, usage and impacts; and a performance analysis by the World Economic Forum (WEF) on the use of information technologies in a country.

Looking from the point of view of legislations; Wolverton (2002), Achar (2000), Kshetri & Dholakia (2005) and Jehangir (2011) stated that there is need for legal arrangements to support all commercial and non-commercial transaction on virtual environment through the Internet. Gibbs et al. (2003) dealt with the issue of supporting e-commerce by legislation from the viewpoint of digital signature, personal rights, consumer protection, copyrights, content arrangement and taxation and stated that the positive legislation works would have positive effects on e-commerce transaction volume. And, Palagios (2003) emphasized the importance of legal legislation works in Mexico transform e-commerce to a more reliable and preferable business.

Under the lights of these studies we, in addition to the components previously added to the model in our article; included to the model the global competitiveness index GCI published by WEF that also deals with the legal structures of the countries.

Looking from the view point of logistics; Jay Joong‑Kun Cho, John Ozment, Harry Sink, (2008) , Wang Ying, Sang Dayong (2005), H. Scott Matthews, Chris T. Hendrickson, Denise L. Soh (2007) emphasized the importance of the positive relation between logistic structure and e-commerce.   Under the lights of these researches, we included into the model in our article, the logistic performance index (LPI) values in addition to

the components that were added previously.

In addition, many articles and researches that we read mention frequently about these factors as driving forces of e-commerce, various works are done and these factors are used by global research companies.

"The 2013 Global Retail E-Commerce Index" value obtained in the research "Online Retail is Front and Centre in the Quest for Growth" by ATKearney used some of these factors affecting the above mentioned e-commerce. With this index, World Top 30 e-commerce countries list is obtained. This index uses online market size by 40%, technology adaption and consumer behaviour by 20%, indicators of financial-logistical infrastructure development and quality of logistics providers by 20% and online retail sales growth by 20%.

As shown by the information above, factors which are deemed to have an effect on e-commerce have been studied many times for different countries for different factors. However, no study was found in the literature on the countries with different economic and geographic qualities of all possible variables that may affect e-commerce. This study examines not only the variables affecting e-commerce but also the relations between all these variables and the clusters created by countries in cluster analysis.

2. Materials And Methods
2.1. Materials
The e-commerce sales figures of 25 countries in our study were taken from the e-commerce sales figures given in the "size of online retail market (in$ '13)" tables in the pages 20, 23, 25 and 29 of the slide in the http://www.slideshare.net/justuswilde/amblique-demandware-global-ecommerce-expansion-workshop website which was presented in "The New Global Commerce Reality" workshop in July 2014. The Nordic states values here were obtained by the estimation of e-commerce sales figures through statistically distributed population of Sweden, Norway, Denmark and Finland in this region.

Other variables in this study were the e-commerce sales penetration, Internet user penetration (% of population with Internet), GNP, GNI, GNP PPP, GNI PPP, NRI and environment, readiness, usage and impacts components of NRI, GCI and LPI values. In this study, 2013 e-commerce sales figures of 25 countries were used. Although e-commerce sales values for 25 countries were available, all values of the factors affecting e-commerce were used for 148 countries, and ranks of these 148 countries on the basis of these values were given in Table 1. The descriptive statistics of these values are shown in Table 2.

In the study, the relationships between the AFAe-c values and e-commerce were put forward. AFAe-c variables used in our study and information such as who prepared these values, since when these values are used, what are the scopes and what do they measure are explained below.

For the e-commerce sales values; the e-commerce sales figures were taken from the e-commerce sales figures of 25 countries given in the "size of online retail market (in$ '13)" tables in the pages 20, 23, 25 and 29 of the slide in the http://www.slideshare.net/justuswilde/amblique-demandware-global-ecommerce-expansion-workshop website which was presented in "The New Global Commerce Reality" workshop in July 2014. Since we wanted to address countries in the Nordic states separately, we divided the total 38 billion dollars of e-commerce sales volume of these countries proportional to their population, and calculated the individual e-commerce sales volume of Denmark, Finland, Norway and Sweden as 8.3, 8.0, 7.5 and 14.2 billion dollars respectively.

For the population values; the total country population values in the http://www.internetlivestats.com/internet-users-by-country/ website were used. Since the Internet user and Internet user penetration values were obtained from this website in the study, population data was also obtained from this data set.

For the e-commerce sales penetration values; the e-commerce sales penetration values was created by us in this study. A country's e-commerce sales per capita determine that country's position and participation in e-commerce. It is natural for e-commerce sales volume to increase as population of countries increases. Therefore, the e-commerce sales penetration was obtained by the e-commerce sales volume divided by population in order to eliminate the effect of population.

$$\text{e-commerce sales penetration = e-commerce sales amount} * 100.000.000/\text{population}$$

Thus, the e-commerce sales figure per 100 million people in a country was found.

For the Gross National Income (Atlas Method) $ billions 2013 (GNI) values: The total goods and services produced in an economy in a given period is called national income, indicating the degree of public welfare. It is created by the World Bank annually. Gross national income, Atlas method GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current U.S. dollars. The GNI values of the countries were taken from the http://wdi.worldbank.org/table/1.1 website. The values are for the year 2013. As of January 2015, the values for the 2014 was not published yet.

Gross national income per capita, Atlas method $ 2013 (GNP): Gross national income per capita, Atlas method, GNI per capita (formerly GNP per capita) is the gross national income, converted to the U.S. dollars

using the World Bank Atlas method, divided by the midyear population. The GNP values of the countries were taken from the http://wdi.worldbank.org/table/1.1 website. The values are for the year 2013. As of January 2015, the values for the 2014 was not published yet.

Purchasing power parity gross national income (GNI PPP): PPP GNI is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. The GNI PPP values of the countries were taken from the http://wdi.worldbank.org/table/1.1 website. The values are for the year 2013. As of January 2015, the values for the 2014 was not published yet.

Purchasing power parity gross national per income (GNP PPP): GNI PPP divided by the midyear population. The GNP PPP values of the countries were taken from the http://wdi.worldbank.org/table/1.1 website. As of January 2015, the values for the 2014 was not published yet.

Internet User is the number of users for each country. Most of these data were provided by International Telecommunications Union Telecommunication Standardization Sector (ITU-T). In the study, the Internet User data set from the http://www.internetlivestats.com/Internet-users-by-country/ was used.

Internet user penetration (% of population with Internet): These values that show the percent of population using Internet in a country were taken from the http://www.internetlivestats.com/Internet-users-by-country/ website.

Networked Readiness Index (NRI): It is published by WEF since 2001. This index indicates the extent of readiness of countries to use information technologies, the extent of adoption of these technologies by individuals, businesses and public administration, and the competitiveness among countries. It has four factors of environment, readiness, usage and impact, and these have a total of 54 sub-indexes. These values were taken from the http://reports.weforum.org/global-information-technology-report-2014/ website.

Global Competitiveness Index (GCI): Since 2005, the World Economic Forum has based its competitiveness analysis on the Global Competitiveness Index (GCI), a comprehensive tool that measures the microeconomic and macroeconomic foundations of national competitiveness (ref: World Economic Forum). The values were taken from the http://reports.weforum.org/global-competitiveness-report-2014-2015/ website.

Logistic Performance Index: The LPI is an interactive benchmarking tool created to help countries identify the challenges and opportunities they face in their performance on trade logistics and what they can do to improve their performance. The index covers all aspects of logistics including air, land and ocean freight. LPI was taken from the http://lpi.worldbank.org/ website.

Table 1. Country ranking of the AFAe-c values (* ranking among 25 countries, _ WEF ranking among 148 countries)

Country	e-commerce sales values (for 25 country)*	e-commerce sales penetration (for 25 country)*	Population Rank	GNP	GNI	GNP PPP	GNI PPP	Internet Penetration Rank	nr	environment	readiness	usage	impacts	Global Competitiveness index	lojistic index
Australia	9	6	49	5	12	15	19	14	18	14	9	19	20	22	16
Canada	12	12	36	10	11	14	16	10	17	10	13	26	17	15	12
China	2	19	1	76	2	77	2	78	62	77	73	61	56	28	28
Denmark	16	4	113	7	32	13	52	5	13	16	14	7	19	13	17
Finland	17	5	86	13	39	18	55	8	1	3	1	2	2	4	24
France	7	13	20	18	5	20	8	21	25	30	27	23	23	23	13
Germany	5	10	16	14	4	11	5	18	12	17	8	13	14	5	1
Hong Kong	21	18	98	21	36	6	40	29	8	4	12	15	10	7	15
Indenesia	22	25	4	108	16	94	10	115	64	63	65	69	72	34	53
Italy	11	17	22	22	8	23	11	53	58	88	33	51	82	49	20
India	8	24	2	132	10	117	3	110	83	91	85	91	60	71	54
Japan	4	9	10	16	3	22	4	20	16	21	19	9	16	6	10
Malaysia	23	22	42	57	34	44	27	139	30	24	59	30	28	20	25
New Zealand	20	11	119	20	55	-	-	12	20	2	45	16	22	17	23
Norway	18	3	111	1	22	3	46	4	5	7	4	6	12	11	7
Russia	14	20	9	44	9	40	6	55	50	87	37	53	44	53	87
Singapore	24	16	109	8	35	2	38	27	2	1	6	4	1	2	5
South Korea	6	7	26	26	14	24	15	36	10	34	17	3	5	26	21
Spain	10	14	28	24	13	25	15	36	34	45	30	33	34	35	18
Sweden	13	2	107	6	21	9	37	15	3	8	3	1	4	10	19
Taiwan	15	15	50	-	-	-	-	28	14	25	7	17	7	14	19
Thailand	25	23	19	86	31	71	21	97	67	56	63	80	83	31	35
Turkey	19	21	18	54	18	53	17	77	51	44	42	63	65	45	30
Un.Kingdom	3	1	21	20	6	21	9	13	9	5	21	12	9	9	4
United States	1	8	3	9	1	7	1	19	7	15	5	11	8	3	9

(World Data Bank was not published the related 2013 data for Taiwan and New Zealand yet.)

The first two columns in the table (e-trade sales and e-trade sales penetration) show the ranking of 25 countries, other columns show the ranking of 25 countries among 148 countries included in WFE. This table is important for the countries to determine their positions with respect to these variables, to provide reader with information and to make interpretation.

2.2. Methods

Descriptive statistics: The min, max, median, average and standard deviations (SD) were calculated for all

dependent and independent variables used in this study. In interpreting these values, the rank among all countries in the world is very important, therefore table 1 rank values will also be used in the material section together with the descriptive statistics calculated in this study.

Correlation analysis is a statistical method for examining a linear relationship between two variables and it is indicated by the correlation coefficient r. Correlation coefficient indicates the relationship between two variables and has a value in the range of -1 to 1. The correlation coefficient becomes either +1 or -1 if there is a perfect correlation between the variables. The sign positivity the direction of the correlation (correlation coefficient,2014). The Pearson correlation analysis was used to examine the relationship between e-commerce penetration and AFAe-c values of the countries.

Multiple linear regression analysis is a statistical tool for investigating the relationships between variables. Usually, it is used when researchers want to determine the impact of a variable on another variable. Such as the effect of currency on the inflation rate (Sykes, 2014).

In this study, the effect of the related factors on the e-commerce sales penetration is determined by multiple linear regression analysis. A model was created using multiple linear regression method in order to investigate the linear relationship between e-commerce sales penetration and the related factors (environment, impacts, readiness, usage, GCI, LPI, Penetration of population with Internet, GNP, GNP PPP) in the correlation table. NRI was excluded from this analysis since the NRI is a combination of the environment, Impacts, readiness and usage values and can create a multicollinearity problem.

Cluster analysis is a multivariate method that aims to classify different groups according to their similarities based on a number of measured variables. The distance between the variables are taken into account in the formation of groups in the cluster analysis. The distance between the variables is created according to their similarities and closenesses (Johnston, 1978). The distance between similar objects is small, and the extent of similarity is higher. And, the hierarchical clustering method is a multivariate method that links variables by ranking them hierarchically based on their similarities and differences without knowing the number of groups initially. The dendogram graph obtained by the hierarchical clustering shows the clusters combined and separated. The purpose for using this method in the study is to show the similarities and differences between countries depending on the specific variables. We used cluster analysis to investigate the similarities and differences between countries based on the e-commerce penetration and AFAe-c values.

Limitations

The number of factors affecting e-commerce (AFAe-c) is excessive and information for all these factors are given for 148 countries. However, the biggest constraint is that the e-commerce sales volumes are only given for 25 countries. It was not possible to obtain 2013 e-commerce sales figures of 148 countries despite the extensive researches and purchase attempts from the paid research companies. The results of this study would be different if it was possible to obtain data for all or some of these 148 countries. Although it was possible to find e-commerce sales figures for more countries, the data would be from various periods and places and hence these asynchronous data would lead to different results in our study. Because these values vary between countries in time. In spite of this, we think that these 25 countries used in the study are specifically selected and representative in terms of the income, demographic and social aspects, and have a higher statistical power. Otherwise, the statistics of countries with lower AFAe-c values could skew our results.

Another limitation was the vast amount of findings obtained in the study as to prevent interpretation of all in this article. However, tables and graphs will help readers to draw their own conclusions in terms of economic, social, financial, etc. aspects. In this study, the results were evaluated in terms of the management information systems.

Another limitation is that environments, readiness, usage and impacts among NRI components were included in the model in the linear regression analysis but NRI itself was not included in the model to avoid multiple connection problem as these values have strong relation with NRI.

3. Results

The descriptive statistics of e-commerce sales penetration and AFAe-c values are shown in Table 2.

Table 2: Descriptive Statistics of e-commerce sales penetrasion and AFAe-c

	Mean± Standard Deviation	Median	Minimum	Maximum
Sales Values	39416000000,00±66656993131,50	14200000000,00	2000000000,00	263000000000,00
Population	166935096,76±359045381,44	49512026	4551349	1393783836
E-commerce sales Penetration	614,13±554,78	495,04	7,91	1937,34
Internet User	74736055,20±136953370,73	35010273	675074	641601070
Internet Penetration	70,77±28,10	85,75	2,24	96,15
GNI 2013 Atlas Method	2323,51±3644,68	1301,6	157,6	16967,7
GNP	36261,28±24096,85	38420	1570	102610
GNI PPP	2893,14±4406,21	1458,7	136,3	17057,5
GNP PPP	35,70±17,10	37,58	5,35	76,85
NRI	5,08±0,70	5,4	3,8	6
Environment	4,87±0,67	5	3,8	5,9
Impacts	4,75±0,85	5	3,4	5,9
Readiness	5,73±0,56	5,8	4,6	6,6
Usage	5,02±0,85	5,3	3,4	6,1
GCI	5,07±0,43	5,2	4,21	5,65
LPI	3,68±0,33	3,72	2,69	4,12

Results from correlation analysis:

Table 3: Correlation matrix of the variables e-commerce and AFAe-c

		Sales Values	Population millions 2014	E-commerce sales Penetration	Internet User	Penetration of pop with Internet	GNI	GNP	GNI PPP	GNP PPP	NRI	Environment	İmpacts	Readiness	Usage	GCI	LPI
Sales Values	r	1,0000	0,5100	0,1236	0,7920	0,0876	0,9290	-0,0130	0,9210	-0,0150	-0,0031	-0,0700	0,0455	-0,0363	0,0314	0,1897	0,1799
	p		0,0092	0,5560	<0,0001	0,6770	<0,0001	0,9509	<0,0001	0,9432	0,9882	0,7396	0,8290	0,8632	0,8816	0,3639	0,3895
Population millions 2014	r	0,5100	1,0000	-0,3300	0,8840	-0,4480	0,4160	-0,4460	0,7160	-0,5130	-0,5410	-0,5250	-0,4410	-0,5830	-0,5270	-0,3805	-0,3854
	p	0,0092		0,1072	<0,0001	0,0247	0,0388	0,0256	0,0001	0,0087	0,0052	0,0071	0,0275	0,0022	0,0068	0,0606	0,0571
E-commerce sales Penetration	r	0,1236	-0,3300	1,0000	-0,2252	0,7010	-0,0162	0,7150	-0,1710	0,4960	0,6950	0,6140	0,6730	0,6480	0,7340	0,5750	0,5500
	p	0,5560	0,1072		0,2790	0,0001	0,9388	0,0001	0,4137	0,0117	0,0001	0,0011	0,0002	0,0005	<0,0001	0,0026	0,0044
Internet User	r	0,7920	0,8840	-0,2252	1,0000	-0,2326	0,6960	-0,3060	0,9050	-0,3406	-0,3701	-0,4090	-0,2980	-0,3920	-0,3434	-0,1609	-0,1761
	p	<0,0001	<0,0001	0,2790		0,2632	0,0001	0,1368	<0,0001	0,0957	0,0686	0,0423	0,1479	0,0526	0,0928	0,4422	0,3997
Penetration of pop with Internet	r	0,0876	-0,4480	0,7010	-0,2326	1,0000	0,0780	0,7800	-0,1428	0,7310	0,8160	0,6700	0,7610	0,8340	0,8150	0,6420	0,6580
	p	0,6770	0,0247	0,0001	0,2632		0,7110	<0,0001	0,4960	<0,0001	<0,0001	0,0003	<0,0001	<0,0001	<0,0001	0,0005	0,0004
GNI	r	0,9290	0,4160	-0,0162	0,6960	0,0780	1,0000	0,0340	0,9240	0,0450	-0,0100	-0,0976	0,0146	0,0249	0,0154	0,1665	0,1453
	p	<0,0001	0,0388	0,9388	0,0001	0,7110		0,8718	<0,0001	0,8310	0,9622	0,6426	0,9447	0,9060	0,9417	0,4263	0,4882
GNP	r	-0,0130	-0,4460	0,7150	-0,3060	0,7800	0,0340	1,0000	-0,1895	0,8500	0,7690	0,7140	0,6760	0,7940	0,7610	0,6620	0,6980
	p	0,9509	0,0256	0,0001	0,1368	<0,0001	0,8718		0,3643	<0,0001	<0,0001	0,0001	0,0002	<0,0001	<0,0001	0,0003	0,0001
GNI PPP	r	0,9210	0,7160	-0,1710	0,9050	-0,1428	0,9240	-0,1895	1,0000	-0,1867	-0,2449	-0,3081	-0,1859	-0,2284	-0,2220	-0,0413	-0,0780
	p	<0,0001	0,0001	0,4137	<0,0001	0,4960	<0,0001	0,3643		0,3714	0,2381	0,1341	0,3735	0,2721	0,2862	0,8445	0,7110
GNP PPP	r	-0,0150	-0,5130	0,4960	-0,3406	0,7310	0,0450	0,8500	-0,1867	1,0000	0,8450	0,7840	0,7780	0,8370	0,7990	0,7590	0,7300
	p	0,9432	0,0087	0,0117	0,0957	<0,0001	0,8310	<0,0001	0,3714		<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001
NRI	r	-0,0031	-0,5410	0,6950	-0,3701	0,8160	-0,0100	0,7690	-0,2449	0,8450	1,0000	0,9230	0,9770	0,8930	0,9780	0,9050	0,7490
	p	0,9882	0,0052	0,0001	0,0686	<0,0001	0,9622	<0,0001	0,2381	<0,0001		<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001
Environment	r	-0,0700	-0,5250	0,6140	-0,4090	0,6700	-0,0976	0,7140	-0,3081	0,7840	0,9230	1,0000	0,8730	0,7310	0,8740	0,9050	0,7320
	p	0,7396	0,0071	0,0011	0,0423	0,0003	0,6426	0,0001	0,1341	<0,0001	<0,0001		<0,0001	<0,0001	<0,0001	<0,0001	<0,0001
İmpacts	r	0,0455	-0,4410	0,6730	-0,2980	0,7610	0,0146	0,6760	-0,1859	0,7780	0,9770	0,8730	1,0000	0,8420	0,9600	0,8770	0,6840
	p	0,8290	0,0275	0,0002	0,1479	<0,0001	0,9447	0,0002	0,3735	<0,0001	<0,0001	<0,0001		<0,0001	<0,0001	<0,0001	0,0002
Readiness	r	-0,0363	-0,5830	0,6480	-0,3920	0,8340	0,0249	0,7940	-0,2284	0,8370	0,8930	0,7310	0,8420	1,0000	0,8420	0,7250	0,6470
	p	0,8632	0,0022	0,0005	0,0526	<0,0001	0,9060	<0,0001	0,2721	<0,0001	<0,0001	<0,0001	<0,0001		<0,0001	<0,0001	0,0005
Usage	r	0,0314	-0,5270	0,7340	-0,3434	0,8150	0,0154	0,7610	-0,2220	0,7990	0,9780	0,8740	0,9600	0,8420	1,0000	0,8830	0,7410
	p	0,8816	0,0068	<0,0001	0,0928	<0,0001	0,9417	<0,0001	0,2862	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001		<0,0001	<0,0001
GCI	r	0,1897	-0,3805	0,5750	-0,1609	0,6420	0,1665	0,6620	-0,0413	0,7590	0,9050	0,9050	0,8770	0,7250	0,8830	1,0000	0,7830
	p	0,3639	0,0606	0,0026	0,4422	0,0005	0,4263	0,0003	0,8445	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001		<0,0001
Logistic index	p	0,1799	-0,3854	0,5500	-0,1761	0,6580	0,1453	0,6980	-0,0780	0,7300	0,7490	0,7320	0,6840	0,6470	0,7410	0,7830	1,0000
	r	0,3895	0,0571	0,0044	0,3997	0,0004	0,4882	0,0001	0,7110	<0,0001	<0,0001	<0,0001	0,0002	0,0005	<0,0001	<0,0001	

According to the result of pearson correlation table in Table 3; the relations with e-commerce penetration and AFAe-c values were examined. r values in Table 3 were interpreted as medium if in the range of $0.40 < r < 0.70$ and as strong if $r > 0.70$. If $p < 0.05$, it is statistically significant and summarized in Table 4 by giving direction.

Table 4: The interpretation table of the statistically significant correlations on their significance and direction

Variables	Variables	Strong	Medium
E-commerce sales penetration	Penetration of pop with Internet	X(↑)	
	GNP	X(↑)	
	GNP PPP		X(↑)
	NRI		X(↑)
	Environment		X(↑)
	Impacts		X(↑)
	Readiness		X(↑)
	Usage	X(↑)	
	Global Competitiviness Indeks		X(↑)
	Logistic Performance Index		X(↑)
Population	E-commerce sales values		X(↑)
	Internet users	X(↑)	
	Penetration of population with Internet		X(↓)
	GNI 2013 Atlas Method		X(↑)
	GNP		X(↓)
	GNI PPP	X(↑)	
	GNP PPP		X(↓)
	NRI		X(↓)
	Environment		X(↓)
	Impacts		X(↓)
	Readiness		X(↓)
	Usage		X(↓)
E-commerce sales values	GNI 2013 Atlas Method	X(↑)	
	GNI PPP	X(↑)	
	Internet users	X(↑)	
Penetration of population with Internet	GNP	X(↑)	
	GNP PPP	X(↑)	
	NRI	X(↑)	
	Environment		X(↑)
	Impacts	X(↑)	
	Readiness	X(↑)	
	Usage	X(↑)	
	Global Competitiviness Index		X(↑)
	Logistic Performance Index		X(↑)
GNI 2013 Atlas Method	GNI PPP	X(↑)	
	Internet user		X(↑)
GNP	GNP PPP	X(↑)	
	NRI	X(↑)	
	environment	X(↑)	
	impacts		X(↑)
	readiness	X(↑)	
	usage	X(↑)	
	Global Competitiviness Index		X(↑)
	Logistic Performance Index		X(↑)
GNI PPP	Internet user	X(↑)	
GNP PPP	NRI	X(↑)	
	Environment	X(↑)	
	Impacts	X(↑)	
	Readiness	X(↑)	
	Usage	X(↑)	
	Global Competitiviness Index	X(↑)	
	Logistic Performance Index	X(↑)	
NRI	Environment	X(↑)	
	Impacts	X(↑)	
	Readiness	X(↑)	
	Usage	X(↑)	
	Global Competitiviness Index	X(↑)	
	Logistic Performance Index	X(↑)	
Environment	Internet user		X(↓)
	Impacts	X(↑)	
	Readiness	X(↑)	
	Usage	X(↑)	
	Global Competitiviness Index	X(↑)	
	Logistic Performance Index	X(↑)	
Impacts	Readiness	X(↑)	
	Usage	X(↑)	
	Global Competitiviness Index	X(↑)	
	Logistic Performance Index		X(↑)
Readiness	Usage	X(↑)	
	Global Competitiviness Index	X(↑)	
	Logistic Performance Index	X(↑)	
Usage	Global Competitiviness Index	X(↑)	
	Logistic Performance Index	X(↑)	
Global Competitiviness Index	Logistic Performance Index	X(↑)	

Results of the Multiple Linear Regression Analysis:
Although GNP and GNP-PPP, Penetration of population with Internet, environment, readiness, usage, Impacts, GCI, LPI, and NRI values have a significant mutual correlation, we excluded the NRI from the model due to the potential multicollinearity problem and performed the multiple linear regression analysis to find out the extent of explanation provided by these values. In the model, only GNP and GNP-PPP had significance. Regression equation becomes,

$$Y=0,019\ X-29,009Z$$

where,
Y: e-commerce sales penetration
X: The gross national income per capita.
Z: purchasing power parity gross national income per capita
According to this equation, when GNP is increased 1 unit, e-commerce sales penetration increase 0,019 unit and when GNP-PPP increases 1 unit, e-commerce sales penetration is reduced 29,0009 unit.

Results from clustering analysis:
The first cluster analysis group has AFAe-c values. And the dendogram we have created as a result of these values is shown in Figure 1.
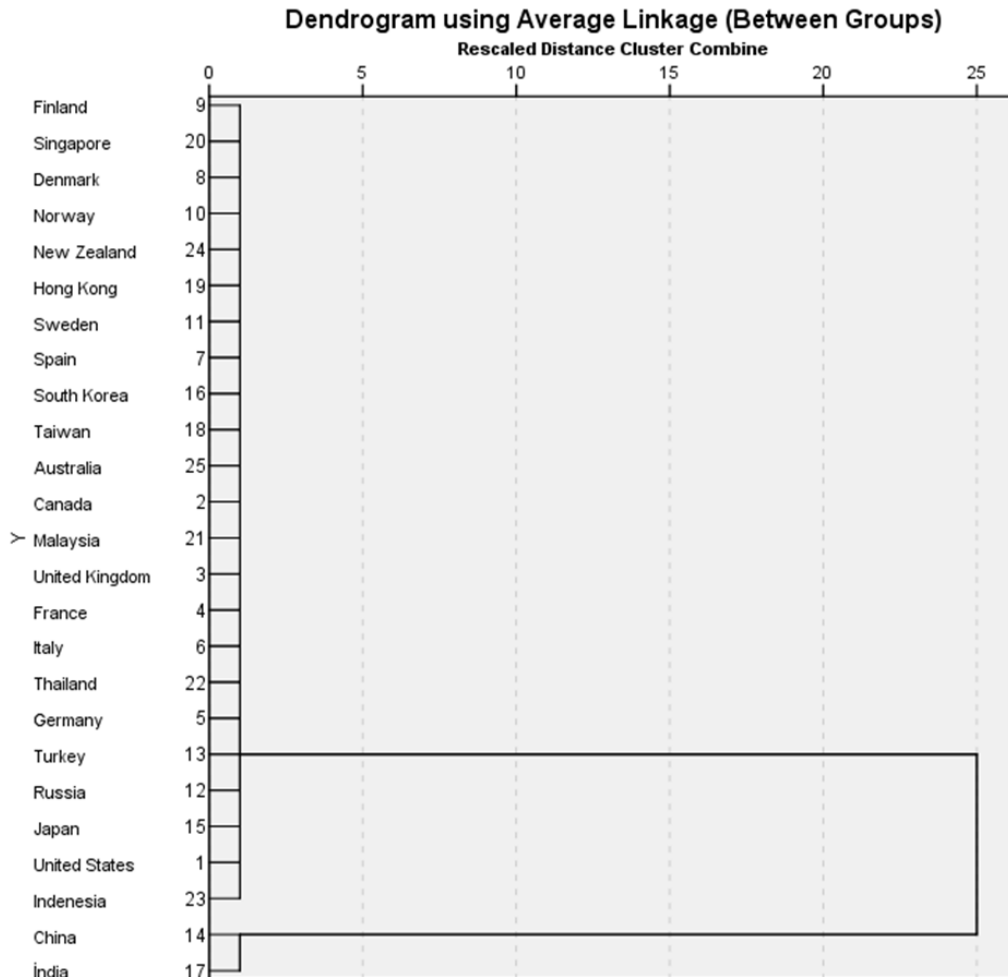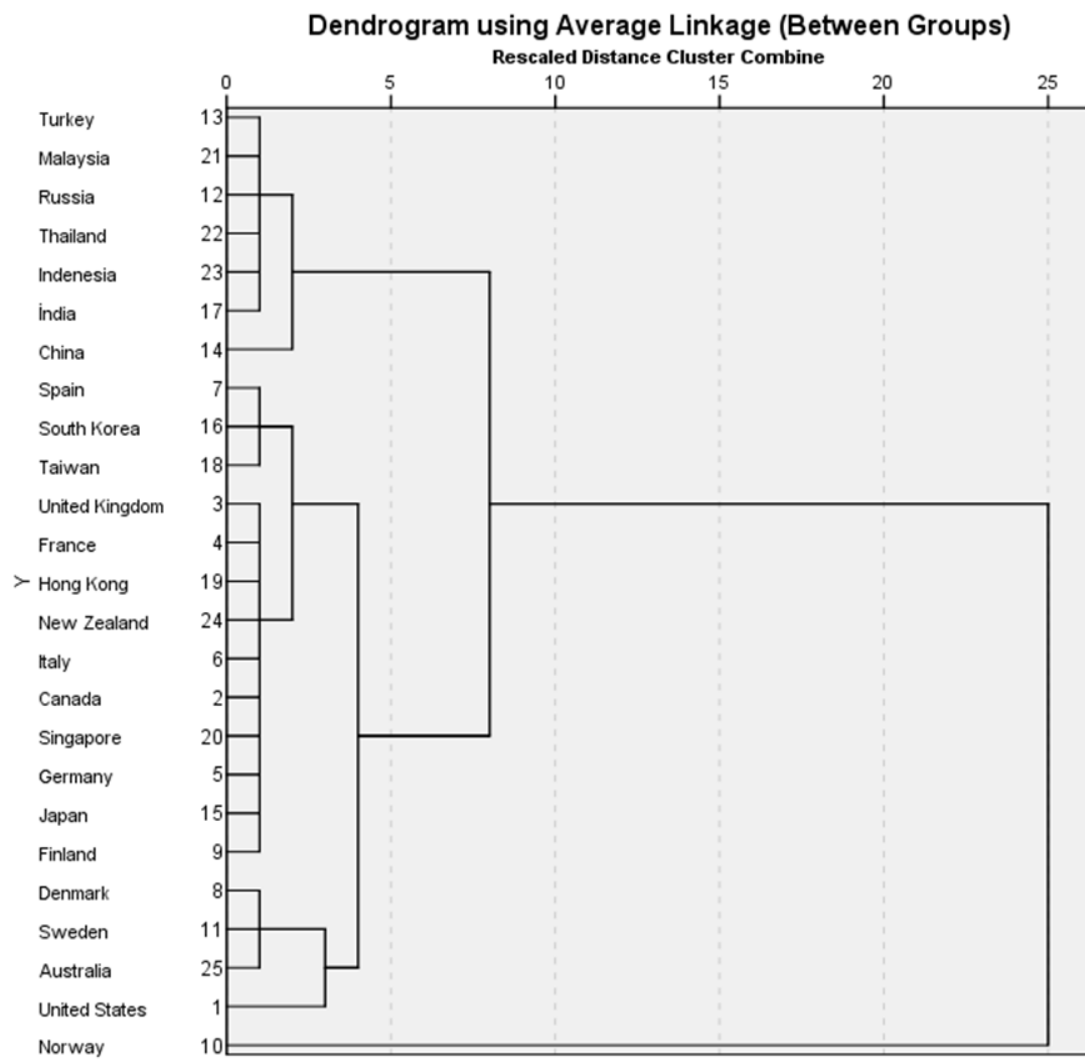

Figure 1: Cluster dendogram with AFAe-c values

Table 5: Cluster accumulation with AFAe-c values.

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	9	20	5465765965,295	0	0	2
2	8	9	27041545944,998	0	1	4
3	18	25	74960899082,771	0	0	14
4	8	10	204042172630,351	2	0	5
5	8	24	803004665816,296	4	0	7
6	3	4	1327217476754,655	0	0	9
7	8	19	4198964470047,707	5	0	10
8	7	16	5981087429583,281	0	0	17
9	3	6	9302064145340,541	6	0	11
10	8	11	17071905109263,104	7	0	18
11	3	22	19488536185931,465	9	0	16
12	2	21	28483568751216,690	0	0	14
13	5	13	46448690422589,070	0	0	16
14	2	18	94773074409328,880	12	3	17
15	12	15	239255226318995,300	0	0	21
16	3	5	245692548977171,060	11	13	19
17	2	7	431527746221065,800	14	8	18
18	2	8	934710802380552,600	17	10	19
19	2	3	2787614255598890,000	18	16	21
20	1	23	4867962075285087,000	0	0	23
21	2	12	10710104470336670,000	19	15	23
22	14	17	15972406799275650,000	0	0	24
23	1	2	61828168447845136,000	20	21	24
24	1	14	1610011520488972290,000	23	22	0

China and India rank 1st and 2nd according to the population rank. Therefore, we have reached the conclusion that the cluster analysis should be performed using the e-commerce sales penetration, considering the fact that the population would have an excessive impact in the cluster analysis. And, it is seen in the results of the 1st cluster analysis with AFAe-c values given in Figure 1 that India and China are separated from other countries.

The dendogram created by the new e-commerce sales penetration value calculated by excluding the population size from the AFAe-c values (by removing the population and e-commerce sales volume from the model) is shown in Figure 2.
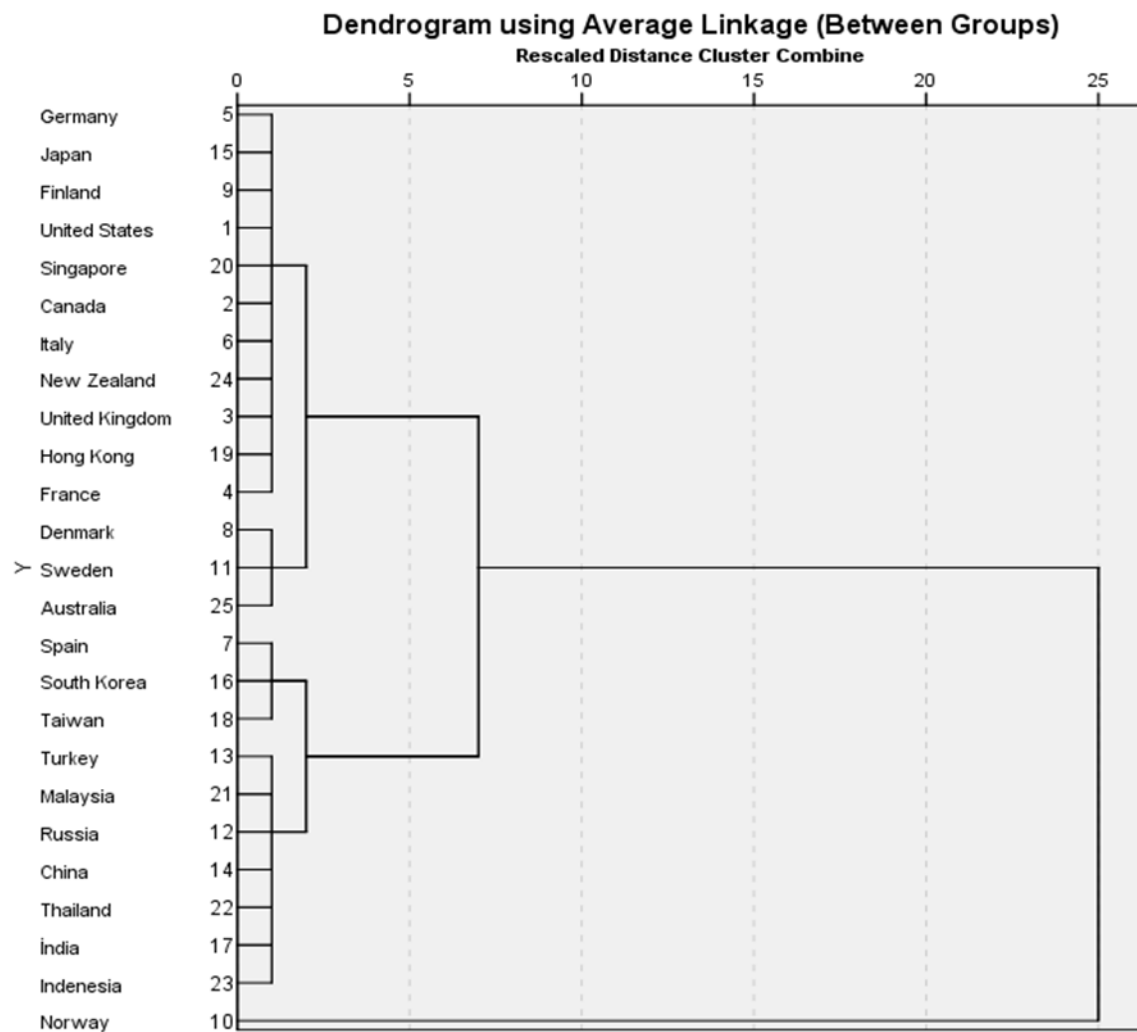
Figure 2: The clustering dendogram of the e-commerce sales penetration, excluding the population and e-commerce sales volume from the AFAe-c in the model.

Table 6: Cluster accumulation of population and e-commerce sales amount removed e-commerce penetration and AFAe-c through the model

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	13	21	1111690,947	0	0	10
2	8	11	3769410,667	0	0	11
3	22	23	5477200,642	0	0	13
4	5	15	6101744,396	0	0	15
5	2	20	6971680,527	0	0	16
6	19	24	8390969,771	0	0	9
7	7	16	10859239,905	0	0	14
8	3	4	11866685,437	0	0	12
9	6	19	15338715,073	0	6	12
10	12	13	17707876,661	0	1	17
11	8	25	31077072,325	2	0	21
12	3	6	34561845,902	8	9	18
13	17	22	37472594,396	0	3	17
14	7	18	39424963,508	7	0	20
15	5	9	39792910,875	4	0	16
16	2	5	64489465,460	5	15	18
17	12	17	82997671,139	10	13	19
18	2	3	155297183,642	16	12	20
19	12	14	269740482,988	17	0	23
20	2	7	380195418,167	18	14	22
21	1	8	609953820,299	0	11	22
22	1	2	653248170,074	21	20	23
23	1	12	1585644158,654	22	19	24
24	1	10	5210192472,274	23	0	0

And, when we use the e-commerce sales penetration and the remaining values obtained after removing the population and e-commerce sales volume from the AFAe-c, it's seen in Figure 2 that Norway is separated from other countries. In order to find out what is the most important factor that separates Norway from other countries, we removed all values in the model one by one and performed the cluster analysis again, and saw that Norway is still separated from other countries.

The dendogram we obtained as a result of the cluster analysis using all the values remained after removing population size, e-commerce sales volume, GNI and GNI-PPP values from AFAe-c and e-commerce penetration is shown in Figure 3.
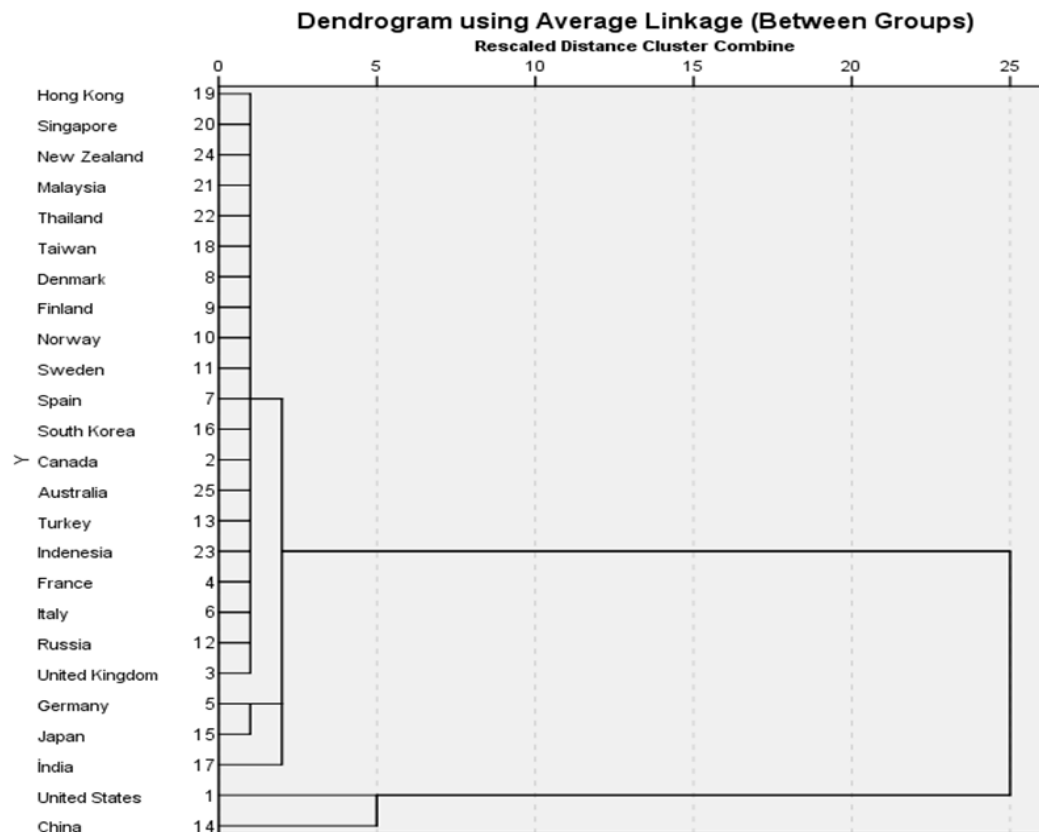
Figure 3: The clustering dendogram created by removing population size, e-commerce sales volume, GNI and GNI PPP values from the AFAe-c and e-commerce penetration

Table 7: The clustering created by removing population size, e-commerce sales volume, GNI and GNI PPP values from the AFAe-c and e-commerce penetration

Agglomeration Schedule

| Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		NextStage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	5	15	1756,346	0	0	6
2	13	21	305164,777	0	0	11
3	1	20	342475,195	0	0	7
4	6	24	1380238,076	0	0	15
5	14	22	1432622,839	0	0	13
6	5	9	1804816,280	1	0	18
7	1	2	2828483,272	3	0	18
8	3	19	3280561,733	0	0	14
9	8	11	3686457,627	0	0	16
10	17	23	4040322,864	0	0	13
11	12	13	10222099,256	0	2	19
12	7	16	10807123,495	0	0	17
13	14	17	12866897,570	5	10	19
14	3	4	13234881,025	8	0	15
15	3	6	28492160,508	14	4	20
16	8	25	29517777,775	9	0	22
17	7	18	38262749,083	12	0	21
18	1	5	48123043,522	7	6	20
19	12	14	61616567,074	11	13	21
20	1	3	162578912,501	18	15	22
21	7	12	354010071,980	17	19	23
22	1	8	359783816,991	20	16	23
23	1	7	1419773672,961	22	21	24
24	1	10	5167312556,135	23	0	0

In Figure 3, we see that Norway is different from other countries when we use all the values remained after removing population size, e-commerce sales volume, GNI and GNI-PPP values from AFAe-c and e-commerce sales penetration. The dendogram we obtained as a result of the cluster analysis using all the values remained after removing population size, e-commerce sales volume, GNP and GNP-PPP values from AFAe-c and e-commerce penetration is shown in Figure 4.

Figure 4: The clustering dendogram created by removing population size, e-commerce sales volume, GNP and GNP PPP values from the AFAe-c and e-commerce penetration

Table 8: The clustering created by removing population size, e-commerce sales volume, GNI and GNI PPP values from the AFAe-c and e-commerce penetration

Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		NextStage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	19	20	8440,423	0	0	6
2	8	9	9202,757	0	0	5
3	10	11	10541,315	0	0	5
4	21	22	61088,117	0	0	7
5	8	10	88898,228	2	3	16
6	19	24	142074,240	1	0	10
7	18	21	172156,559	0	4	10
8	7	16	231637,377	0	0	9
9	2	7	328025,719	0	8	11
10	18	19	413500,107	7	6	16
11	2	25	522382,679	9	0	14
12	4	6	764014,198	0	0	15
13	13	23	839469,490	0	0	14
14	2	13	1392242,184	11	13	17
15	4	12	1617015,122	12	0	17
16	8	18	1651926,808	5	10	19
17	2	4	2979577,835	14	15	18
18	2	3	4145021,665	17	0	19
19	2	8	5599139,393	18	16	22
20	5	15	6100096,648	0	0	21
21	5	17	16146331,231	20	0	22
22	2	5	28668535,596	19	21	24
23	1	14	66391480,636	0	0	24
24	1	2	375338261,212	23	22	0

In Figure 4, we see that China and USA are separated from other countries when we use all the values remained

after removing population size, e-commerce sales volume, GNP and GNP-PPP values from AFAe-c and e-commerce penetration. This is probably because of the higher national income of the countries. The e-commerce sales penetration and AFAe-c values of the countries separated from other countries in the cluster analysis are given in Table 9.

Table 9: The countries separated from other countries in the cluster analysis (* India was included for its population).

	Norway	United States	China	India*
e-commerce sales values (bilion$)	7,5	263	219	28
e-commerce sales penetration (100million)	1472,9	815,3	157,1	22,1
Population millions (year of 2014)	5.091.924	322.583.006	1.393.783.836	1.267.401.849
Logistic performance index (LPI)	3,96	3,92	3,53	3,08
Internet User	4.895.885	279.834.232	641.601.070	243.198.922
Penetration of population with Internet	96,15	86,75	46,03	19,19
Global Competitiviness Index (GCI)	5,35	5,54	4,89	4,2
Environment	5,5	5,2	3,9	3,8
Readiness	6,3	6,3	4,8	4,6
Usage	5,8	5,6	3,9	3,4
Impacts	5,3	5,4	3,7	3,6
GNI 2013 Atlas Method	521,7	16.967,7	8.905,3	1.960,1
GNP	102.610	53.670	6.560	1.570
GNI PPP	338,2	17.057,5	16.080,6	6.697,9
GNP PPP	66,52	53,96	11,85	5,35
NRI	5,7	5,6	4,1	3,8

As a result of cluster analysis, Figure 5 includes the graphics according to the gross national income per capita that indicates a significant increase in e-commerce in the multi linear regression equation and that makes a difference in distinguishing countries as a result of cluster analysis.
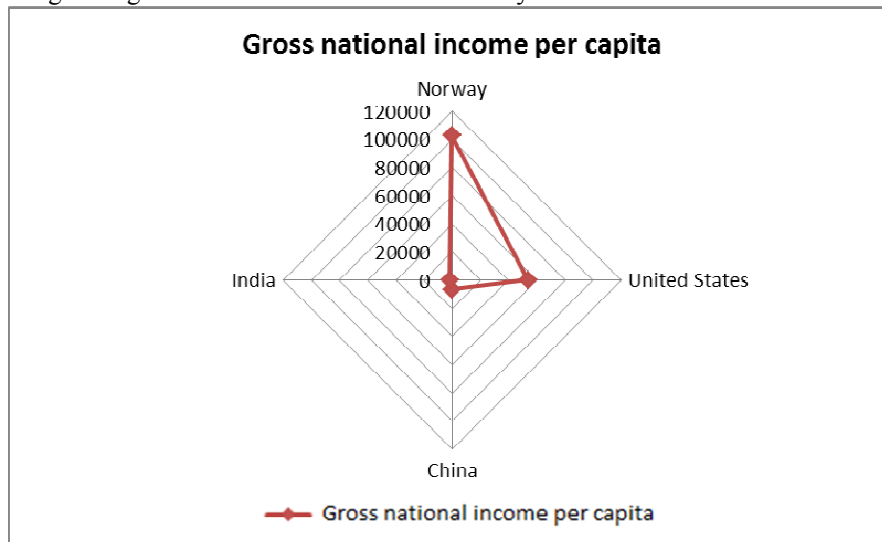
Figure 5: The distribution of gross national income per capita that differentiates countries

When Figure 5 is examined, as it can be seen from the values given in Table 9, the gross national income per capita is 102.610 for Norway, 53.670 for United States, 6.560 for China and 1.570 for India. Norway is leading far ahead. High GNP value will provide more personal e-commerce with respect to e-commerce sales penetration.

4. Discussion

What are the influential factors needed for countries and companies in that countries in order to sustain their presence and compete each other in e-commerce which creates a paradigmatic shift in the traditional commerce? First the values related to e-commerce sales amount are regarded as gross national income 2013 Atlas method, purchasing power parity gross national income, population and internet user, therefore increase of these values

by countries will cause an increase in e-commerce sales amounts. However, other than population, the increase of others will only be realized as much as the country population. Therefore, population is the most important factor among these variables. There are some indirect elements as well. For a country with sufficient population, an explanation through e-commerce penetration, a country should first increase its gross national income per capita. When population effect is removed, the relation order with e-commerce penetration is in the second order, however, it becomes more important than the others by the fact that it is significant in the regression model. Apart from that, an attempt to increase usage, penetration of population with Internet, NRI, impacts, readiness, environment, global competition index, logistic values respectively will provide significant increase in e-commerce sales in the businesses of these countries.

Looking at the ranks given in Table 1 for the 25 countries:

In terms of population, China is the 1st, India is 2nd, and U.S. is 3rd in the world. And, in terms of e-commerce sales volumes U.S. is the 1st and China is 2nd. Population has a great influence on the e-commerce sales volume. The impact of population is shown in the cluster dendogram in Figure 1.

In terms of e-commerce sales penetration, U.K. is the 1st, Sweden is 2nd and Norway is 3rd among the 25 countries with e-commerce sales data. We can say here that the Nordic States are particularly leading. Although the e-commerce penetrations of the United Kingdom and Sweden are higher, Norway is the first in the e-commerce sales penetration by its national income per capita completely as can be seen in the cluster dendogram.

In terms of GNI and GNI PPP, the U.S. is the 1st, and China is 2nd in the rank. These values are followed by Japan, Germany, France, United Kingdom and Russia, respectively. And, the commerce sales rank for these countries is United Kingdom, Japan, Germany, South Korea and France, respectively. Here, the GNI and GNI PPP values of the countries are very effective on the e-commerce sales volumes. Its impact is shown in the cluster dendogram in Figure 4.

In terms of GNP and GNP PPP, Norway is followed by Sweden, Denmark, Singapore, United States and Australia respectively. The impact in Norway is shown in the cluster dendogram in Figure 3.

In terms of NRI and its components, Finland is the 1st, Singapore is 2nd, Sweden is 3rd and Norway is 5th best country in the use of ICTs. But they are not prominent in e-commerce. When we look at the population values of these countries, we see that the ranks of Finland, Singapore, Sweden and Norway is 86th, 109th, 107th and 111th in 148 countries respectively. It is easier in small countries to establish ICT infrastructure. But it's not enough to have better values in these variables to have a say in the world e-commerce environment.

In the global competitiveness index, Singapore, United States, Finland, Germany, Japan, Hong Kong, United Kingdom and Sweden are at the top.

In terms of the logistic performance index, Germany, United Kingdom, Singapore, Sweden, Norway and United States are at the top, respectively. It is clear here that the impact of logistic performance index on e-commerce is not much.

Jay Joong-Kun Cho & John Ozment & Harry Sink, (2008), Wang Ying & Sang Dayong (2005), H. Scott Matthews & Chris T. Hendrickson & Denise L. Soh (2007) have had stressed the importance of the positive relationship between the logistics structure and e-commerce in their studies. The ratio of "indicators of financial-logistical infrastructure development and quality of logistics providers" was taken as 20% in obtaining the rank of the World E-commerce Top 30 Countries, which was presented in "The 2013 Global Retail E-Commerce Index" provided in the "Online Retail is Front and Center in the Quest for Growth" research made by AT Kearney Company. However, the logistics infrastructure was found to be less effective than other elements in our e-commerce model.

If we look at the rank of China, which is one of the leading countries in e-commerce sales volume, in some of the variables of AFAe-c, we see that it's 1st in the World population, 76th in GNP, 2nd in GNI, 77th in GNP PPP, 2nd in GNI PPP, 78th in Internet penetration, 62nd in NRI, 28th in global competitiveness, and 28th in logistic performance. Data on other countries can be seen in the rank table.

According to the results of the Pearson Correlation Analysis, there is a strong positive correlation between e-commerce sales penetration and usage (r=0,734, p<0,0001); there is a strong positive correlation between e-commerce sales penetration and the gross national income per capita (r=0.715, p=0.0001); there is a strong positive correlation between e-commerce sales penetration and the penetration of population with Internet (r=0.701, p=0.0001); and, there is a moderate positive correlation between e-commerce sales penetration and the Purchasing power parity gross national product (r=0.496, p=0.0117).

After using these values in the multiple linear regression model, the gross national income per capita and the purchasing power parity gross national income per capita were found to be significant in the model. According to the result we found in the regression equation, we concluded that when the gross national income per capita increases by 1 unit the e-commerce sales penetration increases 0.019 units; and, when the gross national income per capita purchasing power parity increases by 1, the e-commerce sales penetration decreases by 29.009 units. Accordingly, if a country increases its gross national income per capita then its e-commerce sales will increase as well.

Caselli & Coleman (2001), Gibbs et al. (2003), (Seyidoglu, 2006:480-481), Caselli & Coleman (2001), Wong (2003) all have reached the same conclusion. People's economic power and disposable income levels increase, as their income increases. According to "consumption function", consumption increases or decreases in line with the increase or decrease in income, and an increase in the purchasing power of people in a country will increase e-commerce sales as well.

And, according to the results of the cluster analysis we have performed to differentiate countries from each other, China and India were prominent in terms of population and e-commerce sales volume, Norway was prominent in terms of e-commerce sales penetration, again Norway was prominent in terms of national income per capita according to the division by income groups in the e-commerce sales penetration, and China and US were prominent on the basis of national income only.

In Figure 4, we see that China and USA are separated from other countries when we use the environment, impacts, readiness, usage, NRI, GCI, LPI, Penetration of population with Internet, GNI PPP and GNI Atlas method. This is probably because of the higher national income of the countries.

According to overall data of Norway, United States, China and India presented in Table 9, their logistic indexes seem to be close to each other. Norway's score is higher than of other countries in terms of Environment, readiness & usage. Although the U.S. has the greatest gross national income, Norway has the greatest gross national income per capita, and Norway's purchasing power per capita is higher than other countries in terms of income per capita. And, although China and India has the greatest population, the e-commerce sales volume is the greatest in the U.S. and China. However, when we divide the e-commerce sales volume by the population, i.e. when we use the e-commerce sales penetration value, it's found that Norway is at the first rank. In addition, the penetration of population with Internet ratio of Norway is quite high than of other countries.

Norway differs from other countries in the cluster analysis; and, when we look at the overall values of the U.S., China and India, it is seen that Norway has the greatest number of e-commerce transactions among the countries which we have data, due to the e-commerce penetration value despite its lower e-commerce sales volume. (The rank order would be different if all e-commerce sales values could be used in the analysis). So, what makes Norway superior in terms of the factors we have used? The national income per capita and the purchasing power per capita. And, what were the value that makes the U.S. and China superior? They were found to be GNI and purchasing power parity GNI. Accordingly, it was found that rich countries and countries with larger population will be active in the world e-commerce, not the countries with higher national income per capita and purchasing powers. Populations and world e-commerce sales figures of US and China supports this.

All values of the countries separated from other countries according to the cluster analysis results are given in Table 9. Looking at the table we see India's and China's population is higher than of Norway and the United States. Although Norway's sales volume is lower than of other countries, its e-commerce penetration was higher than these countries. That is to say, it would be better to use this ratio not the population or e-commerce sales volume of a country in making assertions about its e-commerce rates.

Figure 5 shows that the gross national income per capita is the highest in Norway. This value is the most effective factor in differentiating countries in cluster analysis. In Figure 5, the gross national income per capita values were 102,610, 53,670, 6,560 and 1,570 for Norway, USA, China and India respectively. Norway's leadership is significant. The higher GNP value will lead to more e-commerce on a personal basis in terms of e-commerce sales penetration.

5. Conclusions

Countries in the world aim a transition to e-commerce from the conventional commerce, and this poses a difficult period for the unready countries. These countries do not know what to do in the competition against the most powerful countries in e-commerce. Since the 2000's, these facts were emphasized in numerous studies carried out on the issues such as the number of Internet users, information technology, Internet infrastructure, political and legal regulations and logistics, as if these are enough. But there is a very important part that can not be explained here that a country's commerce needs to be supported in order to transform it into e-commerce and to strengthen the e-commerce in time. We think that e-commerce of countries will not increase and reach a sufficient size without increasing the national income, national income per capita, purchasing power and purchasing power per capita whatever they do. According to the results of this study, the most important detail here that we want to share with our readers is population. The countries with large populations such as the U.S., China and India have a greater share in e-commerce. The magic of logistic index in e-commerce is no longer valid, and the logistic index has not significance as before.

The most frightening and important example here is Norway for us. Despite having perfect values in all indicators, Norway and the Nordic states have not significant share in e-commerce. Here, Norway does not play a role in e-commerce due to its low population, in spite of its individual perfectness in e-commerce. And, this shows us that increasing only the values in AFAe-c other than population is not enough to have a say in the

world e-commerce. The countries with lower population will not have a place in e-commerce.

The decline of population in Europe is a risk factor for e-commerce. China, which has the greatest population, may soon become the world leader in e-commerce. India and Russia also enters into the world e-commerce. And, if India can create its infrastructure it will raise its rank in e-commerce. Russia should also be taken into account. It will have a say on e-commerce in future.

It was found that the logistic index was lower than expected, and it was also found that increasing number of Internet users and establishing the infrastructure necessary for e-commerce was not enough to increase e-commerce, purchasing power should also be increased and the country's national income, hence the population was found to be effective in this regard. The similarities and differences between the most prominent manifestation, i.e. between the U.S., China and Norway were put forward in this study. Countries which want to have a say in the e-commerce must consider Norway's rank values.

The groups of national income per capita which are so effective in the differentiation of countries were also found to be significant in the linear regression model creates e-commerce penetration. According to the national income per capita groups that differentiates the countries most, if a country increases its gross national income per capita then it will be more successful in terms of e-commerce sales penetration. On the contrary, if a country's population is large and if it increases its national income value then it will be among the world leaders in e-commerce sales. The countries with larger population will be more advantageous in e-commerce.

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