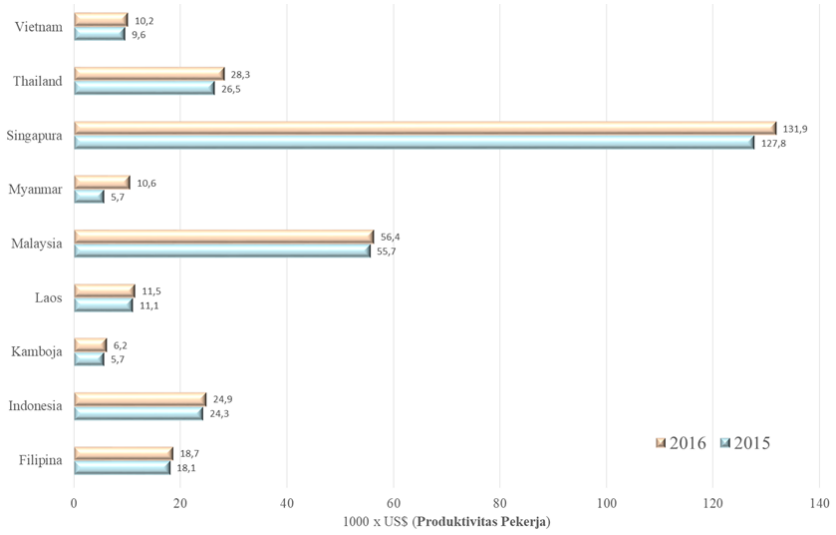
Macro External Challenges of Marine Construction Engineering Technology Study Program

Diponegoro University Vocational School, as one of the higher education institutions that is required to graduate job seekers and job creators have skills, expertise and competence in the field of industrial technology, as a manifestation of the Indonesian State Vision, namely; ” To be an independent, united, sovereign, just, and prosperous nation.", In addition, it has quite severe challenges, especially Indonesia entering the era of Economic Globalization Flows (FTA, WTO, NAFTA and AEC / MEA or ASEAN Economic Community).

MEA was formed to mutually strengthen countries in the ASEAN region in facing global free competition, realizing peace, stability and common prosperity, which was formed based on 3 pillars: Security Political Community, Economic Community, Socio-Cultural Community. However, the application of the MEA is the 5 elements of free flow within the ASEAN community: Goods, Services, Investment, Capital and Skilled Labour.

The 4th volume of the Industrial Revolution is an advancement in industrial technology, a challenge in the world of higher education and various other fields. The era of the Industrial Revolution volume 4 there was a change in the provision of labor with new skills and expertise (new professions that master the emerging skills or are able to fill the emerging jobs), to fill new business patterns (the emerging business), with creativity, innovative, and high-speed competition. This requires science and technology in order to compete, leapfrog and get ahead of other nations, in order to produce superior Indonesian human resources, who have the character: tolerant, disciplined, noble character / noble ethics, continue to learn and work hard, dedicated, independent, confident, caring for each other, thinking critically and with the ideology of Pancasila. The 2019 government strategy, in the development of superior human resources, is an effort to accelerate economic growth needed to improve the welfare of people .

The level of productivity of Indonesian workers compared to other ASEAN countries can be seen from the figure. 2, the following. The graph illustrates the condition and quality of the country's Human Resources (HR) in realizing development ideals, and can see the extent of the contribution of labor to economic growth. The productivity level per Indonesian worker in 2016 was around US$ 24,900, far below Singapore, Malaysia and Thailand. In 2016, productivity per worker in Singapore was US$ 131,900, Malaysia US$ 56,400, and Thailand around US$ 28,300. Therefore, the Government seeks to improve the quality of the Indonesian workforce through skills training by establishing Job Training Centers and revitalizing vocational higher education in universities. The government will also implement tax incentives (Super Deductible Tax) given to business actors who participate in encouraging human resource development. Tax incentive (Super Deductible Tax) where if a company invests equipment in an educational institution will get a tax deduction twice the value of the investment in a certain period of time.



Picture. 1. ASEAN labor productivity

Human Development Index (HDI) Ranking 2019, Indonesia 0.707 ranks 111 out of 189 countries recorded in the Human Development Report UN Office, The country with rank 1 is Norway 0.954 with a national income per capita (GNI / gross national income) of US $ 68,059, - the average citizen takes education or length of school 12.6 years with the standard school time expected by the Norwegian government 18.1. China ranks 4th, with an average education time of 14.1 years from the government's expected 17.1 years and has a GNI of $60,221,-. In the ASEAN region, Indonesia's HDI is below Singapore, Brunei Darussalam, Malaysia, Thailand, Philippines, this can be seen in the table below. The government has launched 12.9 years of education, but it still achieves an average of 8 years. Countries with high HDI populations have 55% higher education, while developing countries have 44%. Indonesia has 269.6 million people in 2020, demographic bonus, namely the number of productive age population is more than the unproductive age (unproductive age + unproductive age) as many as 185.34 million people are the productive age group (15-64 years). The participation of the Indonesian population in universities has only reached 30.28%, which is on time 18.85%. This shows that the chances of the Indonesian occupation of higher education are still very low, so the government needs to provide higher education so that equitable development of superior human resources can be achieved.

Government policy through education and culture has launched a vision to create superior human resources, namely "The Formation of Indonesian Human Resources as People with Character and as Productive Development Resources". This can be achieved by providing quality, productive and competitive educational services. At the higher education level, the government conducts Strengthening Quality Higher Education: Higher Education as a Producer of Science and Technology, Innovation and Center of Excellence, increasing Higher Education Cooperation with Industry and Government, Improving the Quality and Utilization of Research, Improving the Quality of Higher Education Graduates.

Table.1. Human Development Index (HDI) 2019.

No. HDI Rank	Country	Human Development Index (HDI)	Mean Years of Schooling	Expected Years of Schooling	Gross National Income per Capita
		Value	(Years)	(Years)	($)
1	Norway	0,954	12,6	18,1	68.059
2	Switzerland	0,946	13,4	16,2	59.375
4	China	0,939	14,1	17,1	60.221
9	Singapore	0,935	11,5	16,3	83.793
43	Brunei Darussalam	0,845	9,1	14,4	76.389
61	Malaysia	0,804	10,2	13,5	27.227
77	Thailand	0,765	7,7	14,7	16.129
106	Philippines	0,712	9,4	12,7	9.540
111	Indonesia	0,707	8,0	12,9	11.256
118	Viet Nam	0,693	8,2	12,7	6.220
140	Laos	0,604	5,2	11,1	6.317
145	Myanmar	0,584	5,0	10,3	5.764

Source: Human Development Report Office 2019.

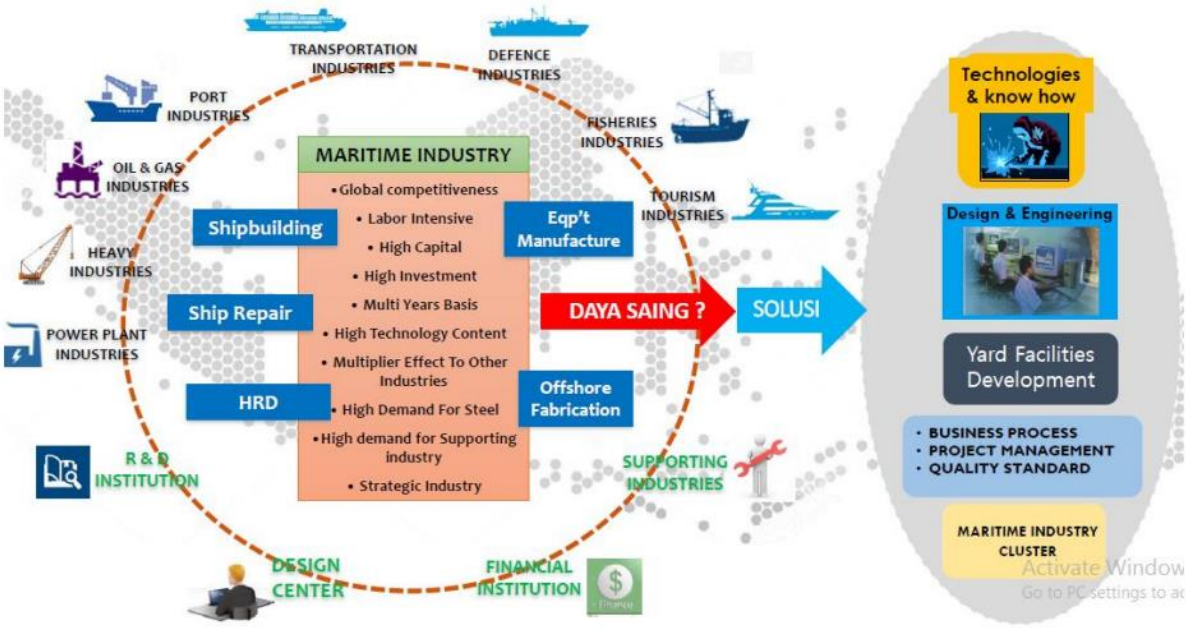
Diponegoro University Vocational School with eleven applied undergraduate study programs in line with the government's mission in developing Industrial Cooperation-Based Vocational Education and Training Programs; Alignment of Study Programs or Areas of Expertise and Innovative Learning, Improvement of Quality Vocational Educators, Implementation of Quality Vocational Education and Training, Strengthening the Competency Certification System, Certified Student Internship Program (PMMB) 2020 at the Indonesian Human Capital Forum (FHCI), is a way to achieve Superior Human Resources.

The Applied Bachelor study programs developed in the Department of Industrial Technology UNDIP Vocational School are: Industrial Chemical Engineering Technology, Automation Engineering Technology, Mechanical Design Engineering, Marine Construction Engineering Technology, and Industrial Electrical Engineering, expected to produce graduates with Superior HR qualifications in accordance with the Industrial Revolution era volume 4.0, where there are changes in the provision of labor with new skills and expertise (profession new), to fill new business patterns, with creativity, innovative, and high-speed competition.

Marine Construction Engineering Technology is one of the focuses of the development of the Vocational School in the Department of Industrial Technology, because in the world of shipping industry it really needs human resources with more than 300 types of competencies (types of skills and expertise).

The shipping industry is an industry with labor-intensive, capital-intensive and high-tech characteristics, a strategic sector for the national economy. The maritime industry is not only able to boost economic activity, but also as a symbol of state sovereignty through strengthening the connectivity of sea transportation facilities consisting of several sectors, among others, can be seen in Figure 3, below.

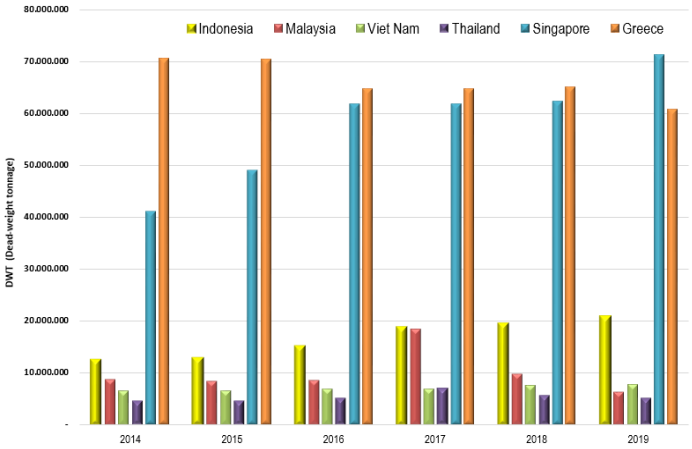
External conditions of the applied undergraduate study program Shipping Construction Engineering Technology is a provider of experts and skills as part of the Indonesian shipping industry (shipping industry), and supports the Geopolitical program of the Indonesian government "Indonesian Sea Toll" and "Indonesia as a World Maritime Axis (PMD)", based on the geography of the Indonesian maritime country which has 17,499 islands from Sabang to Merauke. The total area of Indonesia is 7.81 million km2 consisting of 2.01 million km2 of land, 3.25 million km2 of ocean, and 2.55 million km2 of Exclusive Economic Zone (EEZ). The Indonesian Sea Toll is an effective sea connectivity in the form of ships that sail regularly and scheduled from west to east Indonesia (Bambang P, Director of Transportation Bapenas, 2015). The world maritime axis program is prepared to support the achievement of Indonesia's marine sector which is projected to reach 171 billion US dollars (Kadin, 2015) or equivalent to 2046 trillion Rupiah (exchange rate Rp.12,000 per US dollar) which includes: a). Fisheries amounting to 380 trillion Rupiah; b). Coastal Areas 670 Trillion Rupiah; c). Bioketnology 480 Trillion Rupiah; d). Marine Tourism 24 Trillion Rupiah; e). Petroleum 252 Trillion Rupiah; f). Sea transportation 240 Trillion Rupiah. Experts and skills to meet the needs of new ships or buildings to achieve Indonesia's program as a world maritime axis with various types of ships: container ships, pioneer freighters, bulk carriers, tugboats & barges, tankers, and people's ships (funding value of Rp. 101,740 billion).



Picture. 2. Scope and Characteristics of the Shipping Industry (PT. PAL Indonesia)

Government policy to support the national shipping industry is reflected in INPRES No.5 of 2005 (cabotage principle) and Law No.17 of 2008 concerning Shipping states that domestic sea transportation activities are carried out by national sea transportation companies using Indonesian-flagged ships and manned by Indonesian crew, and foreign ships are prohibited from transporting passengers and/or goods between islands or between ports in the territorial waters Indonesia, has an impact on national shipping as seen in figure 4, below. The capacity of the national fleet continues to increase from 12,519,000 DWT, in 2014 to 23,880,000 DWT in 2019 (9,879 ships, 10% of the world's total ships), with foreign ownership of 6.85% while Singapore reached 129,581,000 DWT (3,433 ships, 3.57% of the world's total ships), foreign-

owned as much as 41.32%. Greece (Greece) as the country that has the most global sea transportation market share (market share) 17.79%, followed by Japan (11.47%), China (10.51%), Singapore (6.19%) and Indonesia ranks 20th (1.14%) and has the opportunity to increase world transportation market share. Geographically, Indonesia's oceans are the world's shipping lanes, so this is very possible to be improved.



Picture. 3. Increased capacity of Indonesia's fleet (source: UNTAD, 2019)

The Unitary State of the Republic of Indonesia (NKRI) has sea transportation is a strategic thing for an archipelagic country (UNCLOS 1982). Law No. 17 of 2008 mandates on Shipping that sea transportation that has national transportation characteristics and reaches all regions through waters needs to be developed potential and increased its role as a liaison between regions, both nationally and internationally including across borders, because it is used as a means to support, encourage, and drive national development in an effort to improve people's welfare and become the glue of the Republic of Indonesia.

The role of the government in an effort to reach all parts of Indonesian territory through the provision of sea transportation with fixed routes and pioneers carried out by the Directorate General of Sea Transportation, has now reached all outer and remote islands in Indonesia. This is shown by the development of a network of sea transportation routes (liner) and non-route (tramper) supported by the people's shipping system and equipped by pioneering sea transportation networks / PSOs.

The development of Indonesian shipping reached 7.7% per year, the growth of national ship fleet provision was around 10% per year, and in 2013 the share of domestic sea freight cargo controlled by national ships had reached 99.7%. Ships are available with a small capacity of short routes, to be more flexible and efficient to follow the demand for sea freight which is still a feeder for large and international ports. In the era of sea tolls as the backbone of national connectivity and making Indonesia the world's maritime axis, major changes are required in the pattern of implementing sea transportation, both in terms of providing port infrastructure, network arrangement, and in the business system.