

Human capital toward ensuring port sustainability

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ABSTRACT: Asia is a home to many world-class mega ports. 9 out of 10 largest container ports are located in this dynamic continent. With more than 1000 ports in this region, port competition is getting very stiff. However, the world had recognized Asia and South East Asia (SEA) as the new economic powerhouse. SEA alone has a population of 622 million of which 50% are below 35 years of age, signifying potentially huge demand for goods and related services. This is supported by the anticipated economic growth rate of between 5 – 6% in coming years. Nevertheless, ports in SEA are still characterized by low efficiency and high indirect cost according to World Bank study (2017). This requires private sector involvement to increase efficiency and greater governance to ensure efficient port management. Ports in this region, apart from being the engine of growth have extended responsibilities of not only in cargo handling but transportation, logistics and even manufacturing. The increase trend in container vessel sizes had reduced ship calls while demanding deeper draft-berths, state-of-the-art equipment and facilities with changing pattern of shipping schedule of hub and spoke network, and pendulum services. Smaller ports will then play feeding to the mega ports in the region. The strategic alliances by container lines had put them in control on users' decision and logistic movement, thereby demanding operational efficiency and above all cost effectiveness. Hinterland is an essential element to be considered for a particular

port. Our experience shows that port sustainability rest greatly on the strong development and relationship with the surrounding area. Future expansion and improvement in this respect will have to be in synchronization with the concept of 'One-Belt-One Road' to increase efficient movement of cargo in the global supply chain network. Malaysia's economic plans also include the development of various industrial corridors to create supportive hinterlands for our ports – Port Klang (11th) and Port of TanjungPelepas (PTP) (19th). In this regards a portion of the Johor region with a landmass of 2,217 square kilometer is now being developed and will be fully ready by 2045, to become the 'Southern Logistic Corridor' of West Malaysia. This covers development and expansion of Port of TanjungPelepas, oil terminals in Pengerang and IRDA Commercial Zones. This development alone is anticipated to generate about 1.3 billion tonnes of cargo or approximately 50 million TEUs. Existing trend indicates a tremendous growth of port activities within the country and the region. Johor is also bordering rising Indonesia and spirited Singapore. In tandem with this phenomenal progress there is a critical need for human capital development. The knowledge institutions need to collaborate with the port industry and its strategic partners to ensure the harmony of operational excellence by all parties involved. This paper in particular will address the impact of recent and future trends in port operations on education and training needs of port workers in Malaysia. The paper emphasis will be to specifically assess the role of knowledge institutions in the port sector to uncover academic-industry relevant areas where knowledge institutions can make a difference interms of performance and operational improvement along the lines of human capital development.

INTRODUCTION

The importance of maritime transportation for the South East Asian (SEA) region

The aspect of maritime in international trade has now been given more focus and increasing strategic importance among the South East Asia (SEA) countries, a trend that is in keeping with their emergence as the new economic powerhouse. The maritime industry looks promising for the SEA region thereby shifting the world focus from the previous OECD (Organization for Economic Co-operation and Development) areas. SEA region alone has a population of 622 millions of which 50% are below 35 years of age, signifying potentially huge demand for goods and related services. This is supported by the anticipated regional economic growth rate of between 5 – 6% in coming years. Globalization and internationalization have further spurred development and growth of the region and made the whole world market practically at any one country's door steps. Already the world has recognized that shipping has taken 90% of the transportation mode of merchandise trade (UNCTAD 2017), (ICS 2018).

The major shipping lines and their respective strategic alliances have come to realize that the dynamic SEA must be given special attention considering its huge economic potential and therefore its shipping demand. It is no wonder that shipping lines servicing this sector has gone into the next phase of strategic alliances. To the shipping lines, strategic alliance is now the best options as it only synergizes the assets, the management and shipping activities but does not tantamount to mergers or acquisition (Hagedoorn and Sadowski, 1999). These alliances are providing efficient services much sought after by the shippers, with better and extended services covering more markets; increase frequencies of sailings; more cost effective and promising better productivity (Egbe M.E. 2015).

For example, there is now a New World Shipping Lines which created a new Far East – Europe alliance. This alliance has established about 9 loops of base-plan port shipping rotation which covers all major ports in Asia and SEA and strategic connection with most European ports. Other smaller ports can then feeder to the mega ports in the region for onwards connection to other parts of the world. This alliance promises improve service coverage specifically for Asia-Europe market. The main characteristics of this alliance are extending fast transit times, broader port coverage, and providing newer vessels with capacities reaching 14,000 twenty-foot equivalent units (TEUs). This arrangement has placed them in control on the shippers' decision and logistics movement, thereby demanding operational efficiency and above all cost effectiveness from the ports. Top 25 companies are now controlling about 85% of the shipping market.

The author believes these alliances will serve better the SEA sectors as it seems that there is now less competition and more synergistic effort among the individual shipping lines, which certainly reduces the cutthroat competition. According to the World Bank (World Bank Report, 2017), SEA region still continues to register the highest economic growth area in the world which promises increasing international trade. In this respect the shipping sector look set to play a more dominant role.

On the other hand, the ports in SEA region are making effort to continue improving their competitiveness. As reported by the World Bank, most ports in the SEA region are still characterized by low efficiency and high indirect cost. The same report has suggested for these ports to increase involvement of private sectors to ensure better efficiency and greater governance to ensure efficient port management. This is necessary as modern port, apart from being the engine of economic growth, have also extended responsibilities of not only in cargo handling but also transportation, logistics and even manufacturing. But ports in the region still lack the synergistic efforts or collaboration, quite the equivalent to that of the shipping sectors. This requires the ports to stay in competition to increase their efficiencies and effectiveness in an effort to elevate themselves to world standard. Only then the maritime players and actors in the SEA region especially will experience efficient and effective logistics equivalent to that of developed areas of Europe, Japan, Korea and the US.

Potential offered in large and expanded market is encouraging major terminals in SEA to compete intensively. For example, Malaysia's Port of Tanjung Pelepas and Port of Singapore are competing to attract container shipping lines that operate at the east-west sailing route to hub at the terminal. Based on 2016 statistics and collective data for world ranking (Table 1), the largest SEA ports are making marks in the global throughput and ranked competitively in terms of container handling, measured by the total number of actual TEUs transported through the ports.

Table 1. Ranking of ASEAN Ports 2018 (Source: Lloyd's List. One Hundred Ports 2018. Maritime Intelligence)

<i>Port</i>	<i>Country</i>	<i>Container Handling (Million TEUs)</i>	<i>World Ranking</i>
Singapore	Singapore	30.90	2
Port Klang	Malaysia	13.17	11
Port of Tanjung Pelepas	Malaysia	8.28	19
Laem Chabang	Thailand	7.22	20

Saigon	Vietnam	5.98	24
TanjungPriok	Indonesia	5.98	27
Manila	Philippines	4.52	32
Tanjung Perak	Indonesia	3.35	43

Although ports have been evolving since the beginning of civilization, only recently we are seeing the emergence of mega-ports, fuelled by the acceleration of globalization and improvement in efficiency and development of hub ports. Mega-ports are considered as indispensable nodes of the globalized economic system. Seven out of 10 biggest ports or mega ports are located in China. The other ports are in Singapore and South Korea.

The trend now is in the growth of ships and there are designs for ships up to 25,000 TEU capacity today. The role of ports has now become more important. The ports are now struggling to keep pace with increase size of ships. When such ships come in to port, they need larger container gantry cranes, a larger storage yard, and better inland distribution. All these ports have to invest in new facilities or upgrading their facilities to meet these changes. For instance, PSA Singapore is going ahead with the expansion of the Pasir Panjang terminal to cater for 50 million TEUs capacity. Richard Clayton, chief correspondent at IHS Maritime and Trade says that Singapore is planning for 2050 – more than a generation away. The mega ships will most likely be used for long-haul, large volume routes such as Shanghai-Rotterdam or Shenzhen-Long Beach rather than the routes for the smaller ships.

MALAYSIAN MARITIME INDUSTRY

Presently, Malaysia is proud to be recognized as a maritime nation, which she learned from acknowledging the importance of the sea to chart her wellbeing. For Malaysia especially this is nothing new. Having a peninsular and a big northern portion of the island Borneo, Malaysia's dependency on shipping is more than 98%. As for countries such as Malaysia, the importance of maritime trade becomes more apparent given its strategic position along the two world's key shipping lanes namely the Straits of Malacca and the South China Sea.

This situation has roots dated back to the glorious Malacca Sultanate in the 15th century, when Malacca then was recognized as one of the Premiere merchant ports (Figure 1 shows the trade flow during the Malacca Sultanate in the 1500s). This history can also be traced from an Atlas of the World in 33 Maps, Venice, 1553. Early global trade activities were also accounted in the Ptolemy's book '*Geographia*' which recognized "Golden Khersonese" as the Malay Peninsula (Wheatley, P. 1961). It

is a small wonder that Strait of Malacca has now become one of the busiest shipping lanes with one third of global sea trade passing through it, one quarter of oil trade by sea and almost 90,000 vessels transit per year (Figure 2 shows the modern trade flow).

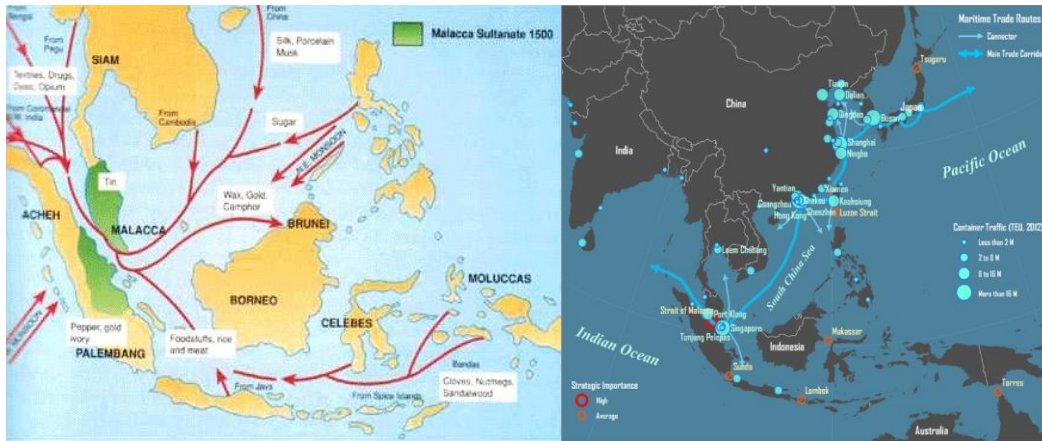


Figure 1: Old trade map

Figure 2: Modern trade map

Malaysia's maritime corridors are central to its multimodal transport grid and integrated linkages have been developed with other transport modes i.e. road, rail and air. Malaysian ports now play the role of connecting shipping service with inland transport. Two of our ports, the Port Klang (11th) and Port of TanjungPelepas (19th) are now among the top 20 busiest container ports in terms of throughput handled, while the Malaysian International Shipping Corporation (MISC) is a shipping company which ply the ocean of the world. Port Klang is the national load center while Port of TanjungPelepas is the southern transshipment hub. Penang Port serves the northern industrial hinterland.

The Malaysian government is committed to strengthen Malaysia's position in the maritime domain with its shipping and integrated logistics sector playing a critical role in the overall development of the nation. Shipping is a significant contributor to the Malaysian economy. It was reported that Malaysian total trade in 2018 was RM 1.89 trillion of which not less than 98 percent is carried by sea.

It is interesting to note that the Malaysia Shipping Master Plan (MSMP) 2017-2022 is the result of extensive industry consultation and is designed to restore conditions that will enable the Malaysian shipping industry to achieve full self-sustainability. The MSMP has five focus areas each with its targets and a five-year implementation plan. The focus areas are:

- (1) Promoting employment of Malaysian ships
- (2) Promoting employment of Malaysian seafarers and maritime human resources
- (3) Facilitating access to capital and financing

- (4) Enhancing Malaysia’s attractiveness to shipping businesses
- (5) Promoting innovation in and sustainable growth of maritime ancillary services

It is expected that the MSMP would help provide the Malaysian shipping industry a level playing field to compete successfully in domestic and regional markets. Positive outcomes include the reduction of balance of payment deficit attributed to shipping, enhanced creation of employment opportunities and revenue for Malaysia, improved transport security for Malaysian trade, and maritime connectivity.

A National Shipping and Port Council (NSPC) was also established as a key component towards realising the MSMP with its members tasked to develop and implement action plans for each of the MSMP’s focus areas. Although long overdue, the NSPC is envisioned to spearhead a systematic effort in providing inputs for policy decision-making to improve not just the Malaysian shipping sector but also enhancing the competitiveness and productivity of Malaysian ports.

In the port industry, the significance of hinterland must be given decorous attention. Our experience shows that port sustainability rest greatly on the strong development and relationship with the hinterland. As seen by China, the whole Asia is now one big hinterland, and the future development in the international trade will have to be in synchronization with the concept of “One-Belt-One Road” to increase efficient movement of cargo in the global supply chain network.

In this respect, Malaysia’s economic plans also include the development of various industrial corridors to create supportive hinterlands for our ports. In this regard, under the Johor region (Southern region of Peninsular Malaysia), the Government is aggressively and actively developing a land mass of 2,217 square kilometres which is earmarked for industrial and commercial areas and will be fully ready by 2045, to become the ‘Southern Logistic Corridor’ of West Malaysia. This covers development and expansion of Port of TanjungPelepas, oil terminals in Pengerang and IRDA (Iskandar Regional Development Authority) Commercial Zones. This development alone is anticipated to generate about 1.3 billion tonnes of cargo or approximately 50 million TEUs.

IRDA Malaysia who is the responsible authority has a grand plan to promote nine economic sectors as depicted in Table 2.

Table 2. Iskandar Malaysia’s nine economic sectors (*Source: Iskandar Malaysia*)

<p>SERVICES: - Financial & Business Services</p>	<p>MANUFACTURING: - Electrical & Electronics - Petrochemical and Oil &</p>
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<ul style="list-style-type: none"> - Education - Healthcare - Tourism - Logistics - Creative 	<ul style="list-style-type: none"> Gas - Food & Agro-Processing
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These sectors had secured a total investment of RM 207.99 billion from its inception in 2006. Out of this, 52% or 106.43 billion has been realized. Investment from domestic players accounted to about 60%, signifying local confidence.

This globally renowned metropolis received wide coverage supplement in **fDi** magazine published by the Financial Times Group of London in April 2008. Also in the same month of April, 2008, there was a 4-page coverage in Arabic Language Print supplement in the Middle East edition of Business Week magazine. High-profile network that featured Iskandar Malaysia also include: Pan-Regional Networks, CNBC Asia, CNBC Europe, CNBC Arabiya, PBS (USA), BBC World, Orbit, Channel News, Bloomberg, also the National Broadcasters in India, Australia, Saudi Arabia, UAE, Europe and others.

About 40% or RM 86.71 billion of the total committed investment were derived from foreign investors (Table 3).

Table 3. Eleven top investing countries (*Source: Iskandar Malaysia*)

No	Countries	Billion RM
1	China	23.78
2	Singapore	20.02
3	USA	7.06
4	Japan	4.50
5	Spain	4.18
6	Korea	3.11
7	Australia	2.74
8	Germany	2.28
9	UAE	1.90
10	India	1.89
11	Netherlands	1.89

It is interesting to note that the Malaysian government is planning to extend the Iskandar Malaysia economic area for land development and modern agriculture, which will see the total area being expanded from 2,217 km square to 4,749 km square.

These developments are expected to have a direct and positive impact on the 4 drivers which are *demography, societal, economic & technological advancement* that governs on how organization operates (Deloitte 2015) Revitalizing the industrial and commercial activities will certainly boost the internal trade. Ports of TanjungPelepas (PTP) and the Johor Port Berhad (JPB) which are on the receiving hands will have to be readied to handle this influx of cargo by 2040. Both ports are now going through their phases of development and improvement. PTP has its share of success within the top 20th position due to its advanced facilities and its strategic location close to the busiest shipping lane. PTP has also been named as the world fastest growing port for several years where she attained the 1 million TEUs mark in just a year. JPB on the other hand had been planned to be a multi-purpose port as its hinterland has a diverse types of cargo. JPB to date has the largest oil palm tank installation in the world and as a consequence stands as the biggest handler of refined palm oil in the world. Of recent development, since 2004 JPB was certified as an LME port and listed on London Metal Exchange. They become one of 9 approved locations in Asia to store LME warrants and ranked 6/37 LME locations in the world in terms of tonnage stored.

TRENDS IN PORT INDUSTRY

Ports are important nodes in global supply chains and due to increasing global trade. Cargo volume is increasing, and this trend is continuing in the future. Increased automation, better use of new technologies, better organization of work, improvements of vessels and adjustment of port infrastructure and workforce capability to better response for the type of vessels using the port are needed to handle these trends (Drewry, 2014). To enable improvements in port workers performance in changing operational port environment, there is a need to ensure that the workers get appropriate focused and specialized education and training. Equally challenging on the port development or investment will be both on the physical as well as on the human capital.

The operating environment in ports has changed considerably during the last few decades. The public ownership had decreased, and the private international operators have taken bigger role in operating and managing port business. The technological development has been rapid in shipping and port industry which include increase in vessel size and increase in share of containerized cargo and automation. Handling cargo is much faster than before and due to globalization more variety of containers are being handled in view of their geographical origin and destination. These developments have posed new challenges for ports workers. The traditional port work requirements where the ability to do heavy physical work in

a group have changed. Due to automation, the work requires less physical strength. In addition, the work is increasingly being done in small groups without much supervision. The number of handled cargos per worker has increased and the variety of the origins and destinations of the cargo too have amplified.

It is clear that the port roles have been transformed, and more so in the very near future when technological advancement is being intensified. From the initial port authority, it has developed into port terminal operators and now moving into trade service providers. These are the result of immense pressure from the maritime industry which demanded faster handling speed, increase efficiency and effectiveness combined with lowest handling cost and above all more modern berth and equipment. The moved by major shipping lines into forming strategic alliances is underpinning these pressures. Increased vessels size has reduced port calls resulting in increasing port size and complexity.

In response, major ports such as Port of Singapore, Rotterdam, Fremantle, and Montreal had initiated future plans into upgrading their ICT technologies, hinterland logistics network and sustainable Smart Port Cities. Smart Port initiatives had gained strong response as these calls for the use of new technologies to optimize efficiency and productivity by making use of existing available capacities, time, energy and existing natural resources.

Ports in Australia for example, have the highest percentage of automated container terminals in areas of automatic stacking, new level of automation weigh in Motion devices, booking system to regulate arrival at terminals and empty parks, and paperless flow in both terminals and empty parks. Other major ports, such as Singapore, Rotterdam, Hamburg, Nagoya, Long Beach, Xiamen, Qing Dao and Yang Shan are aggressively developing their Automated Guided Vehicles (AGV) at the yards and wharfs. Port of Singapore is also actively enhancing its operational productivity with truck platooning in port and some of its public roads.

The smart port concept will also encompass the internet-of-things which will include all relevant and important activities connected to the port. This is in line with the concept of maritime cluster. This will also ease the embracement of blockchain technology which require a well-developed Port Community System.

HUMAN CAPITAL DEVELOPMENT IN PORT SECTOR

The region's future continues to be shaped by science, technology and innovation. The socio-economic transformation of the region has been achieved through the growth of critical technologies that provide for basic needs and improve the peoples'

quality of life. In coming years, as we go through the Fourth Industrial Revolution (IR4.0) the changes will only continue to be good, with the development of artificial intelligence, big data analytics and robotics.

In fact, IR4.0 defined by evolving technological trends, is already taking shape and has immense potential to change the life of millions of people globally. It is about digitalization of data and information exchange, advanced automation and robotics, through Cyber Physical System and Artificial Intelligence. It is the convergence of Operational tools, Productivity Tools and Information Tools, Digital Data Exchange, Global Infrastructure Connectivity, and Edge Computing.

The pace of innovation continues to accelerate, and technology affects every part of our lives. We know that robots are taking over thousands of routine tasks and will eliminate many low-skill jobs in advanced economies and developing countries. At the same time, technology is creating opportunities, paving the way for new and altered jobs, increasing productivity, and improving the delivery of public services. Upskilling and reskilling are the challenges of the present workforce.

However, the SEA region is hardly ready to elevate its business strategy for future growth with an acute scarcity of quality workers plaguing the region. Poised to become the fourth largest global economy by 2050, ASEAN countries are hoping to address this talent gap the best way possible. Although the emerging SEA region shows an increasing demand for a highly skilled labour force, a lack of supply is creating unique challenges.

The rate of change—both technological and economic— is exponential, widening the gap between the labour market and education. In Indonesia, a glaring mismatch between what is taught in institutions and what the industries require explains the large and persistent skills gap. In this country of 250 million people, only 10 percent of the total employment is highly skilled. Furthermore, the median age of working population in the region is less than 30, signifying a young and less-experienced workforce to adapt to the fast-changing labour landscape.

Many jobs today, and many more in the near future, will require specific skills—a combination of digital and technological know-how, problem-solving, and critical thinking as well as soft skills such as perseverance, collaboration, empathy and entrepreneurial skills. When we consider the scope of the challenge to prepare for the future of work, it is important to understand that many children currently in primary school will work in jobs that do not even exist today.

The question in our mind is “Are our education institutions preparing students to succeed in an environment that is increasingly evolving? Is our learning system

fostering curiosity in our young people, adopting future-focused learning approaches and establishing a strong education partnership? According to Deloitte's Preparing Tomorrow's Workforce for the Fourth Industrial Revolution Study, two-third of today's five-year-olds will find themselves in jobs that do not exist today.

It portrays a distinct characteristic of the university: a drive and ambition to constantly evolve and improve. University is not only a place for intellectual and theoretical debates, it is also important for universities to be relevant, excellent and effective in the present challenging environment. This can only be done through having academics who are more visible with works that are used by the community. University education is not the only panacea in shaping one's knowledge and certainly not the required experience.

Lifelong learning has to go through 3 levels to ensure a complete education that guarantee successful and sustainable endeavours in life which are IQ, EQ and LQ. The IQ (Intelligence Quotient) can be acquired through the structured and formal education. The EQ (Emotional Quotient) is ability to understand and manage one's emotion. To use it positively to relieve stress, communicate effectively, empathize with others. And in bigger scenario to overcome challenges and defuse conflict. The LQ (learning Quotient) is much sort after now. This is the desire to learn and continue learning in the quest for knowledge for oneself and for the benefit of others. But Jack Ma had proposed another LQ, which is the Love Quotient. To him this is the binding force that forge the network of mankind. We need love to acquire knowledge and we need love to be successful. Therefore, knowledge seeking education is now said to be guided by these 'Quotients'.

Both knowledge institutions and port industry can derive mutual benefits for each other by forging partnerships. For universities, these partnerships provide financial support for the educational, research, and service missions besides broadening the experience of students and faculty. It would help to identify relevant problems and increase employment opportunities for students. Industry partnerships can provide access to expertise they did not have previously. This collaborative partnership would aid in the renewal and expansion of technology improve (Prigge 2005). Human resource competency development should always be aligned with the targeted productivity of a port as well as with the port equipment and well-trained workforce. Existing maritime education in Malaysia is focusing on producing sailors only and other the subjects such as maritime safety, environmental administration, maritime law and policy, port and shipping management, marine environmental and ocean management, and IT system are not taught at most higher education institutions.

The author's experience with the Netherlands Maritime Institute of Technology (NMIT) reveals a "Think New" approach that promotes inquisitive and project-based learning while providing flexible learning pathways for students. Students are encouraged to think independently, critically, creatively, which in turn builds their confidence and results in higher levels of innovations. Senior managers and logistic professionals from the industry are engaged to share their experience with the students.

Bad work ethics, plagiarism, and academic bullying must cease. Integrity will not be compromised. Publication of articles that has no quality should be exterminated. Publications should reflect the mastery of intellectuals in their respective fields and be regarded as universal reference within the field. A mentor-mentee relationship between senior professors and new lecturers to realize more school of thoughts in their respective fields should be encouraged. Equally important is the mobility of professors and staff outside the country as well as having more academics from overseas visiting and serving in NMIT.

NMIT also emphasizes on TVET (Technical and Vocational Education and Training) to remain competitive and meet market expectation. We are working on programs to improve the skills of graduates through an industry-led approach, eliminating duplication of programs and resources, and increasing cost effectiveness.

NMIT has been working with both foreign and local universities and professional bodies in harmonizing accreditation system with quality assurance for enabling student's mobility. NMIT always believe in quality, collaboration and internationalization.

Collaboration between education providers, industry players and the Government is important. In this endeavor NMIT is fortunate to work with among others Port of TanjungPelepas, Johor Port Bhd, Classification Societies, Trade and Manufacturing Associations, Logistics Associations, Manpower supply companies, Johor Port Authority, Iskandar Regional Development Authority and Johore Petroleum Development Corporation. NMIT students have their practical trainings for a period of about six months with the industry players. Apart from industry visits and exposures in Malaysia, NMIT students also frequent to world class industry visits, seminars, and exhibitions in Singapore and Netherlands.

Partnerships between institutions have also been instrumental in meeting the needs of young people who are increasingly seeking a variety of global maritime education and career pathways. NMIT's partnering with Solent University and Nottingham Trent University, United Kingdom; Breda University, Netherland; University of Aegean, Greece; Piri Reis University, Turkey; University of Tasmania, Australia; and Arab Academy for Science, Technology and Maritime Transport, Egypt allow students and lecturers to experience the best of education and exposures in those countries.

Such initiatives and the forward-looking vision of our NMIT have proven to be effective in ensuring students receive high-quality education and more importantly, gain international experiences, and will help them to meet the demands of ever-changing global economy. In addition, NMIT programs are accredited by Chartered Institute of Logistics and Transport UK, thereby connecting it to the world logistics network.

NMIT engages world-class consultants from across the globe in some of the work conducted in Malaysia and the region. Joint projects provide good opportunities to enrich relationships, knowledge and experiences.

NMIT always believes that industry collaboration in today's research environment is multidisciplinary and international in nature. Without industry and international cooperation, without interdisciplinary expertise, researchers have nothing much to learn and gain. It is vital to have mobility for researchers as it is imperative to have a diversity in a research project. It is important to have a research environment where people have different skills and can look at problems in very different ways. Both basic and translational research are important as it is not only leaping into the unknown with new technologies and innovative ideas but also can be used by the community and industry.

INDUSTRY ADVISORY COUNCIL (IAC)

NMIT always believe in dialogues, debates, discourse and other intellectual programs that provides solution to society's problem and develop the nation. This led to the establishment of an Industry Advisory Council (IAC) that calls upon active and influential professionals and leaders in the industry to advise the academic board on "fit and relevant" curriculum design and course delivery. At the same time, it helps to develop a strong link with businesses, organizations, and policymakers to ensure the continuing relevance of NMIT programs and activities.

NMIT IAC currently include, Ministry of Transport, Marine Department, Malaysian Shipowners Association, Johor Port Authority, Port of TanjungPelepas, Dialog Group Bhd, Chartered Institute Logistics and Transport Malaysia, Manufacturers Association, Classification Societies, Petronas, Maritime Consultants, Business Councils, Iskandar Regional Development Authority and the Netherlands Embassy.

Moving forward, NMIT's journey continues with emphasis on strategies leading towards academic leadership, research stewardship, student's experience and operational excellence.

CONCLUSIONS

There is a famous quote by Heraclitus – the only thing that is constant is ‘change’. In modern day, ‘change’ is extremely difficult to measure. More so when we think of port future and trends. Today, technology is sweeping the international trade logistics in a manner never expected and thought of before. Port organisation is now found and considered to be most suitable to be revolutionized technologically. The rate of transformation in port is considered phenomenal with the advent of new technologies in some of the ‘Smart Port’ such as Port of Rotterdam in areas of AGV, truck platooning, supply chain, global supply chain, the resultant value chain, block chain, and the cold chain. New know-how such as the ‘Crypto Technology’ will have to be viewed critically.

The author believes presently education and training with regards to the maritime industry are done in isolation and fragmented. This has to be relooked objectively as it is necessary to bridge the gap between the human resource development and up-to-date technological requirements to ensure efficiency, effectiveness, and timeliness in maritime operation which will in the long run result in worldwide cost saving. It is pertinent therefore for both the maritime industry and the knowledge institutions to work even closer together and synergise all efforts. Both the industries and knowledge institutions must learn to understand each other’s purposes and responsibilities to ensure effective and meaningful solutions are offered to the maritime community and industry as a whole.

In conclusion, the interactive and collaborative relationship between academia and industry should be enhanced further. A productive interface between the maritime education institutions and maritime industry is good for further progress especially in this time of knowledge economy and rapid technological advancement. The paper presented merely reflects the aspiration of the author.

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