Analysis of Factors Affecting E-Commerce Potential of any Country Using Multiple Regression

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ABSTRACT: The advancement of Information Technology and Telecommunication has opened new avenues for business. These astonishing developments have led to rapid diffusion of E-Commerce which is gaining popularity around the globe. However, it is interesting to investigate those national factors which can affect the growth of E-Commerce in a country. For this purpose, a study using secondary data was carried out to find out such factors. E-Commerce Potential was selected as Dependent Variable and its score was taken from UNCTAD B2C E-commerce Index value. On the other hand, several country related variables such as Readiness Sub-Index of Networked Readiness Index, Trade Logistics, Mobile Cellular Subscriptions per 100 people, Use of Virtual Social Network, Urbanization, Gross National Income per Capita, Business Prospects and Cyber Security were taken as Independent Variables. Data of 145 countries on aforementioned variables for year 2014 was obtained from different sources such as World Bank Data, Global Information Technology Report, and Human Development Report etc. Nine different Multiple Regression Models were generated by combination of different factors in order to analysis the effect of these factors on growth of e-commerce. It was found that the sensitivity of the E-Commerce potential was highest for GNI per Capita and Readiness Sub-Index respectively proving the importance of national earning, infrastructure of ITC and its affordability as well as education and skill level of people in the growth of e-commerce in that country. However, Cyber Security and Business Prospects were found to be statistically insignificant in few of the models.
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1. INTRODUCTION

There has been a rapid advancement in Information, Technology and Telecommunication during the last two decades of the preceding century. This progress has opened new avenues for business firms and forced them to make drastic changes in their business activities. An ever growing number of internet users have encouraged many firms to enter in online business (Kumar at el, 2014) which was warmly welcomed by their customers. This has led to the increase in the number of e-commerce firms and as a result the conventional brick and mortar firms are started doing online business. This led to emergence of a new form of transaction between the buyers and sellers known as e-commerce. E-commerce is defined as "sharing of business information, maintaining of business relationship and conducting of business transactions by means of telecommunication network" (Zwass, 1996). Such businesses which are conducted on the World Wide Web are different from the conventional brick and mortar business since there is no physical interaction between the buyer and the seller. Buyers can now shop from the home without having to physically travel to the shops. E-commerce extends unique prospects for firms and customers as it obliterates 'physical market' (Arano, 2008). E-commerce has made it easier that transactions between buyers and sellers are carried out digitally.

E-commerce has proved to be productive for both firms and buyers. On one hand, e-commerce is also gaining popularity due to its low cost because there is very little capital cost associated with startup or advertisements. E-commerce gives the opportunity directly interact with the customers through interactive websites (Zhu, 2004; Ayo at el, 2011). Now customers can make purchase and book their order online without any restrictions of space and times. This direct interaction helps the firms in reducing their product and service costs which are typically associated with market intermediaries. E-commerce has enabled firms to use internet for information sharing, improved logistics, better customer service and "back-end integration" (Zhu, 2004). Now, more and more companies are going online realizing the change in the customer's habit that tend to search the requisite information online before conducting actual purchase (Venkateswaran, 2013). The trend of e-commerce is on the rise. Like all other technological advancements, e-commerce was originally initiated in developed countries but it is quickly gaining popularity in

developing and third world countries. It is estimated that the total volume of global B2B and B2C conducted through e-commerce was around approximately $15 trillion and $1.2 trillion in year 2013 (Information economy report 2015). On other side, it has given the luxury to buyers to shop independent of their time and place. Samadi at el., (2015) has described certain benefits of e-commerce which include "easier access to information, availability and simplicity of purchase, wide range of items, organization and economy of time, attractive prices, convenient delivery and availability of comparative advantages and disadvantages among the offers".

Much of the result in the domain of e-commerce is conducting by taking into consideration those factors which are specific to the firms. However, little work is done in determining those national factors which may be critical in determining the success or failure of e-commerce in a particular country. This study is conducted to shortlist such factors which will help governments and their policy makers to take necessary steps for facilitation of e-commerce. E-commerce is still relatively new in developing countries. This is more important for developing countries where micro or small size enterprises, which are the driving force of a nation's economy (Steinfield & Scupola, 2006). These are yet to enter in the e-business because the incorporation of e-commerce in a country is gradual, evolutionary process and this process is affected by economic, socio-cultural, political and legal factors of that country (Rogers, 1995; Hariharaputhiran, 2012). Our main focus will be on B2C which is driven under the country's local factors (Gibbs at el, 2003).

2. LITERATURE REVIEW

Electronic business and commerce started in 90s when few firms started to take advantage of growing internet use. Now, tremendous growth in information technology and communication has encouraged the firms to conduct their business and financial transactions over internet. It is also enables firms to perform important non-financial activities at their own level, that to at minimum price, which were hitherto either costly or carried out by third party. These "may range from static information to online order tracking, and from digital product catalogue to personalized features tailored to the customer's needs" (Zhu, 2004). All these factors combined with expansion in the field of ITC has encouraged firms to conduct their business online and become digital (Kumar at el, 2014). This has presented unique opportunities for the business firms as well as a threat to their very existence if they are not embracing this immanent change. Contrary to other technologies, internet and e-commerce is not limited to big enterprises. Small and medium firms are also internet to expand their operations. They can reduce their cost and operate in a particular market niche (Zafar at el., 2014). Due to its undeniable relevance to business, internet has become an integral part of modern firms. Firms are using internet and social media before and after actual sales. Firms are not only using internet and ITC to provide product and service to their clients but it is also using as a tool to gather valuable information about their suppliers and competitors. ICTs also provide means for interacting with customers, stakeholders, suppliers, dealers, business regulators as well as communicate with both downward and upward side of supply chain (Warkentin, 20001; Zhu, 2004). Organizations are now using ICT to improve their logistic system (Rao at el, 2010), supply chain management and reverse logistics. ICT facilitates firms in improved coordination, better information processing, superior decision making, and effective data and knowledge management (Zafar at el., 2014). In short, e-commerce and its related capabilities have enabled firms to create a value proposition (Zhu, 2004).

It is pertinent to mention here that majority of work in information system is carried under Technology Acceptance Model (TAM) given by Fred Davis (1986). This model has roots in Theory of Reasoned Action (Ayo at el, 2011). This model has two important propositions which are Perceived Usefulness and Perceived Ease of Use. Later, another proposition of Perceived Risk in TAM (Ayo at el, 2011) is added in it. Perceived risk is defined as "consumers' perceived risk and their own tolerance of risk taking that influence their financial transaction decision" (Chan and Lu, 2004). Without doubt internet and e-commerce has proved to be of extreme use people are adopted it rapidly. This has inspired firms operating in online business to make e-commerce more and more user friendly and interactive for their customer. However, there is a highly element of risk associated with e-commerce which is inhibiting the growth of e-commerce. These risks stem from certain characteristics of e-commerce as well as few intentional or unintentional practices being carried out in this business and act as cognitive barriers to adoption of online business (Kshetri, 2008) for example the problems faced in returning of sold goods (Ahmad & Hassan, 2016) increases perceived risks of buyers. In addition, there is a severe lack of brand awareness of online firms. People have the habit to buy from well recognized brands because they doubt the level of service of unknown brand. These doubts are issues of trust among buyers (Samadi at el., 2015).

Need of trust and confidence between buyers and sellers becomes more paramount in online shopping as it is different from regular. Good quality of relationship will increase customer loyalty even in e-businesses. In order to build customer loyalty, online firms like traditional firms should strive to provide better quality service to their buyers by meeting or even exceeding their expectation (Kotler & Armstrong, 2010).

Aim of this paper is to investigate and shortlist factors which are important for spread of e-commerce in any country. A brief description of these factors is as follow.

2.1. Infrastructure of Information Communication Technology

An important national factor in the growth of E-commerce in a particular country is the infrastructure of Information Communication Technologies or ICT. ICT is defined as "diverse set of technological tools and resources to create, disseminate, store, bring value addition and manage information" (Nath, 2001). The explosion of e-commerce today can be attributed to the revolution in the field of ICT (Smith, 2009). These ICTs are being used in every field of life and they have brought positive changes in productivity, participation of customers (Baek & Hong, 2003) product advertisement and promotion. In addition to this, ICT is helpful in cost reduction, better customer relation and market niche development (Kutlu & Özturan, 2008). As pointed out earlier, developed countries where the one to start trend of e-commerce. Companies in such countries took advantage of the infrastructure for ITC which was developed by their government. There are a number of studies which proves the positive effects of ICT on economic growth especially that of e-commerce. A major factor which contributes to lower diffusion of e-commerce in third world countries is their poor overall infrastructure in general and ICT infrastructure in particular. This lacks their ability to start in this novel economic activity (Sarokolaei at el., 2012). Thus, any government should work in providing the necessary infrastructure for the growth of ICT. Appreciable existing infrastructure in Singapore has facilitated easy diffusion of e-commerce (Wong, 2003). It is also imperative that the citizens of a country posses the required skills for effective use of such technologies. Many entrepreneurs in the developing countries failed in e-commerce due to their lack of knowledge and skills in ICT (Zafar at el., 2014). Thus, lack of infrastructure may widen the gap in standard of living of developed and under developed countries (Ahmed & Hassan, 2016).With a better infrastructure and skill level of the citizens, the usage of e-commerce will increase. This will encourage people to carryout bulk of their routine purchases from internet which will further boast economic activity. The growth of ICT and e-commerce in turn can help any country to increase its revenue by entering in the global market. Jalava & Pohjola (2008) research demonstrated that in Finland the increase in multi level factor production caused due to growth in ITC was around 60% which was almost 66% more than that of electricity. Therefore, governments should take heed by investing in and developing infrastructure of ICT which will ultimately help them as the aforementioned circle completes.

2.2. Mobile Phone Subscription

Mobile phone is one of the most preferred equipment of ICT. There has been an exponential increase in the user of mobile phones throughout the world. According to World Bank Statistics, in 2014 there are around 97 mobile subscriptions out of 100 people where according to Wikipedia total number of mobile users in the world is more than 6.9 billion mobile users in 2013. The innovation of 3G and 4G communication system has turned mobile phone into an all round device. This has also led to the emergence of M-commerce which is considered an extension of e-commerce. Mobile Commerce is defined as "as any transaction with a monetary value-either direct or indirect-that is conducted over a wireless telecommunication network" (Barnes, 2002). Mobiles have increased the volume of online business (Kim at el., 2015). Many firms such as E-bay, Amazon etc have developed their own mobile applications in order to capture larger market segment. Mobile phone and tablets have become an important source to excess global e-market. In 2013, people in US made 7.4% of their online purchase through tablets whereas contribution of mobile phones for this purpose was 5.3$ (Venkateswaran, 2013). These figures are likely to grow as more and more people are using mobile application for various online retail purchase.

2.3. Social Networking Sites

The use of social networking sites is also on the rise. Social networking sites such Facebook, Twitter and many other similar websites help firms in socially relating with their target customers (Montague, 2011). Therefore, these websites provide an excellent platform for advertisement of product and service. Social media is defined as "online platform and tools that people use to share opinions and experiences including photos, videos, music, insights, and perceptions with each other" (Lai & Turban, 2008). Social media is being effectively used by the firms in creating brand and product awareness by providing

detailed information about same, better customer service, routing more traffic to official website. It is also being used for paid content and advertisement (Hariharaputhiran, 2012). Another interesting use of social media is the spread of word of mouth which is an extension of Electronic Word of Mouth (EWOM) whereas later is described as "It has been described as an informal communication directed at other consumers about the ownership, usage, or characteristics of particular goods and services or their sellers" (Berger, 2014). Especially, emergence of Web 2.0 has increased the user generated content (UGC) on networking sites (Yan at el., 2016) which is quickly becoming a wide source of word of mouth. After every shopping, the modern generation share their experience and opinions about their purchase on different social networking sites (Yan at el., 2016). People are referring to online reviews, blogs and other forms of UGC before making an actual purchase (Cheung and Thadani, 2012). People refer to these UGC in order to improve their product/service selection related decision. Therefore, UGCs and EWOM have an impact on the buying decisions of people. However, there is a negative side to such endorsements as people are not aware of the authenticity and reliability of the reviewer (Yan at el., 2016). Therefore, organizations are giving due care to this and they are constantly monitoring different social forms to check their brand and product image (Kotler & Armstrong, 2010).

2.4. Urbanization

A most understated factor which has promoted the use of e-commerce is the migration of people living in rural areas to urban settlements. People are migrating to urban cities in order to avail better education, health, jobs and business opportunities. They work relentlessly in order to have better earning. Such people try to give much of their time to work and there are left with very little time to spend on shopping. In an attempt to save more time, they resort to online shops and place orders ranging from common grocery items to home appliances. Many firms are offering their product by keeping in view the specific needs of such customers. The development of ICTs has made matters simpler and people can save their time by shopping from online stores. Good infrastructure of ICT in cities helps them in going online for shopping (Moss, 1987). Firms also uses infrastructure to their advantage (Steinfield & Scupola, 2006). Rural areas of countries are usually less developed due to lack of good roads and telecommunication infrastructure (Orford et al., 2004) and they have less access to computers and internet. This halts the growth of entrepreneur SMEs in rural areas. On the other hand, people and SMEs working in the cities enjoy access to internet and better roads facilities (Kyobe, 2008). Due to urbanization, industries usually form clusters in urban areas and cities (Breschi & Malerba, 2001). They are majorly concentrated in a particular area to obtained geological benefits from it (Porter, 2000) or proximity of buyers and suppliers (Leamer & Storper, 2001). These clusters are important for economic activities in a particular region as buyers take advantage of low transportation cost for being closer to firms (Leamer & Storper, 2001). Therefore, urbanization is an unsung factor increasing the use of e-commerce. However, people living in the rural areas of countries are also obtaining benefits from e-commerce (Samadi at el., 2015).

2.5. Education and Technical Literacy

In addition to urbanization, education and technical literacy level is another social factor which affects the use of internet and online shopping. These factors affect information adoption which is "a process in which people purposefully engage in using information" (Cheung and Thadani, 2012). Zaree (2004) has found a positive relationship between knowledge of computer, internet and similar capabilities and e-commerce. Education level can significantly increase the adoption process of e-commerce. Kumar at el. (2014) has argued that Generation Y is more connected and familiar with internet than their preceding generations. Due to their better education level and awareness, Generation Y is using internet for shopping and buying of products and services. Further, education and literacy level of entrepreneur of SMEs interested in conducting their business through internet also effect the growth of e-commerce (Kyobe, 2008). Taiwan government has managed to become leaders of B2C through the used technical oriented literature and scholarships which has equipped their citizen for better diffusion of e-commerce in the country (Ahmed & Hassan, 2016). Low level of education of entrepreneurs can affect their ability to handle technology and make them more prone to cyber attacks (Kyobe, 2008). Literature shows that e-commerce related education and curriculum should be more theory-driven (Toraskar & Lee, 2006). There is a need to develop a "cross functional and multi-disciplinary approach" (Toraskar & Lee, 2006) to e-commerce related education with prime focus on business management (Tomkovick at el, 2000). Dean and Nasirin (2002) have emphasized the e-commerce should be taught along with other discipline; in beginning the course should be taught with traditional business course but later it should become gradually specialized and the

course should end with a special project related to e-commerce.

2.6. Cyber security

However, an important issue which can halt the growth of e-commerce is the threat of online frauds and cyber crimes. E-commerce security is defined as "protection of information and the systems used to store and transmit information against threats and risks involved in e- commerce activities" (Kyobe, 2008). As stated earlier, there is no physical interaction between buyers and sellers in online business (Gnanasekar, 2014). The perpetrators of cyber crime take advantage of this anonymity (Perez, 2005) and they commit crimes to make illegal money for themselves. Payment in such business is done through firm's own account or third party system for which buyer has to provide his/her credentials and important personal information. This poses the threat of identity theft, stolen credit card number, stolen national security numbers and abuse of similar information. The situation is made worst by the development of sophisticated hacking software (Fiyani, 2015). Since mostly buyers in e-commerce and some sellers are ordinary people with little knowledge about cyber threats, they remain unable to detect such perils. These fraudulent practices are a serious challenge because the more an online business grows the higher are the chances of such malicious practices (Turban at el., 2005). Unfortunately, firms also give less attention to this security aspect and are somewhat complacent to cyber threats (Kyobe, 2008). Firms operating in online business should work hard to increase their technical capacity in combating this threat (Moyoachille & Rogers, 2014). To make things worse, several governments have done little to protect their citizens from transactions disputes and online frauds. Therefore, governments should take immediate steps to protect consumer's interests by making strict legislation in this regard.

2.7. Income Level of Citizens

Many studies have illustrated that e-commerce is particularly less popular in developing countries. People in developed countries are more inclined to shop through online means. A major region is the economic progress and higher per capita income. According to Information Economy Report 2015, the top 10 countries with highest B2C revenue were those who enjoy higher GDP and GNI. In the same report, it is revealed that largest internet retail companies in US, Europe, Asia and Latin America for 2012-13 belongs to US, UK, Germany, China, Brazil and France. Similarly, an active economy will provide more business opportunities to its nationals. These better business prospects will encourage firms and enter into online market to tap its advantage. Rao at el (2010) has proved a positive relationship between e-commerce transaction and economy growth. Economic and financial factors decide whether venture capitalists have enough resources to start online business (Gibbs at el., 2003). Contrary to this, poor economy and lack of financial resources in developing countries have adversely affected spread of e-commerce (Lawrence & Tarr, 2010). Lack of ability to generate constant streams of funds from their own resources or stockholder is a big reason in failure of e-business firms (Zafar at el., 2014). Therefore, it is safe to assume that economic progress and business prospects in a country will encourage its buyers and firms to venture into online business.

2.8. Business Activities

Advancement in e-commerce has enabled governments to expand business activities in their countries as ICTs have provided thrust to local and global business. Computer, internet and ICTs are quickly becoming part of any firm's business setup (Hariharaputhiran, 2012). Countries are now better utilizing their previously unused resources due to which the economies are approaching the optimization state and improving economic status (Allen at el., 2001). When people buy more through e-commerce it increases the business activities in the country. In 1990s, optimization of labour force due to growing ICT was one of the reasons for economic growth (Jalava & Pohjola, 2008). E-commerce helps in development of secondary and tertiary industries in the countries (Rao at el., 2010). Crafts (2002, 2004) has conducted a series of studies to investigate the effect of steam, electricity and ITC on British economic growth. His research revealed that maximum growth from steam and electricity was 0.4% (period 1850-70) and 1% (period 1919-29) respectively whereas the same peak value for ITC growth was estimated to be 1.9% (1996-2000). However, the role of a stable political and economic system; and an effective legal system is essential for growth of any business let alone e-business. Ahmed & Hassan (2016) notes that many countries such as Singapore, Taiwan, Malaysia, Thailand etc have used tax reliefs to encourage entrepreneurs and venture capitalists to start business. Contrary to this, various policies and red tapes in starting e-commerce has badly hurt Arab countries in online ventures.

2.9. Logistics

Turban at el. (2000) defines "E-commerce is a commercial activity in the field of advertising and distribution of goods and services through the use of the Internet". Presence of Trade logistics and an

efficient infrastructure plays a pivotal role in the advancement of e-commerce, but this topic gets little attention in e-commerce related research (Wisner, 2003). Unlike conventional brick and mortar system, the online firms have to deliver varying quantities on order to their respective customers; therefore, an extensive logistic system is required (Rutner at el., 2003). Therefore, importance of a reliable and extensive distribution network is evident in any online business (Rabinovich & Knemeyer, 2006). Researchers have indicated that an efficient distribution system is an indication of better customer service for customers which increases their support. Cho at el. (2008) have proved a positive relation between logistic capabilities and firm performance in an e-market thereby suggesting the importance of logistics in the success of e-commerce. However, most of these researches are done for a specific firm and no consideration is given to the infrastructure of trade logistics, custom clearing process and quality of logistic services etc on national scale. Therefore, a country related logistic performance index will be used in this study.

3. OPERATIONALIZING AND DATA SOURCES

This study is aimed at determining the country specific factors which may affect growth of e-commerce in a country. This study is different from other empirical research in e-commerce as the later were more interested in determining the firm and customer specific factors, while none of them have taken into consideration the national factors which may increase online business activities. Therefore, the variables were divided into three categories.

1. Technological Factors
2. Social Factors
3. Economic Factors

The Technological factors included infrastructure of ICT, Mobile Phone and Virtual Social Network. Data of infrastructure and use of Virtual Social Network was obtained from Global Information Technology Report for Year 2014. This report is published by World Economic Forum and it ranks countries on the basis of Network Readiness Index which is an aggregated score of four sub-indices. For Infrastructure of ICT, Readiness sub-index was used. This sub-index is based on three pillars which are infrastructure, affordability and skills. These pillars are themselves further sub-divided into different dimensions. Similarly, use of Virtual Social Network under the pillar of individual usage of ICT was used as a measure of social media usage. The measure of mobile phone usage was adopted from the Mobile cellular subscriptions (per 100 people). Data of this variable was obtained from World Bank site.

For Social Factors, Urbanization, Education and Cyber Security were considered as relevant constructs. Data of urban population (as a percentage of total population) was obtained from World Bank site. To measure education level of a country, Expected Year of Schooling score from Human Development Report was used. Global Cyber Security Index (GCI), developed by ABI Research, was used to represent the cyber security rating of a country. This index is based on five work areas which are regarded as crucial in determining the cyber security of a country. These areas are legal measures, technical measures, organizational measures, capacity building and cooperation.

For economical factors, GNI per capita, logistic capabilities and business opportunities were considered. Data of GNI per capita was obtained from Human Development Report. Logistics capabilities of country are represented by Logistic Performance Index. This index is a weighted average of efficiency of customs and border management clearance, quality of trade and transport infrastructure, ease of arranging competitively priced shipments, competence and quality of logistics services, ability to track and trace consignments and frequency with which shipments reach consignees within scheduled or expected delivery time.

For Business Opportunities, Distance to Frontier Score from Doing Business Report was used as relevant measure. Ease of Doing Business report published by World Bank is based on Distance to Frontier score. This score is based on the aggregate score of ten dimensions and 36 indicators. These dimensions include “Starting a New Business, Dealing with Construction Permits, Getting Electricity, Registering Property, Getting Credit, Protecting Minority Investors Paying Tax” etc This scale enables the observer to compare performance of a particular country with the best possible performance and this score will be considered during this study

While for the dependent variable, E-commerce potential of a country was measured from UNCTAD B2C E-Commerce Index from Information Economy Report. This index explains the potential of a country in carrying out B2C e-commerce Internet [20]. This index uses four dimensions: Share of population having mail delivered at home, secure servers per 1 million people, Share of individuals with credit card and Share of individuals using Internet [20]. Since,

number of internet users is already present in this scale, therefore, this variable was not considered as independent variable.

4. RESEARCH HYPOTHESIS

Keeping in view the arguments mentioned above, we are in a position to describe our research hypothesis for this study. These hypotheses will see the impact of technological, social and economic factors on e-commerce potential as these are most pertinent to the growth/inhibition of e-commerce especially in developed countires (Kshetri, 2008).

H1 = The technological factors such as Infra-structure of ICT, Number of Mobile Subscribers and Social Virtual Network Users are positively related with e-commerce potential.

H2 = The social factors such as Urban Population, Expected Years of Schooling and Cyber Crime Security are positively related with e-commerce potential.

H3 = The economic factors such as GNI per Capita, Logistic Performance Index Score and Distance to Frontier Score are positively related with e-commerce potential.

5. RESULT SECTION

Data of variables under considerations for 145 countries were obtained from various sources as mentioned in Table No 1. Year 2014 was taken as the base year for data collection. Descriptive statistics was used to perform Uni-Variate Analysis on the variables. Means was used as a measure of central tendency; however, for those variables whose Skewness Index Score was outside the permissible limit, Median was used. Standard Deviation was to indicate spread of the variables. Results on these Descriptive Statistics of variables are shown in Table No 1.

Table 1: *Descriptive Statistics of Variables*

Name of variable	Data source	No of obs	Mean/Median	Standard deviation Deviation
B2C e-commerce index	Information Economy Report	122	49.24	24.17
Readiness Sub-Index score	Global Information Technology Report	140	4.56	1.14
Mobile phone subscription	World Bank database	149	110.18	38.11
Use of virtual social network	Global Information Technology Report	140	5.48	0.72
Urban population	World Bank database	149	58.87	22.75
Expected years of schooling in years	Human Development Report	149	8.25	3.16
Cyber security index	Global Cyber Security Index	145	0.35	0.22
Gni per capita	Human Development Report	149	12190.00*	19,513.35
Logistics performance index	World Bank database	149	2.80*	0.76
Distance to frontier score	Doing Business	149	63.03	12.47

* Since the value of skewness index was outside the range of -1.3 to 1.3 therefore, median is taken as a measure of central tendency. For all others, value represents mean value.

After performing Uni-Variate Analysis, Bi-Variate Correlation Analysis was carried out to check the association between variables. Pearson Correlation was used as it is the most appropriated variable in case of continuous variables. A strong correlation of E-Commerce Potential Score with other variables was observed. Further, all the relations were positive hinting that all these variables have a positive effect on e-commerce potential, and all relations were statistically significant. E-Commerce Potential Score has strongest correlation with the Readiness Sub-Index as the value of Pearson Correlation was greatest between these two variables. On the contrary, E-Commerce Potential Score has the weakest relation with Mobile Phone Subscription.

In order to prove hypotheses, Multiple Regression Analysis was performed on the data set and Table 3 shows the results of 9 Regression Models which are formed by the combination of different variables. Each of these models satisfies all conditions of Regression Analysis. Models 1-3 are used to test the research hypothesis. Results of the Bi-Variate Correlation analysis are shown in Table No 2.

Table 2: *Correlation between variables*

Name of Variable	1	2	3	4	5	6	7	8	9
B2C e-commerce index	1**	-	-	-	-	-	-	-	-
Log GNI per capita	0.846**	1	-	-	-	-	-	-	-
Readiness sub-index score	0.915**	0.678**	1	-	-	-	-	-	-
Mobile phone subscription	0.555**	0.527**	0.571**	1	-	-	-	-	-
Use of virtual social network	0.801**	0.628**	0.780**	0.531**	1	-	-	-	-
Urban population	0.733**	0.693**	0.645**	0.587**	0.627**	1	-	-	-
Expected years of schooling	0.859**	0.587**	0.865**	0.559**	0.701**	0.604**	1	-	-
Cyber security index	0.659**	0.503**	0.646**	0.349**	0.553**	0.484**	0.542**	1	-
Logistics performance index	0.495**	0.225**	0.332**	0.118	0.227**	0.296**	0.311**	0.364**	1
Distance to frontier	0.749**	0.587**	0.743**	0.465**	0.662**	0.553**	0.696**	0.610**	0.327**
**Correlation is significant at the 0.01 level (2-tailed).									

In the first model, both Readiness Sub-Index and use of Virtual Social Network are positively related with the E-Commerce Potential Score but unexpectedly number of Mobile Phone Subscriber was negatively related. The sensitivity of Readiness Sub-Index was highest among three variables. This means that 1 percent increase in the readiness index will cause an approximately 17 percent increase in the e-commerce potential.

Table 3: *Different Regression Models*

Name of Variable	1	2	3	4	5	6	7	8	9
Readiness sub-index score	16.96*** (1.62)	-	-	14.28*** (1.77)	-	-	8.359*** (2.50)	4.194** (2.11)	8.594*** (2.51)
Mobile phone subscription	-0.059* (0.037)	-	-	-	-	-	-0.167*** (0.039)	-	-0.126*** (0.03)
Use of virtual social network	6.384** (3.03)	-	-	4.682* (2.84)	-	14.669*** (3.91)	-	-	4.629*** (1.79)
Urban population	-	0.235*** (0.07)	-	-	0.115** (0.05)	-	-	0.116** (0.45)	0.114*** (0.06)
Expected years of schooling	-	4.419*** (0.44)	-	-	1.774*** (0.39)	-	-	1.179** (0.56)	0.837 (0.53)
Cyber security index	-	24.153*** (6.13)	-	-	-	16.808** (8.22)	2.466 (4.97)	0.208 (3.99)	-3.789 (4.41)
Log GNI per capita	-	-	35.504*** (2.95)	-	29.582*** (2.88)	-	30.376*** (5.27)	22.787*** (3.58)	15.451*** (4.89)
Logistics performance index	-	-	4.085* (2.06)	3.931* (2.17)	-	4.990 (3.61)	3.744*** (1.23)	-	2.76** (1.89)
Distance to frontier score	-	-	0.262** (0.11)	0.211** (0.10)	-	0.579*** (0.20)	-	0.104 (0.11)	0.108 (0.11)
Constant	- 56.124*** (11.15)	- 11.246*** (3.08)	- 98.071*** (5.48)	- 66.457*** (6.82)	- 89.771*** (7.58)	- 88.992*** (15.82)	- 88.071*** (10.75)	- 83.079*** (10.19)	- 89.962*** (12.02)
No of Valid Obs	117	120	116	111	115	111	107	104	105
Probability of Shipro-Wilk test	0.527	0.192	0.105	0.086	0.098	0.052	0.062	0.053	0.213
Durban Watson Statistics	1.922	2.076	1.932	1.868	1.802	2.164	1.886	1.964	1.886

Value of R^2	**0.837**	**0.796**	**0.884**	**0.848**	**0.905**	**0.698**	**0.907**	**0.919**	**0.923**
Note: Values represent un-standardized coefficients while those in parenthesis are standard deviation of un-standardized coefficients.									
*** p<0.01, ** p<0.05, * p<0.1									

The second model shows the impact of social factors on the success of e-commerce. The three variables involved were not only positively related with the spread of e-commerce but also statistically significant. This proves our 2nd hypothesis. The overall strength of the model was pretty high which means that 80% variation in the value of E-Commerce Potential Score is described by these three variables. This model also demonstrates that among different social factors, e-commerce is most sensitive to cyber security.

The third hypothesis is also supported as all three variables involved in it are positively affecting e-commerce business. The highest sensitivity of e-commerce among all three variables was for GNI per Capita as the value of un-standardized coefficient was 35.5. The value of R^2 for this model was 0.884.

In the remaining models, different combinations of variables were used to examine their effect on the outcome. Models No 4, 7, 8 and 9 prove the importance of Infrastructure, Affordability and Skill level of ICT in the growth of online business. In all these models, the score of readiness sub-index was statistically significant and positively related with e-commerce potential. Similarly, considerable effect of GNI per Capita on online business can be observed from Models 5, 7, 8 and 9 as in all these model the value of un-standardized coefficients was very high. This confirms the notion that countries with higher income have more budding prospects for e-commerce. Result of this study is aligned with the previous studies that Logistics Performance Index had a substantial effect on e-commerce. However, in certain models Logistic Performance Index becomes statically insignificant. Same is the case for Virtual Social Network which appears to be a potent variable in growth of online business. Social factors such as Urbanization and Expected Years of Schooling were proved to be important for e-commerce. But, the value of urbanization was un-standardized coefficient was low which indicates its impact is not as strong as other variables. Surprisingly, Cyber Security Index was insignificant in many of these models. This variable was significant only when few variables where included in the model, however, inclusion of other variables render cyber security non generalisable. Similarly, the impact of Business Opportunities (Distance to Frontier) was very little and it was insignificant in the presence of Readiness Sub-Index and GNI per Capita.

Model No 9 represents the effect of all variables on online business potential. This model shows that a unit increase in GNI per capita and Readiness Sub-Index produces a respective increase of 15.6 and 8.6 units in the value of e-commerce. Use of Virtual Networking Sites and Urban Population are positively related whereas Mobile Phone Subscribers are negatively related. The remaining four variables were statistically insignificant. This model has the highest value of R^2 and this model explains 92% variation in the value of E-Commerce Potential Score.

6. CONCLUSIONS

The aim of this study was to investigate the impact of different social, technological and economic factors on growth of e-commerce in a country. E-commerce Potential was found to be positively associated with all social, economic and technological factors under consideration except Mobile Phone Subscription. GNI per Capita was the most important factor in the growth of online business. This is consistent with the findings of Rao at el (2010) in their research on relationship between Chinese e-commerce transactions and GDP, in which they have concluded that there is long term positive relation between e-commerce and economic development of China. The second most important factor was Readiness Sub-Index (which is aggregate of Infrastructure of ICT, Affordability and Skills). Singapore with better infrastructure and higher readiness was able to ensure diffusion of e-commerce at a faster pace (Wong, 2003). However, poor infrastructure of ICT is a biggest problem which developing countries fact during the adoption of e-commerce. In most of the countries, a large population doesn't have access to internet (Papastergiou & Solomonidou, 2005) which is creating a digital divide in the country. Governments should take immediate steps to minimize this digital divide. Social variables such as Urban Population was a significant predictor of E-Commerce Potential whereas the results of factors like Logistic Performance, Virtual Networking Sites and Expected Years of Schooling were mixed as sometimes these variables become statistically insignificant at times. This shows that these variables are of complementary nature and they assist the basis factors in the expansion of e-commerce. To utter surprise, Cyber Security had persuasive effect on e-commerce in few cases but it often became non

significant whereas the impact of business prospects were found to be very little.

7. CONCLUSIONS

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