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ABSTRACT

While the concept of economic development has been widely used to understand the health and wealth of countries, it is accepted that the access to the internet for electronic commerce transactions enable generation in income and improvements in lives. However, with the rise of disparities in income within countries, electronic commerce opportunities can be limited to the few with internet access. In this paper, we investigate how e-commerce diffusion affects economic development and factors of electronic commerce diffusion that promote or impede economic development. Using data available through international data collection agencies, we analyze three ASEAN members with relatively close GNI as of 2013 as well as three countries with largely high GNI as of 2013. The contribution of this paper is in understanding the impact of electronic commerce diffusion on development.

Keywords

E-commerce diffusion, development, Gini coefficient.

INTRODUCTION

The Internet and the World Wide Web have been noted as the prime enablers of today's global market place. Since their inception, these technological innovations have dramatically reinvented, and continue to shape, human society's ability to conduct and extend business transactions between and among organizations and individuals. Such is manifested in what we know today as electronic commerce or *e-commerce* (Laudon and Traver, 2013). Indeed, the development of information and communications technologies (ICT) has opened the world's doors to *techno-economic revolution* (Hanna, 2003). There is evidence to suggest that ICT enables e-commerce to achieve rapid and sustainable improvements in people's lives (Bui et al, 2003; Molla and Heeks, 2007; Montealegre, 1999; Qureshi and Davis, 2006). However, while there are nations that continue to leverage electronic businesses successfully at a riveting pace, by and large, there are other nations that still continue to fall behind and struggle in realizing the potential of e-commerce (Kapurubandra and Lawson, 2006; Molla and Heeks, 2007; Wresch, 2011).

Improvements in people's lives have been studied at various levels. Some studies (e.g. Avgerou, 1998; Morales-Gomez and Melesse, 1998) argue that ICT can effectively push national development to fruition only when ICT is infused alongside social change (Sein & Harindranath, 2004). Traditionally, the concept of development has been tied with modernity, whereby it is achieved by undergoing an intricate integration process with the social, political and cultural attributes of a society that, likewise, evolve temporally and spatially (Willis, 2011). If ICT and e-commerce are to pervade, therefore, the societal willingness to accommodate such modern changes must also transpire. In another vein, the gaps in the post-modern definitions of "national development" is being debated (Sein & Harindranath, 2004).

In order to understand the disparities in a country, the *Gini coefficient* is used to measure income inequality. In this research, e-commerce adoption is measured against the degree of disparity between and among countries of relatively low economic status (based on GNI). Versus countries having high economic status, we get a snapshot of the factors that promote and impede economic development. Understanding their current state may help these nations of low national development

indices reflect upon the chronic barriers that have been hampering them to fully adopt e-commerce that could transform their economies into promising digital economies. In this study, therefore, we pose the following questions: (1) *how does e-commerce diffusion affect the development of a nation* and (2) *what factors of electronic commerce diffusion promote or impede development?* In investigating these questions we create a composite index of development, compute for each country's e-commerce diffusion factor, and then carry out quantitative analysis to compare the e-commerce diffusion with development. Our analysis includes comparisons of the eight factors between and among the six countries. As a result of this analysis we hope to gain an understanding on the impact of electronic commerce diffusion on development.

THEORETICAL BACKGROUND

"Development"—A Reconceptualization

The concept of development links social change that leans towards *modernity*. Willis (2011) explains that modernity originated as an early Western concept which describes a nation for being industrialized, urbanized and has increased use of technology across most of its economic sectors. This means to say that only through the willingness of a society to accommodate the "modern ways" can ICT and e-commerce diffuse successfully. Yet, enmeshing social change with ICT to push e-commerce diffusion is not a leapfrog phenomenon. They undergo an intricate integration process with the social, political and cultural attributes of a society that, likewise, evolve temporally and spatially (Willis, 2011). These attributes must then be carefully considered when exploring for catalysts that push, or barriers that inhibit, diffusion of e-commerce.

Further, the prevalent use of the phrases "developed countries" and "developing countries" have allowed governments to distinguish national economies apart from each other. Based on *social differentiation theory*, these categorizations, however, lack a universally accepted set of criteria among today's global societies, which consequently inflict confusion in determining which country belongs to which category. Another debated perspective is related to the *theory of dependency*, which is a consequence of colonialism. For some countries, being continually labeled as "developing" is perceived as an exasperating "stigma," having destitute and outdated modes of living conditions from where one is incapable of breaking free and chronically reliant upon more economically stable governments (Portes, 1976; Sein & Harindranath, 2004). Escobar (1992) has gone so far to suggest that development has been the primary mechanism through which parts of the world, termed the "third world," have been marginalized by the "first world." In particular, they argue that the real challenges lie in the disparities within countries and marginalization of populations unable to reap the benefits of the internet information highway (Escobar 2011; Castells 2011). The widespread use of social networking tools is further increasing the disparities between the rich and poor bringing about greater gaps in economic opportunities between countries (Castells 2012).

Instead of choosing one perspective from the other, many international institutions and organizations have begun reconstituting the meaning of development by incorporating the three perspectives: modernity, dependency, and human-centeredness (Sein & Harindranath, 2004). For example, the World Bank uses a set of economic indicators such as gross national income (GNI) in conjunction with the human development index (HDI)—a non-economic dimension of development—as well as the Gini coefficient and Gini index, which are means of measuring inequality of income between individuals or other social units (Willis 2011). These measures are said to provide a country's temporal and spatial economic snapshot.

Gross National Income

The World Bank recently began to use gross national income (GNI) in its annual World Development Report (Willis, 2009). Gross domestic product (GDP) and gross national product (GNP) are very closely related to GNI. Whereas GDP refers to the monetary measure of all products and services produced within a country's borders, GNP refers to the monetary measure of all products and services produced by a country's residents regardless of whether or not the production took place within the country's borders. Both GDP and GNP are measured over a specific period of time. GNI, on the other hand, is an alternative name for GDP (Willis, 2009). Dividing these measures by the country's population gives us their "per capita" (p.c.) values.

Human Development Index

The human development index (HDI) is a national economic indicator that is computed based on a UNDP (2009) reported set of indicators—life expectancy at birth; adult literacy; gross enrollment ratio in primary, secondary and tertiary education; and GDP per capita and the purchasing power adjusted per capita GDP. An HDI value close to "0" means that the level of human development is low, whereas an HDI value close to "1" means the level of human development is very high. Table 1 shows the categorizations and their respective indications.

Gini coefficient and Gini Index

According to Lambert and Aronson (1993), the Gini coefficient is a measure of income inequality. The indicator varies from 0 to 1, such that a "1" means that perfect inequality is achieved, whereas a "0" means that perfect equality is achieved (Willis, 2011). Willis (2011) reports a way to interpret the meaning of the numbers further: between 0.50 and 0.70, highly unequal income distributions; and between 0.20 and 0.35, relatively high equitable distributions. The Gini index, on the other hand, is the Gini coefficient that is translated in percentage form such that "0" means perfect equality whereas "100" means perfect inequality (UNDP 2009).

HDI Range	Indication
0.9 or higher	developed
below 0.9	developing
0-0.499	low
0.500-0.799	medium
0.800-0.899	high
0.9 or higher	very high

Table 1. HDI values and their indications (adapted from UNDP, 2009, Box 1.3)

E-commerce Diffusion

We draw upon a notable research contribution in Economics that have helped assess the e-readiness and potential solutions for e-commerce diffusion among developing nations—Bui, Sankaran and Sebastian's (2003) framework for measuring national *e-readiness*, or the ability of an economy to translate traditional businesses into new economy using ICT. In other words, e-readiness is the propensity of an economic entity (e.g. usually a country or a region) towards successfully adopting electronic commerce. They argue that every country's e-readiness characteristics are unique, for which, therefore, business strategies and trade priorities must align to successfully adopt e-commerce. The level of e-readiness is considered a strong predictor of whether or not a country can perform in the new economy. The theoretical model illustrates that, by increasing a country's propensity towards successfully adopting e-commerce, the country's ability to increase its development follows as well (see Figure 1).
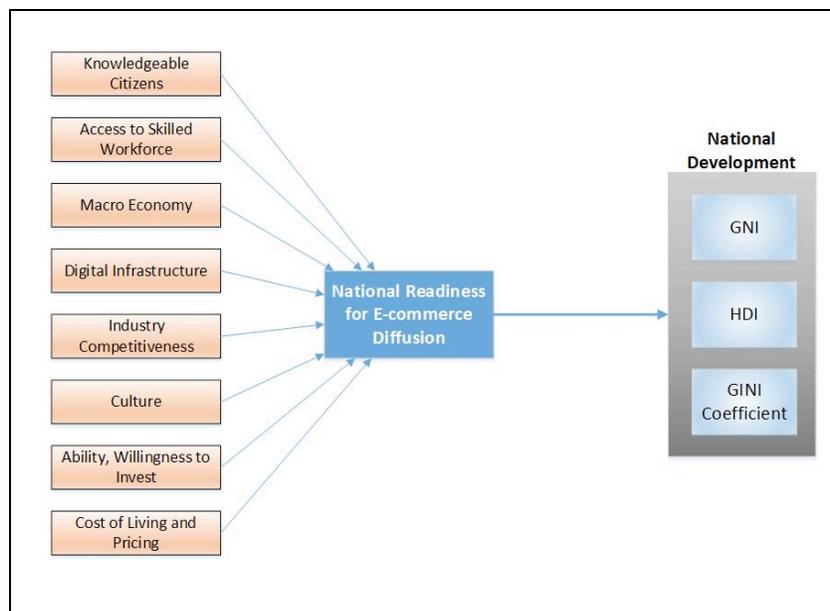

Figure 1. Theoretical Model for Assessing the Impacts of E-commerce Diffusion on Development

METHODOLOGY

Statistical analysis was performed to quantitatively evaluate and interpret the disparate findings between the two groups of countries. The first group is comprised of three ASEAN countries—Malaysia, Philippines and Thailand; whereas the second group is composed of Japan, United States and United Kingdom. These groups of countries were selected because they have relatively similarly low and comparatively higher GNIs, respectively—i.e., $310B, $322B and $358B (for the first group)

and $5.9T, $16.9T and $2.7T (for the second group) as of 2013[1]. All data were collected from secondary sources published by public institutions, namely, the International Telecommunications Union of the United Nations and the World Bank.

On assessing the development, we computed a composite index we call the *development index* (DI) based on the GNI, HDI and Gini index:

$$DI = \frac{GNI * HDI}{Gini}$$

Although it may be perceived simplistic, the DI's magnitude may provide scalable insights that could easily distinguish economic disparities between countries. After computing for the each country's e-commerce diffusion readiness factor, we made careful comparisons between the e-commerce diffusion readiness with the development index.

RESULTS AND ANALYSIS

Table 2 shows the DI values corresponding to each of the six countries chosen in this analysis. The DI is an index which highlights a country's development status by factoring together the GNI, HDI and Gini coefficient. The inverse of the Gini coefficient was used as a factor since the magnitude of the Gini coefficient increases in reverse direction from the increasing magnitudes of GNI and HDI. The resulting DI value, therefore, should consistently mirror the economic development status of a country (in US$). The higher the DI value, the more developed the country is.

	Malaysia	Philippines	Thailand	Japan	United States	United Kingdom
GNI	$310B	$322B	$358B	$5.9T	$16.9T	$2.7T
HDI	0.77	0.66	0.72	0.89	0.91	0.89
Gini Index	46.2	43.03	39.4	32.1	41.1	38
DI	$5.18B	$4.93B	$6.55B	$163B	$376B	$63B

Table 2. Computed DI Values based on 2014 GNI, HDI and Gini Index Data

Following the procedures presented by Bui et al (2003), we were able to derive the e-readiness indices for each of the factors per country. It should be noted that an index value closest to "1" is the least ready, whereas an index value closest to "5" is the most ready (Bui et al, 2003). In order to consistently follow the algorithm proposed by Bui et al, we opted to drop the surrogate measures with missing data from our scale. There are also instances when we could not find the data suited for a specific surrogate measure. Table 3 below shows a summary of resulting e-readiness index value per factor per country.

Earlier, we had proposed that, by increasing a country's propensity towards successfully adopting e-commerce, the country's ability to increase its development follows as well. Table 3 explains that the Philippines has the lowest e-readiness score, whereas the United States has the highest e-readiness score. Having low scores of "1" for both "cultural readiness" and "ability, willingness to invest" has pushed the Philippine's e-readiness as the lowest from the rest, then followed by low scores on "digital infrastructure" and "access to skilled workforce." These may closely link to the fact that the country's HDI is the lowest from the rest as well. In contrast, the United States' "ability, willingness to invest" and "culture" scores, together with having the skilled workforce, suggest a high level of confidence in pushing investments out in the market. This is again consistent with the US's high HDI, which is in fact the highest among the listed countries. Comparing these factors with the DI, the markedly large disparity between the Philippines and the US does suggest a consistent pattern of "least e-ready and least developed" and "most-ready and most developed" between the e-readiness and DI factors. However, there is also a consistent trend between e-readiness and DI across all countries. This means to suggest that an increase in the e-commerce diffusion also follows an increase in the country's development.

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[1] World Bank: *http://data.worldbank.org/indicator/NY.GNP.ATLS.CD*

	Malaysia	Philippines	Thailand	Japan	United States	United Kingdom
Knowledgeable Citizens	3.333	2.833	2.333	3.500	4.667	4.333
Access to Skilled Workforce	3.600	1.600	3.200	3.600	4.600	3.000
Macro Economy	4.900	3.200	3.000	4.100	4.000	4.700
Digital Infrastructure	3.333	1.500	2.333	4.500	4.167	4.833
Industry Competitiveness	3.286	2.143	2.429	3.857	3.857	3.429
Culture	3.000	1.000	2.500	5.000	4.000	4.500
Ability, Willingness to Invest	3.000	1.000	3.500	3.500	5.000	3.500
Cost of Living and Pricing	3.333	3.667	3.667	2.000	4.000	5.000
e-readiness	*3.473*	*2.118*	*2.870*	*3.757*	*4.286*	*4.162*

Table 3. Average factor values and computed e-readiness index per country

CONCLUSION, LIMITATIONS, FUTURE RESEARCH AND CONTRIBUTIONS

In this research we conducted a pilot study to investigate a concept of development that takes into account the impacts of e-commerce diffusion readiness to development. In order to do so, we created an index to reflect development within a country as well as in between countries. Our analysis suggests that e-commerce diffusion readiness affects the development of a country by the country's ability and willingness to accept newer business economies. Consequently, these are all tied to several factors, the most prominent of which are culture, availability of digital infrastructure and the ability and willingness to invest. The contribution of this paper lies in re-conceptualizing the notion of development which shows that a country's e-readiness may push a country's economic development up. However, there are indeed other social forces at play which require further investigation. By understanding the historical (temporal) profile of a country, we may also begin to understand what other forces are contributing to, or inhibiting, e-commerce diffusion, and consequently, to improved development.

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