INDONESIAN HIGH TECHNOLOGY TO FACE ASEAN ECONOMIC COMMUNITY

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ABSTRACT

Indonesia started to integrate with ASEAN Economic Community (AEC) since December 31st, 2015. ASEAN will become a single market and a single production base which occurs the flow of goods, services, skilled labor, investment and freer capital in the ASEAN region. It will open opportunities for Indonesia to increase its market share in the ASEAN region. Unfortunately, based on Global Competitiveness Report, Indonesia rank is decrease from 34th to 37th in 2016, even overall trade balance was surplus.Therefore, Indonesia should maintain the competitivenessin terms of products, services and human resources (skilled labor) to comply with theAEC.The collaboration among the academics, businesses and government by sharing infrastructure, technology, funding and human resources hopefully will support this issue, especially for high technology content which has more added value.

Keywords :ASEAN, Indonesia, innovation, death-valley, product standard, high technology content.

I. INTRODUCTION

Enforcement of ASEAN Economic Community (AEC) in the late of 2015 causes the free traffic of goods, services, human resources, capital and investment in the ASEAN region including Indonesia. It is necessary preparedness to deal with the increasing competitiveness, infrastructure and human resources. Based on GCI (Global Competitiveness Index)report 2015-2016[1], Indonesia overall rank decreased from 34thout of 144 countries in 2015 to rank 37th out of 140 countries in 2016 . At the level of ASEAN, Indonesia's rank is still inferior to the three neighboring countries, namely Singapore, which is ranked second, Malaysia ranked 20th and Thailand who is ranked 31st. However, the position of Indonesia have still outperformed to the Philippines, who is ranked 52nd, Vietnam ranked 68th, Laos ranked 93rd, Cambodia ranked 95th, and Myanmar in the ranking of 134th.

As can be seen from table 1, Indonesia's trade has deficit both with world and with ASEAN in 2012. Imports are higher than exports. For instance, in medical devices almost 94 %are import. Even if it is produced in Indonesia, the quality of product is not research based product quality, but mostly can be categorized as a low technology‘s product such as hospital

bed, wheel chair, and so on, can be seen in Fig.1.

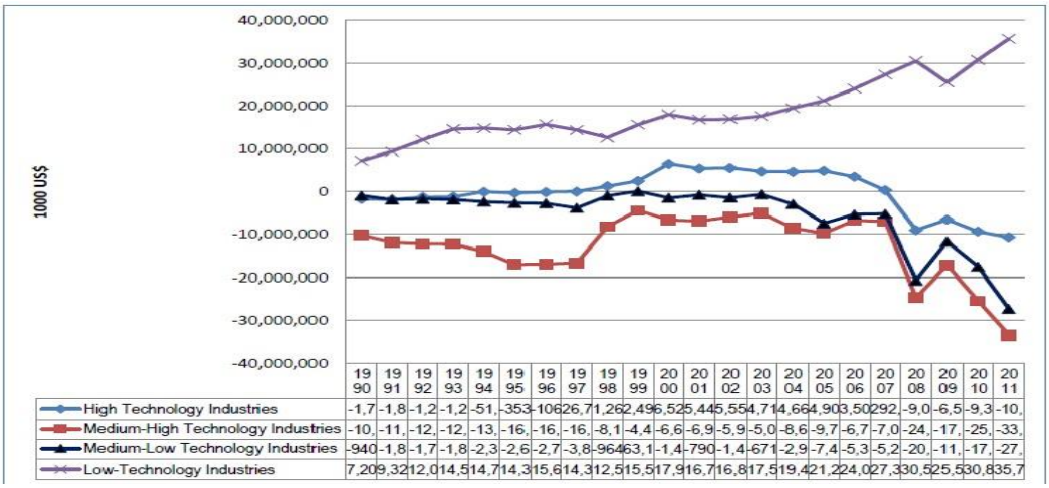

Fig. 1 Trade balance based on technology content

Table 1 Indonesia's trade balance (in thousands USD, 2012)

Country	**Trade with WORLD**		**Trade with ASEAN**	
	Export	***Imports***	***Exports***	***Imports***
Brunei	12.646.692	5.851.820	1.721,1	1.191,1
Cambodia	8.616.240	11.105.177	833,7	2.170,1
Indonesia	190.031.839	191.690.908	41.831.096	53.822.133
Lao PDR	2.755.718	5.360.577	959,8	1.570,5
Malaysia	227.302.727	196.418.972	60.926.855	54.976.200
Myanmar	9.696.083	15.448.442	3.957,4	3.250,3
Philippines	51.995.238	65.386.399	9.804.383	14.953.912
Singapore	408.393.020	379.722.889	129.831.250	79.800.497
Thailand	229.544.513	247.575.852	56.732.360	42.622.805
Vietnam	123.164.427	124.009.490	13.504,8	20.793,2

Therefore, a research based products are needed to gain the added value for the product and to be competitive in the market.

However, it is not all the results of research and development easily become an industrial products which are readily to be delivered to the market. Currently in Indonesia, only below 30 % of the research products become industrial products [5]. This phenomena is called as the valley of death in developing research product to industrial products [6].The collaboration among the academics, businesses and government are encouraged by sharing infrastructure, technology, funding and experts.

II. THE TECHNOLOGY READINESS.

Technology is one of the main factors for economic progress and continuous innovation. However, the benefits of innovation will never be enjoyed by people without going through a process, the process of technology diffusion, which is the process of dissemination of technology to a social system (see Fig. 2).

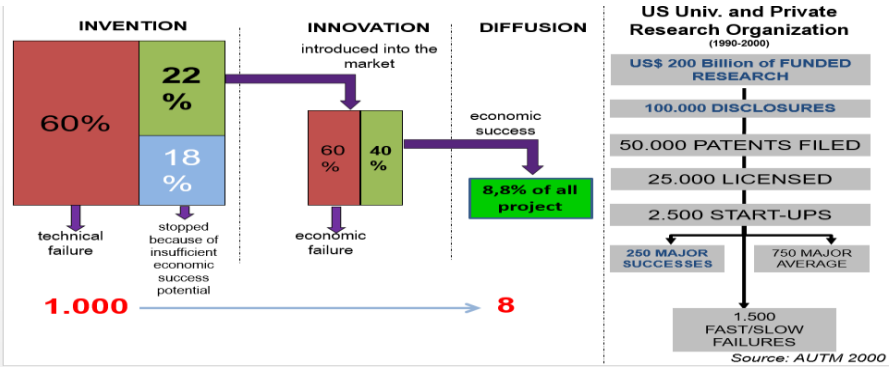

Fig. 2 Research stages and the success rate

It can be seen from Fig.2 that not all invention can be marketable. Only 8.8 % of all project could get economic success.This is what is called as the valley of death in the innovation from basic research to system development for industry (see Fig.3).

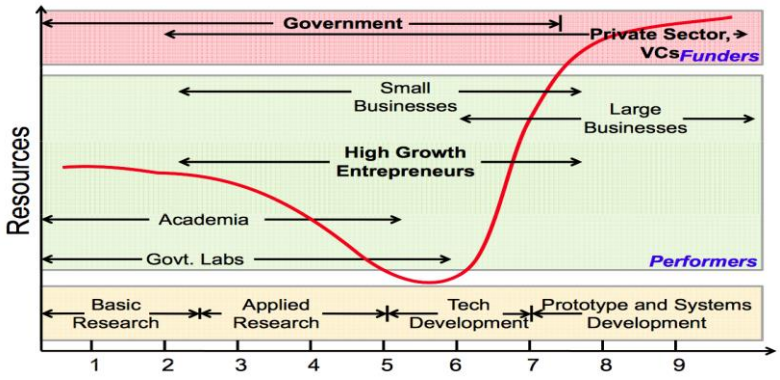

Fig. 3 The valley of death

It should minimizedthe gap between government support and the risk to company. In Indonesia, maybe it could be less risk if the results from research and development used by the stated-own enterprises first.

Therefore, strengthening the innovation system becomes a very important agenda in many countries, including Indonesia. In the era of globalization, where the development of science and technology is so dynamic, the development of the innovation system in a country is no longer possible to be implemented without collaboration among government, academics and industry. To succeed in the innovation system development, stakeholders must hold and promote the improvement of five factors: linkages (linkages), partnership (partnership),

networks (networking), positive interactions and synergies as a key success factor. Five of these factors suggest that the success of innovation depends on their effective interaction.The development of innovation, diffusion and learning process is believed to be increasingly determine the productivity and competitiveness.

Also, it is a measure to assess the maturity level of a particular technology adopted from NASA (National Aeronautics and Space Administration)[8]. It is called Technology Readiness Level (TRL). There are nine level of TRL, from TRL 1: Basic principle observed and reported to TRL 9: Actual system "mission proven" through successful mission operations. Ministry of Research, Technology and Higher Education provide incentive to promote the minimizing gaps (the death of valley) between academics and research and development institutions with industry, mainly for the research topics in the TRL 7, 8 and 9. For the research topics which are reached TRL 8 and 9, the incentives are for prototype testing comply with applicable standard.

III. THE FINANCIAL READINESS

One of the drawback that the research is hard to meet the industrial production is financial problems. Testing and certification of products need a lot of funding. Let's give the example about the cost for products certification. In this case the production of low technology product such as stethoscope. It can be seen from table 2 that for the production of 1000 units of stethoscopes, the cost for research and development is 30.000 USD, certification cost 200.000 USD clinical testing cost 200.000 USD, production cost 100.000 USD, marketing cost + tax + profit are 200.000 USD, so the total selling price is 730 USD per unit.

Table 2 the cost of stethoscope production

NAME & NUMBER	R&D COST	CERTIFICATION COST	CLINICAL TESTING COST	PRODUCTION COST	MARKETING COST, TAX AND PROFIT	TOTAL SELLING PRICE (W/O CERTIFICATION & CLINICAL TESTING)	TOTAL SELLING PRICE (W/O CERTIFICATION & CLINICAL TESTING)
STETHOSCOPE 1000	30 000 USD	200 000 USD	200 000 USD	100 000 USD	200 000 USD	**330** 000 USD	**730** 000 USD
					INVESTATION	230 000 USD	630 000 USD
STETHOSCOPE 10 000	30 000 USD	200 000 USD	200 000 USD	800 000 USD	1 600 000 USD	**2 43**0 000 USD	**2 83**0 000 USD
					INVESTATION	1 630 000 USD	2 030 000 USD

However, if the stethoscopes are produced 10.000 units, the total selling price become 283 USD per unit which cheaper than 1000 units because the cost for clinical testing and certification are not differ. Ministry of Research, Technology and Higher Education (Kemristekdikti) through the National Innovation System (SINas) incentive give the funding for collaboration research among industry, academics and government institution up to 3

billion IDR, while for the individual basic research and applied research up to 300 million IDR per year per proposal. This is the support from the government to improve knowledge based economy. There are seven priority science and technology program to be funded by this scheme, namely: food, medicine and health, energy, transportation, ICT, safety and defenseand materials.

IV. INFRASTRUCTURE READINESS

Facing the ASEAN Economic Community, it is important to make sure that the products meets the international standard, ASEAN standard / directive and Indonesian National Standard (SNI) to give assurance of safety, quality, environment protection and fairness of products in the market.

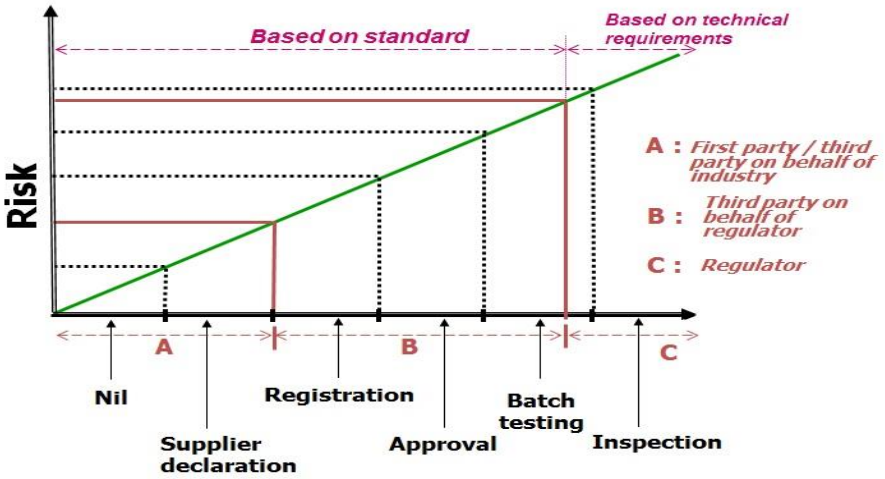

Fig. 4 Good Regulatory Practices Principles

For instance, in medical devices, each ASEAN members should make sure that all the medical devices in the ASEAN market comply with ASEAN Medical Devices Directives (AMDD) including the Essential Principles of Safety and Performance of Medical Devices in appendix 1 AMDD.

Each medical devices made for distribution in ASEAN must be assessed by the regulatory authority or institution. This means that each medical devices available in the ASEAN market is recognized by the regulatory authority and assessed the appropriateness of medical supplies to the Essential Principles of Safety and Performance of Medical Devices.
Each member state must implement registration system of medical devices and establish the license system for the circulation of medical supplies in the region. Also, each member state shall take the necessary measures to implement:

ASEAN Common Submission Dossier Template (CSDT), ASEAN Post Marketing AlertSystem Requirements (PMAS) and ASEAN Harmonized Set of Elements for a Product Owner or Manufacturer's Declaration of Conformity (DoC).

Compliance with the Essential Principles of Safety and Performance of Medical Devices proved by compliance with the technical standard recognized by ASEAN Medical

Device Committee (AMDC) or technical standard acceptable by regulatory authorities.

Those requirements need to be equipped with the national standard body and committee, testing laboratory, product certification agency and competence or certified practitioner. The committee could be joined committee from academics (University), association, industry and government. Testing laboratory could be in house laboratory with the feasibility in maintenance, repair and calibration; regional with the capability of pre and post market assessment accredited by national or notified accreditation body and national laboratory with high cost laboratory testing facility.

V. CONCLUTION

ASEAN Economic Community has been applied to Indonesia. Indonesia should be competitive and cooperative with the ASEAN state members. The collaboration of higher education (academics), government's research and development institution as well as industry is crucial in the implementation of various activities aimed at improving the ability of the acquisition and utilization of science and technology in order to support national development, which is expected to deliver impact in increasing the self-reliance, competitiveness and quality of life of the Indonesian nation. Support from government, industry, academics and community should be strengthened in order to make the nation as a knowledge based economic nation.

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