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A SHORT COMPARATIVE OVERVIEW OF THE ASEAN 5 COUNTRIES ECONOMIC AND SCIENTIFIC ACTIVITIES

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ABSTRACT

Due to globalization and competition, nations tend to be innovative in order to compete. Association of South East Asian Nation (ASEAN) is progressing both in economy and science. This study investigates the economic development and scientific progress of the five leading ASEAN countries (Indonesia, Malaysia, Philippines, Singapore and Thailand) based on available literatures. The study shows that Singapore is the only leading ASEAN country that is both economically and scientifically at par with the global leading countries. Therefore, for other ASEAN countries to be both economically and scientifically competitive, studying the concept of Singapore or of other advanced emerging countries is important.

Keywords: ASEAN, Economy, Technology, Innovation.

1. INTRODUCTION

Globalization is opening the border for the flow of products, manpower, scientific and technological innovation. It is imperative to develop national manpower capability to support the competitiveness of a country (Coccia, 2012). For the development of scientific and technical ideas, new products and services are available not only for national consumption but also for global demands which result to economic progress (Bradley *et al.*, 2012). Employment is generated through factories and industries as demand for products increases (Audretsch and Link, 2012). Industrialization is the product of scientific and technological innovations. Leading and developed countries nowadays can attribute their value in science and technology (Malakoff, 2000). The scientific innovation and discoveries almost tend to solve the economic problems through research and development (Normile, 1998). There is an interrelation between the scientific innovation and the economic development (Leshner, 2011; Bradley *et al.*, 2012). In the second half of the 19th century, other countries conducted a massive scientific and technical development through the establishment of top caliber research universities (Atkinson and Blanpied, 2008) and research

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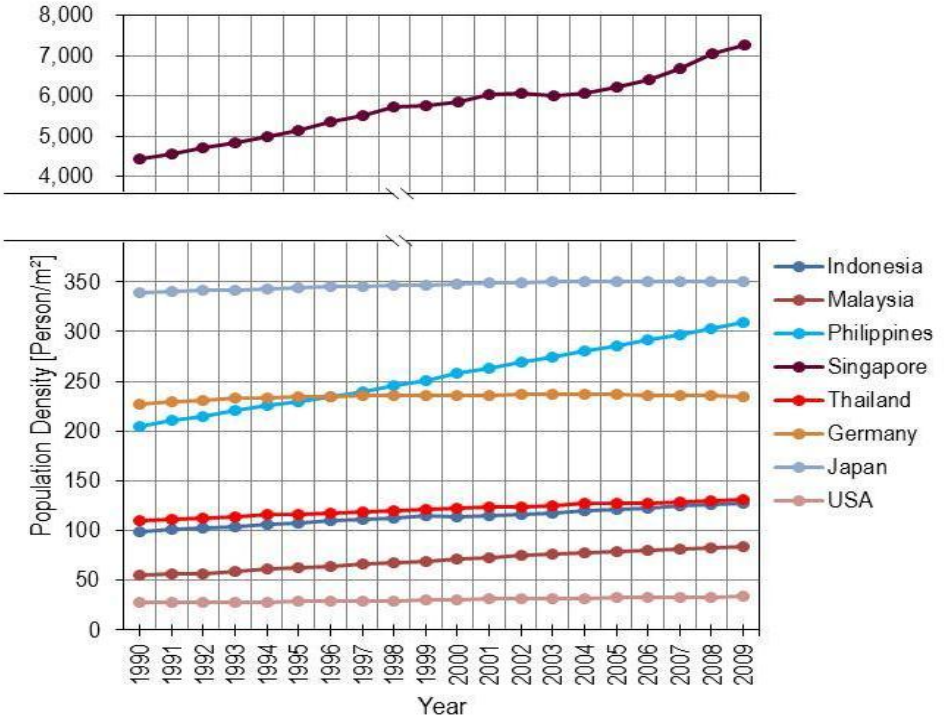
institution such as in Germany (Max Plank Society; Fraunhofer Society) through government innovative policies for the development of scientific manpower to support innovative products (Delvenne and Threau, 2012; Goldtein and Glaser, 2012; Shin, 2012). These products end now in

Figure-1. Population density of five leading ASEAN countries (Indonesia, Malaysia Philippines, Singapore and Thailand) benchmarked to three global leading countries (Germany, Japan and USA) from 1990 to 2009.



Different households and industrial applications which tend to compete with each other and bringing the price down. The Association of South East Asian Nations (ASEAN) countries should establish a strong culture of scientific and technical innovation if the region wants to compete with the very dynamic world. China is very aggressive to turn her economy based on scientific innovation (Huang *et al.*, 2012). It is important for the region to start through the establishment of high caliber universities and top policy for scientific manpower development. This paper shows the economic and scientific development of leading ASEAN countries in terms of economic development, population growth and scientific publications in comparison to the leading innovative countries for the period of 20 years. The scientific publications are compiled by SCOPUS (Scopus). The leading innovative countries mentioned here are Germany, Japan and USA.

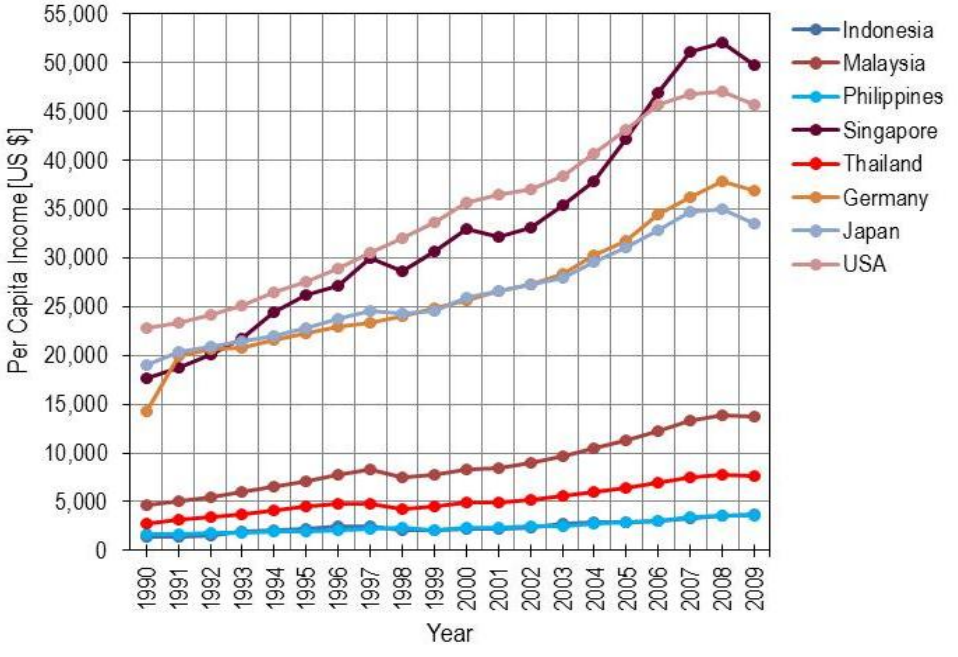
2. NATIONAL SITUATION

Most of the developing countries have population growth in contrary to most of the developed countries (World Population Prospects, 2004). There are many issues and reasons for this situation of the developed and developing countries. For this reason, some developed countries are inviting immigrants to fill the shortage of population growth. Based on the case of the ASEAN 5 it can be

said that – in the leading Association of South East Asian Nations comprising the countries of- Indonesia, Malaysia Philippines, Singapore and Thailand, the population is increasing naturally except Singapore in which immigration from different neighboring countries augmented the population growth. In the leading countries such as Germany, Japan and USA the population growth is also dependent on immigration. Japan and Germany with strict immigration policy are declining population which will affect its economic growth. Figure 1 shows the population density of the ASEAN 5 countries in relation to Germany, Japan and USA. The calculation of the population density is based on the land area (CIA World Fact Book) and the information of population (Index Mundi; US Census). Singapore has the largest population density in comparison to any ASEAN 5 countries and steadily increasing except for the period of 2002 to 2003. Philippines has the natural growth of population which is almost linear. In comparison to the three other ASEAN 5 (Indonesia, Malaysia and Thailand), these three have gradual population growth. Growth of population in Singapore is due to the encouragement of government for immigration while in Philippines is due to the serious national issue of population control. On the other hand, the three other ASEAN 5 countries (Indonesia, Thailand and Singapore) have national population policy (Mason, 2001).

The population affects the national economy on the basis of domestic demand and the productivity of the population (Galor and Mountford, 2012). However, the rapid growth of population will be a serious burden to the national growth when the government cannot support the basic needs of the population such as education facilities, medical facilities and other infrastructure (Alexandros, 2005; McNeill, 2006). Based on the economic progress of the ASEAN 5 countries, Singapore is the top leading country with very high per capita income (PCI) (See Figure 2). In fact it is even higher than of any leading countries such as Germany, Japan and USA. It means that its

Figure-2. Per Capital Income (PCI) of five leading ASEAN countries (Indonesia, Malaysia Philippines, Singapore and Thailand) benchmarked to three global leading countries (Germany, Japan and USA) from 1990 to 2009.

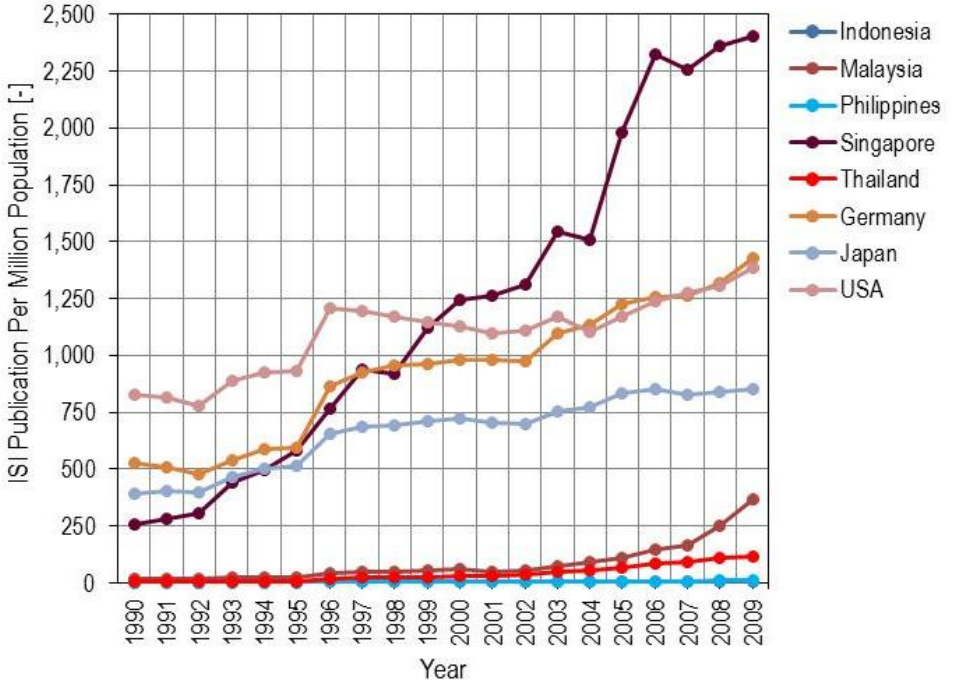


Population is very productive in contributing to the national economy compared to other countries. In addition, government has good foresight in national economic development, because it gives the opportunity of doing business with easy policy and invites talented foreigners. In comparison to other ASEAN 5 countries, the performance of Indonesia and Philippines is very poor with stagnant PCI for almost 20 years. In the case of the Philippines, it is due to the large growth of its population (Orbeta and Pernia, 1999) coupled with political instability. In the case of Indonesia, it is due to slow economic development (Economic Assessment of Indonesia, 2008). The leading innovative global economic power houses such as Germany, Japan and USA have large PCI, however, the PCI of Singapore can compete with them, even can surpass them! These leading powerhouse countries are technologically advanced and they lead in scientific and technological development (World Intellectual Property Indicators, 2012). In fact, most of the high technology products and innovations like household gadgets to major machineries come from these countries. In addition, these countries are the leading exporters of technologically advanced products (National Science Foundation, 2004). The economic progress of Singapore started with the good governance and policy which encouraged investment. In addition, the government encouraged scientific and technological innovation through development of national scientific manpower and skills (Singapore Research. Innovation and Enterprise, 2015). These scenarios led Singapore to become the leading scientific and technological country in ASEAN (Hassan *et al.*, 2012). In fact Singapore is developing home grown scientific and technological companies (Singapore Economic Development Board). With good governance government supports the technological and scientific innovations for which Singapore competes with the leading global innovative powerhouse countries in terms of economic development. In addition, the country is open for global leading scientific and technological experts to settle and contribute to the national development of Singapore (Low, 2001). Other ASEAN 5 countries are still in the beginning of adopting the method of Singapore. This idea was also the idea of the USA to attract talented individuals in shaping the technological and scientific powerhouse of the country.

3. SCIENTIFIC SITUATION

Research is a simple word in discovering the new facts. Industrial revolution started in the western European countries due to the development of new techniques in agriculture through application of new methods such as machines and processes. These situations occurred due to the observation of its citizen in the innovation and alternative methods that could reduce the human physical effort in producing the same products or results. The progress of Europeans in science and technology became fast as the countries encourage scientific and technological pursuit through research and development both in universities and companies (Howells *et al.*, 2012; Hughes and Kitson, 2012). The situation resulted many inventions and discoveries in European countries in the early period of 19th century. Germany, the leading scientific and technological powerhouse of Europe established good universities, research institutes and encouraged companies to conduct research and development; as a result it became the leading country based on the number of Nobel Prize winners, inventions and scientific discoveries in the early years (Atkinson and Blanpied, 2008; Max Plank Society). The model of Germany specifically Prussia was adopted by other

Figure-3. Institute for Scientific Information (ISI) publication per million population of five leading ASEAN countries (Indonesia, Malaysia Philippines, Singapore and Thailand) benchmarked to three global leading countries (Germany, Japan and USA) from 1990 to 2009.

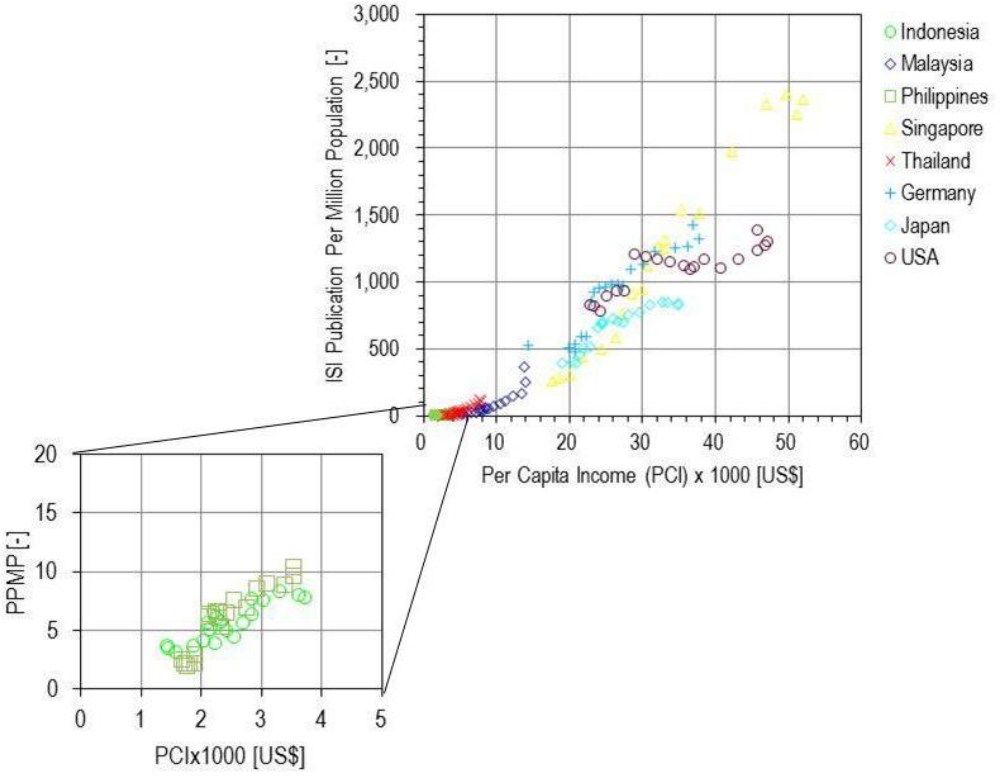


Leading countries such as the USA (Atkinson and Blanpied, 2008). USA encourages brilliant European to migrate to USA and gives lucrative compensations in universities. These result many brilliant Europeans migrating to the USA and getting employed in universities and research institutes. Japan adopted the pattern by inviting leading foreign experts to be employed and give lectures to its universities and research institutes and at the same time encouraged Japanese to have training in Europe particularly in Germany and American universities and research institutes. This pattern resulted to the development of scientific and technological innovation. In ASEAN 5, Singapore is the leading country in this kind of pattern of attracting leading experts (Singapore NRF Fellowship) and at the same time sending brilliant students to pursue higher education in advanced countries (Overseas Merit Scholarship, 2012). Other ASEAN 5 countries such as Malaysia is adopting such kind of pattern by hiring foreign experts to be employed in national universities and also opening the country for foreign universities to put local campuses (Malaysia Foreign University, 2012).

Other ASEAN 5 countries is trying to mimic the pattern but cannot for some problems of the poor national program, nationalistic issues and many more such as perks in inviting experts and sending brilliant students to study abroad (Sirat, 2010). In terms of scientific innovation and contribution shown in Figure 3, the global leading countries is producing and contributing a lot of original scientific ideas for the benefits of mankind. This is the result of national effort in conducted research, development and scientific innovation. It means they produced scientific and

Figure-4. Relationship between the Per Capital Income (PCI) and ISI publication per million populations of five leading ASEAN countries (Indonesia, Malaysia Philippines, Singapore and Thailand) benchmarked to three global leading countries (Germany, Japan and USA) from 1990 to

2009.



Technological innovation acceptable to global scientific and technological standard. In fact these countries produced and exported a lot of technologically advanced products. These scientific publications are the products of scientific research and development funded either by the national government, companies and non-governmental organization to solve certain issues and problems that will benefit the government, non-governmental organizations and companies (Larsen and Ins, 2010). In the case of government, the government may commission certain researcher to solve problem that is relevant to the national issue (Goldtein and Glaser, 2012), non-governmental organization may commission certain researcher to investigate problem such as to develop policy and other methods and, companies may commission researcher to solve problems or for product development (Brostrom, 2012; Howells *et al.*, 2012). These scientific and technological innovations resulted to the progress of nation as a whole (Stone and Lane, 2012). The results of these scientific and technological pursuits are sometimes published and sent for international evaluation if it is not confidential or for sharing for the benefits of mankind (Squazzoni *et al.*, 2013). In ASEAN 5, only Singapore can compete with and surpass the global leading innovative countries. This is due to the program of the government in country's scientific and technological innovation (Singapore Science and Technology, 2010). The very poor performer countries are the Indonesia, Malaysia, Thailand and Philippines. Malaysia and Thailand are taking off due to the government program in scientific and technological innovation coupled with government program in economic development. In fact, Thailand is establishing reputable science and technology universities.

4. ECONOMIC SITUATION

The scientific and technological innovation is important for national development, because either the country has natural resources or not such as USA (has vast natural resources), Germany (has natural resources) and Japan (almost no natural resources), scientific and technological innovation drives the economic progress rapidly. Hence, development of national innovation through acquisition of external and internal knowledge makes this things happen (Kafouros and Forsans, 2012). In the case of Germany, the increase of patents resulted to increase of employment (Buerger *et al.*, 2012). Poor performer in ASEAN 5 or any other developing countries could apply the above formula for national development. Based on the survey of the economic progress (PCI) and the number of the scientific and technological discoveries published in original scientific papers I can be said that there is always a correlation between the economic and scientific progress. As presented in Figure 4, leading global economic powerhouses are also leading scientific and technological powerhouses. Singapore as the ASEAN economic powerhouse in terms of PCI is also the scientific powerhouse in terms of publication of population. Thailand and Malaysia, the ASEAN leading and fast developing countries are also taking off its scientific and technological innovations. However, the very poor performer in economies –Indonesia and Philippines are also very poor performer in terms of scientifically and technological innovation (Vinluan, 2012). Hence, these two countries can adopt the formula of Singapore for national economic and scientific development for the benefit of its citizen or investigate the progress of China and South Korea.

5. CONCLUSIONS

Scientific and economic progress have in fact good correlation which can be proved from the experiences and situations of most of the developed countries in Europe, North America and North East Asia besides the leading global powerhouses like Germany, Japan and USA. Due to the scientific and technological innovations of these leading countries, national problems are almost resolved, new techniques are developed, methods and equipment are developed (Stone and Lane, 2012). In addition, this kind of innovation creates new products, opens new markets and creates national employment and taxes which is most important. In general, it leads national economic progress. Therefore, for South East Asian countries (ASEAN) or for the developing world, scientific and technological innovations have great impact to the national economic development. However, this development cannot be done overnight, in fact, decades are needed like many global leading countries. Hence, national scientific development plan is needed for education, research, development, and innovation with the national economic development goal (Shin, 2012; Tyfield, 2012).

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