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Building Innovation Technology Concept in Creative Industry into Vocational Education Study Case in Indonesia, Malaysia and Thailand Industries

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Abstract

   Printing education has made significant progress in Southeast Asia over the last 15 years. The paradigm has been totally changed by yearly development. The Indonesian and Malaysian printing industry have entered the information technology era. The main challenge in this industry is the stiff competition in printing quality. Since the academiaand industry share the vision and mission of the Government and Printing Association, the printing companies in both countries are unified by their pursuit of the same goal. Small and medium enterpriseshave also changed their mindset from labor-based to innovation-based. They have also shifted their focus from processing aspects to product aspects.. The processing aspect today has been replaced by technology, and a large number of workers/laborers is no longer needed in this area. Automation in production will decrease labor cost and optimize production in terms of cost value. The consequence of technology implementation is standardization in the field of education. Vocational education has become the new trend in industry, and this model will boost the industry for future development. This research shows that both Indonesia and Malaysia lack engineering expertise to support this industry. Within this collaborativeresearch, we developed a collaboration program called Asian Printing Training Center that compensates for academic weaknesses through industrial strength, and industrial weaknesses through academic strength. Thailand is our referencefor developingMalaysia and Indonesia. In the end, our hope is that the Asian Printing Training Center Project will help other countries upgrade their human resources quality and skills to meet or reach the Asian standard.
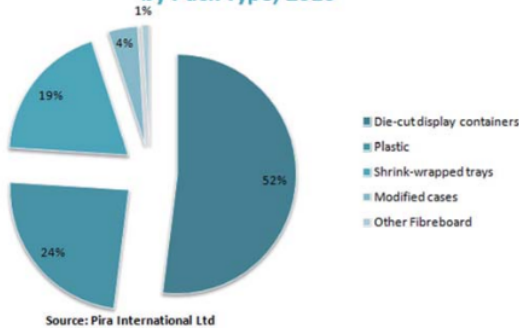
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   Western country reduced the use of labor in production and replace by automation in each aspect. They need the labor as manage and leader the change and innovation. Making concept of system that delivered on production result is important rather than have so many labors with operators' job on processing field. Technology and Innovation will make so many short cut that the processing will be maximize. Learning from Thai Printing Industry, everything was changed, Old Model was disappearing and change to innovative and customized product. In Education Sector, Printing Course Major also changed. They no longer teach as old models but they drive the student become creative and innovative, thinks to be Small and Medium Enterprise (SMEs) business.

   Based on chart above, the opportunities in printing industry sector drive into creative and innovative industry already. Thailand was developing this concept and make preparation for 15 years, from education and lead industry to enter that Global Market. The basic that they developed in Printing Industry, made the basic education stronger. Thailand Government give facility to send many lecture study abroad. Creativity and Innovation couldn't have based on experience only. It must be

**Global Retail-ready Packaging Consumption
by Pack Type, 2010**

- Die-cut display containers
- Plastic
- Shrink-wrapped trays
- Modified cases
- Other Fibreboard

Source: Pira International Ltd

Fig.1　Global retail packaging consumption
(Source: PIRA International Ltd 2010)

Fig.2　Multiplatform media
(Source: PPGI Indonesia)

walking together, experience and education.

How Thailand's government upgrade this industry? The answer is by prepared all human resources from education side. Academic drive the industry. The government facilitated by sending all human resources (lecture, staff and student). Today all industries in Thailand growth and owned by native. All was developed by native, no more foreign. It happens because Thai Education also strong building the basic. Indonesia must learn how to empowerment human resource by good education. Figuring newest trend in printing industry is innovation, creativity and technology must be walking together and support among each other. We cannot avoid the development technology to each industrial sectors. Many companies in Thailand reduce their labor and change into technology investment. Their consideration faster, effective in time, efficiency in cost and reduce human resource problem. It tend to academic must produce matched human resource that industry need.

Printing Industry also support many new SMEs into Innovative, Technology, and Creative Concept in order to capture trend. Today in printing industry established art design in packaging, flexible packaging, digital printing, large format (Offset) and Media Transforming Digital Communication.

Conventional Printing is not able for next 5 years. United States Media Association give the future picture, because of technology no more newsprint anymore.

Fig.3　Media distribution channel IT based
(Source: PWI – Indonesia)

Publishing and Infographic move to Digital. Offset only large format and paper packaging, others will be flexography and gravure. Information channel also move into technology too. Business world move to digital and social media. This movement give direct impact to print media and publishing industry. Others ASEAN Country beside Thailand, Singapore and Malaysia also move into Digital way. Indonesia still on transition progress.

Fig.3 shows to us Print Media Business today. We cannot imagine the prospect of future print media and book publishing since information technology influenced this industry. This changes tend to us become innovative, creative and have own market. Printing Industry also got impact directly from this technology revolution. Printing Company will survive if they have their own product and unique, innovative and creative. One of printing house in Thailand, they were old, since 1974 and fourth biggest printing industry in Thailand. Sri-tong Name Plate Company, this company basic is screen printing but they produce specific product and have R&D department for make many innovations in their main product. This Company is the example of printing company who has specific product based on research and development. They produce name plate that only them capable to made it. This company have strong R&D and specific product that always innovate. From That company we learn if education is a must. No bargain and no other options.

Printing Industries never dies, innovation will be a challenge to this industry, technology application and upgrade human resources become big consideration to keep this industry survive. Thailand success with this industry revolution, all sectors was supported among each sectors. At Saraburi Province that Research and Development Department that belong of Chulalongkorn University shown to us. How important education in Industry today. We cannot avoid that development since technology growth very fast. Indonesia must develop on education sector first before develop in product. Today many printing houses in Thailand leave Labor Aspect models, they no need to hire so many inappropriate human resources. They replaced by technologies and hire smart and matched person in field.

A. INDONESIA TODAY

Indonesia industry especially printing industry, today we call it Creative Industry still need more development in many aspects. The opportunity in Indonesia printing industry market is high. It should be become Indonesia Government concern in Creative Industry. Many young and productive ages (Golden Ages) in Indonesia still unemployment. Creative Industry give challenge and opportunity on it. Firstly upgrade the quality of education and influence them become innovator and creator in this industry. It need new breakthrough, revolution breakthrough to change their mindset become entrepreneur in this industry. Although our workshop and research in Thailand just for one week, it give us clearly vision about the real opportunity into this industry by building strong match education. Engineering, Scientist, Informatics Technologies much more needed compare by Economic and Social Major. Stage of transition development show to us Indonesian need fast and new breakthrough into Innovation and Technology era. The opportunity still strong, based on demography and the industrial capacity. Labor concern model should be leave and change to Innovation model which Information Technology Based.
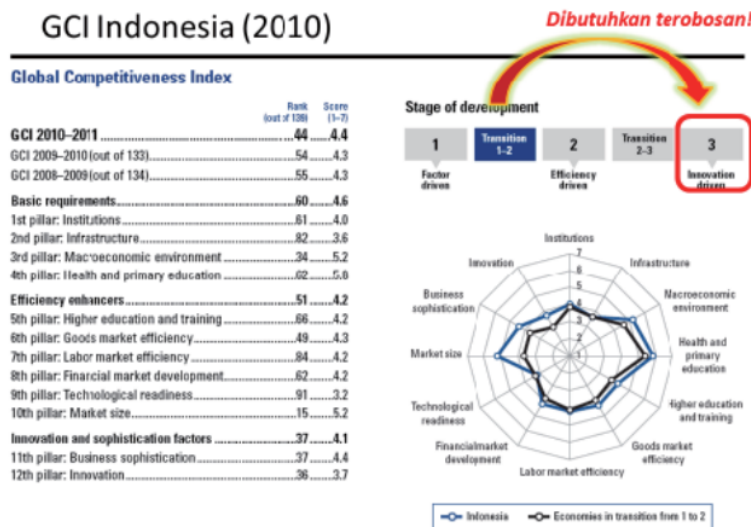

Fig.4   Indnesian global competitivenes index
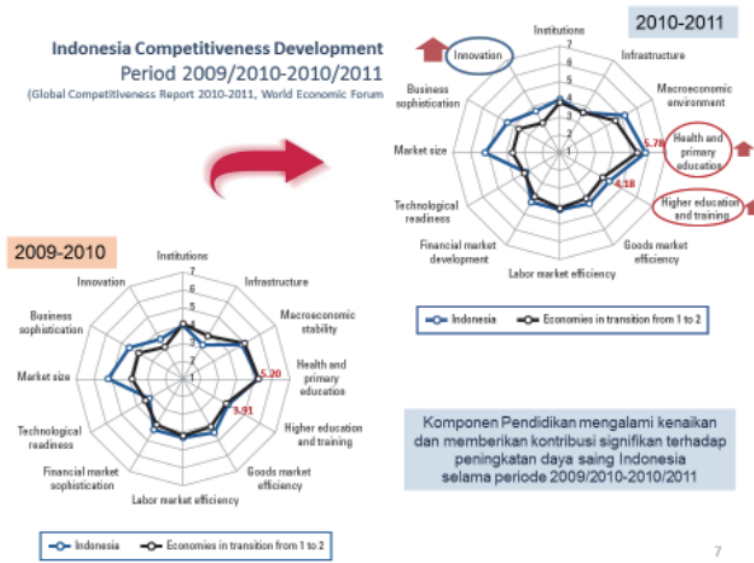(Source: Indonesian Ministry of Industry and Trade 2010)

Fig.5　Indonesian competitiveness index 2009 – 2011
(Source: Indonesian Ministry of Industry and Trade 2010)

International market tends to that era; all customize no mass production anymore. The concept driven to us become more creative. Skill worker must be created from education side.

Thai industries developed and create so many native skill worker, in the past around 5 years ago, many foreign skill worker work in local company, today no longer foreign skill worker, all become native worker. Comparing with Indonesia, the industry still dominant with foreign skill worker, it happen because the quality education didn't follow what the Industry need today. Now become Academic concern how to boost the quality of Indonesian skill worker. Polimedia and UNISBANK develop networking with many foreign student in order to boost the quality of Indonesian Human Resource possible have same standard with foreign worker in ASEAN. This is big home work for all Indonesian University and Polytechnic.

Fig.5 shows to us, trend of Indonesia market, in 2009 – 2010 education component increase significant and give contribution to Indonesia Competitiveness. However, it occurring new problem, Indonesia lack of engineering and science skill lecture on it. This is become big homework for Indonesia Minister of Education and Indonesia Government. Now Minister of Technology Research who responsible with University level of education stimulate many lectures and university to develop research and they support fund for research and study abroad. Suggest many universities make collaboration with foreign university for research, study, and curriculum standardization. The industry growth significantly but imbalance with human resource. For the industry better they pay foreign human resource to run their business rather than using local worker and still send to them training etc. This our Industry faces.

After we learned from Thailand, study with Chulalongkorn University and go to industry, now we realize how important education is. We lack engineering and scientist, Indonesia has so many economic and social graduates but rare in specific engineering and science. In Thailand today engineering and science become big concern in education also industry. They prepare this area since 15 years ago to make balance in human resource and education standard. It also happen at other country at ASEAN beside Indonesia, they changes to create engineering and scientist in order to produce many skill worker in order to support innovation and information technology changes.

The figure above based in Indonesian Statistic Data 2013, shown Creative Industry Sector and positioning. Printing include in *industri kreatif* (Creative Industry) figure. It supports Indonesia income. Indonesian Creative become Indonesian government concern since President Joko Widodo. Indonesia is a country in Southeast Asia, situated at the equator, and located between Asia and Australia as well as between the Pacific and Indian Ocean. It sits between two continents and two oceans. Comprising of 17,508 islands, Indonesia is the largest archipelago country in the world. With a population of 222 million people in 2006, Indonesia is also the fourth most populous country in the world. It ranked 44th of 139 countries on the Global Competitiveness Index, a survey conducted by one of the leading institutions based in Europe. A number of materials can become the
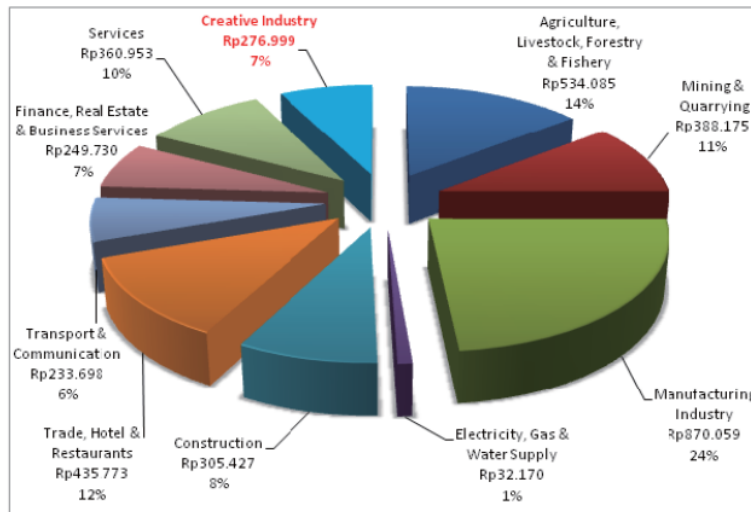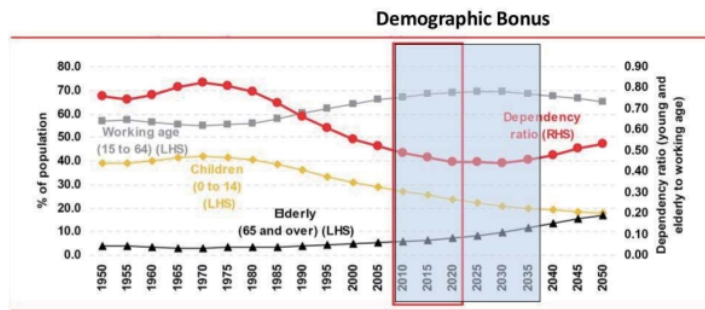
Fig.6 Indonesian creative industry mapping
(Source: Indonesian Creative Economic Bureau 2013)

Fig.7 Indonesian challenges
(Source: Indonesian Coordinating Ministry for the Economy (2010))

elements of the competitiveness, including institutions, infrastructure, macro economy, health, education, market efficiency, technological readiness, business, and innovation.In 2005 the country only sat at 69th position, and in 2002 it was at 54th position.

Currently Indonesia is not considered as advanced industrial countries in the world because there are still many problems in developing its industry, one of which is the number of new entrepreneurs in Indonesia. Only as many as 440 thousand entrepreneurs or approximately 0.2% of the total Indonesian people who are entrepreneurs,

compared with advanced industrial countries like the United States (20%), Japan (18%), and the UK (18%). Even among developing countries, the rate of entrepreneurs in Indonesia is still considered low, for example Singapore (10%), China (5%), and India (5%). This is a dilemma because entrepreneurs have a major contribution in the development of industry.

Indonesian Income Growth One interesting findings in the Global Competitiveness Report 2010-2011 was the fact that the competitiveness of developed countries and developing movement towards 182 a single point. The

World Economic Forum released a progress report each year of competitiveness which is based on a survey on business leaders and the latest economic indicators show the importance in Indonesia's competitiveness globally. Its rank climbed 10 levels to rank 44 of 139 countries. This is mainly due to an increase in macroeconomic indicators, health, and basic education, according to the report. The quality of overall infrastructure has increased from 96 to 90. The protection of intellectual property rights (IPRs) has increased from 67 to 58; the national savings rate has increased from 40 to 16, the effectiveness of antimonopoly policy has risen from 35 to 30, and the impact of taxation has ascended from 22 to 17. Meanwhile, business sophistication index has also increased, including the number of local suppliers, from 50 to 43, while the distribution value chain has decreased, from 35 to 26; the control of international distribution has declined, from 39 to 33, and the sophistication of the production process has also dropped, from 60 to 52. The ranking was based on a comprehensive survey on each the state. Indonesia was behind Portugal (46th), Italy (48th), India (51st), South Africa (54th), Brazil (58th), Turkey (61st), Russia (63rd), Mexico (66th), Egypt (81st), Greece (83rd), and Argentina (87th). Among ASEAN countries, Indonesia was ranked the fifth after Singapore (3rd), Malaysia (26th), Brunei Darussalam (28th), Thailand (38th), Vietnam (59th), Philippines (85th), and Cambodia (109th).

Thailand's economy depends on labor-intensive manufacturing sector for decades, but now the country is in a stage of development of creative industries driven by 177 knowledge and information. Knowledge-based economy is considered as the basis for the development of creative economy. Thailand has sought to enhance its role in international trade with a more proactive and have shifted the focus to the knowledge and creativity-based production with the aim to add more value to his country. Thailand considers knowledge management as an important factor to promote economic development, in addition to managing the infrastructure and services, develop knowledge and technology, and promoting R&D and innovation to commercialization. Software, animation, and games industry in Thailand is still small compared with other types of creative industries. Software market in Thailand was worth THB 67 billion in 2010, while animation and games respectively were worth THB 10 billion and THB 12 billion. The industry currently does not make a significant contribution to the GDP of the country, because they face problems related to financial supports, target markets, and human resources. However, it is believed that the software, animation, and games will play an important role in the future for the creative economy, because they are considered a real cluster in each type of industry and creativity of Thailand. In addition, the Software Industry Promotion Agency under the jurisdiction of the Ministry of Information and Communications Technology has been spearheading a national scheme to support industries ranging from financial support, marketing, and professional training programs. Currently, the government announced the creative economy as a national agenda. Thus the industry is still growing, even during the global economic recession. The needs of creative economy, public and private partnerships, international cooperation, government stability, government policies, and strong private sector will make the animation softwareand games become the main export products nationwide. Thailand was ranked 17 of top 20 exporters of creative goods in 2005. Although not recognized as a major exporter in this field, Thailand is developing itself to become one of the significant exporters of creative goods and services. According to the Thailand government economic and social development plan as well as increased creativity is considered as part of measures for economic restructuring.

Comparing between Indonesia and Thailand Creative Industry, at this chapter printing and graphic art industry, Indonesia below Thailand. Thailand has well prepared on it.

Fig.8 Indonesian creative industry scopes
(Source: Indonesian Ministry of Industry and Trade)

The contribution Indonesia Creative sub sector is mainly varying, the chart below shown each sector contribution on it. Printing Industry at Indonesia also give contribution on In Indonesian GDP. Now our concern and mind set should be changed on it. The industry still gives high opportunity on it. Now depend on us how to utilize that opportunity.
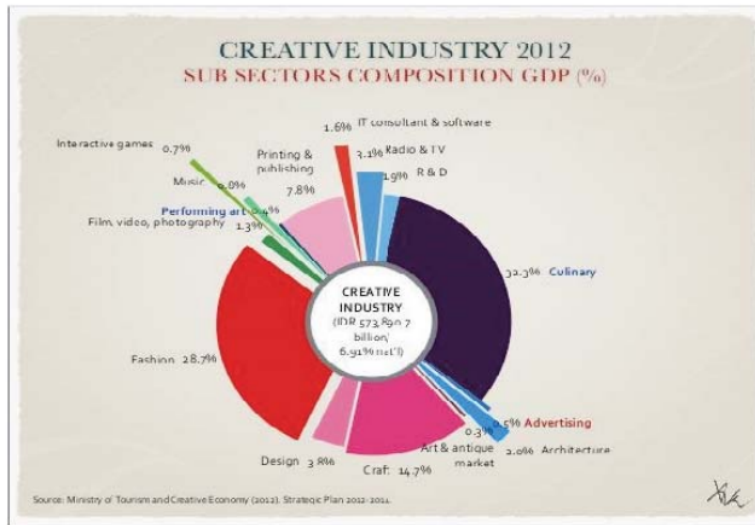
Fig.9 Industry creative sub sectores 2012 − 2018

B. The Malaysian Printing Industry

Today the global of Printing Industry becomes more competitive in relation with customer demand and the development of technology. In the context of the Malaysian printing industry is affected with what is happening in the global development. Generally, the printing industry in Malaysia plays an important role in the national economic contribution. Printing industry in Malaysia is consider as a one of the oldest industry and reported among a top five largest industries in manufacturing sector in Malaysia. Thus this industry gets support from Malaysian Government by actively promoting the export of this service based on their potential development. There are about 9,252 people working and involves in printing industry and achieved the gross income in 2017 is RM 2,617,981 (Malaysia Department of Statistics, 2017). There are 2788 registered printing companies in Malaysia (Ministry of Home Affairs, 2014). This industry is in the fifth position than other industries and most of the companies are in the SMEs category, which are 2,593 companies that representing 93%. The markets for the Malaysian printers are not only cater for the local customers but also market for the International market (Government Policy/vision for the sector liberalization policy, 2016). In Malaysia, SMEs form the backbone of the economy, which contributed greatly to the contribution to income generation and employment opportunities. Generally, SMEs in Malaysia is accounted for 99.2% of total firms and contribute 65% of employment opportunities. The profile of the Malaysia printing industry's sales revenue and workforce is depicted in Table 1.

Malaysia printing firms are confronted with keen competition to getting the printing jobs, especially in the commercial segment getting shrinking. The printing businesses encountered several challenges, in terms of competency for winning the printing project. The increased growth of customers' demands such as low price, fast delivery and good printing quality are among the challenges that need to be considered by the local printing companies to compete in the market. In addition, there was competition between the printers that have prevailing price war in an attempt to get a print job. The increasingly stiff competition in the market due to the explosion of the internet and changes in the purchasing style by the consumer, market shrink, the development of digital printing technology. The printing companies searching for the best method to ensure that the company can remain in business. Generally, to attract the customers to the company should have made an efforts to improve effectiveness in providing services to customers. Therefore, the efforts toward fostering good reputation able to give impact the trust of customers to the company.

The printing industry in Malaysia must be prepared to face challenges the new trends in printing. Printers should update their technologies capabilities, adopt new technologies, modernize equipment, increased production strategies to meet changing demands and remain competitive. The Malaysian printing companies are thinking of planning new business strategies to make them remain competitive and sustain in business.

Technology advancement and digital era change printing industry business and has become sophisticated and integrating with the new media. Today, printers are required to keep up with the enormous demand for print. Some printers raise their concern on the new technologies

Table 1　The Malaysia printing industry's sales revenue and workforce

Year	Sales value of own manufactured products (Ex-factory) (RM '000)	% change year on year	Number of employees engaged at end of period	% change year on year
2014	1,784,963	62.7	7,603	27.7
2015	2,020,897	13.2	7,546	-0.7
2016	2,172,929	7.5	7,833	3.8
2017	2,617,981	20.5	9,252	18.1

Source: Malaysia Department of Statistics, 2017

development, therefore need for capital for investment. However, today they more focus related to market uncertainty rather than making an investment for new technology. Printing company gives emphasis on increasing sales, controlling productions costs, improving human resources. Printers put effort by understanding the business trend in order to the loss of business or closing down the business.

As happens in other countries, Malaysia printing market is also facing challenging where stiff competition in the marketplace. On the other word, doing the printing business is not easy like a decade ago, printers struggling in getting the printing jobs. According to Malaysia Printing and Supporting Industries Directory 2016-2017 reported that the Malaysia print market is totally different with the changing in publication demand. Many of publishing products is less in the physical products where replacing by electronic version. Therefore, the commercial printers companies have experienced in reduction of printing job from publishing segment. At the same time, the publisher has turned to the use of digital printing technique that is more profitable.

Despite technologies advance growth in printing world it is required for new knowledge, new skills and competency in order optimize the output. Based on the development of the printing history, that can be seen the printing has transforming from the art to a science and technology. Therefore, those printing companies who make the transform from traditional method into the digital era will survive and grow. The customer would find those printers to become their preferred supplier who are more efficient and productive by using the latest technology. The rapid development of technology helps printing industry to meet current demands. For those printing companies that have economic strengthening can make an investment where the opportunities moving towards state-of-art printing equipment. Investments provide opportunities for printing companies providing products and services that are innovative and effective and meet the changing needs and demands of customers as well as to cater new local and overseas print market.

C. Conclusion

The printing industry is one of the important manufacturing sectors both in Malaysia and Indonesia. Printing industry provides services for other industries, as a medium for education, communication, dissemination of knowledge and information as well as contributes to the Malaysia economy. There are many developments and experiences that have been achieved. However, there is a still shortcoming especially from the aspect of the study and statistics to explain the printing industry in Malaysia. The current movement in the printing industry is showing more changes, especially in term of customer preferences and need, innovation and new technology. Therefore there is a need for readiness among the players in the printing to change and ready to adopt the appropriate model and approaches to remain relevant in the context of current business.

Most of the Malaysian printing firms have focused and put their efforts on the domestic markets. They used traditional marketing methods, highlighted their company's strength as well as strengthen relationships with customers. Generally, the print market becomes more challenging to the printing companies due to changing trends on the Internet, diversification of customer demand, competitive pricing, and quality service.

Educational institutions also play their roles in helping the printing industry in Malaysia. The lack of managerial personnel and education for formal technical training in the printing industry can retard the development of the printing industry. However, there are number of educational institutions that have been offering printing programs in order to produce more skilled workers and professionals to the printing industry.

There are several printing associations in Malaysian printing industry that representing several ethnics. However, the goal of each association is clearly to protect the interests of members. They have been conducting various activities to build cooperation with the government and related agencies. They always meet

and discuss the trends and future development in the printing industry as well as find solutions based on the problems occurred that affecting the printers survival. Besides that, the printing association also promotes the study and sharing knowledge in order to help members and contribute for the national economic.

This workshop gives us very clearly about Thailand Creative Industry especially related with our course major, Graphic Arts and Imaging Printing. In order to change from labor based to innovation and technology based. Our priority is listed. Education is important, without enough and standard education, all just flew like a dream. Concerning in education field, engineering, science, chemical and information technology next 10 years will be rare. Since today try to concerning at that field in order to support creative industry. Social and Business Economic is too many and over produce. Engineering fields become decrease. Now since we workshop from Thailand together with Chulalongkorn University, we realize how important all major in balance. Our home work is,

1. *Upgrading the lecture on this major by sending study abroad in linear major*

This must concern on related field that support the Industry, today cannot sell the graduated just like is. Now University, polytechnic must concern on what industry would like it? University must provide their product ready to work with industry, not ready to think. Practically based should be higher percentage rather that theoretical based. Giving them the newest curriculum and product. Sending staff and lecture study or training abroad is important. In order to upgrade Indonesian education standardization. Especially related with Creative Industry. Packaging, Publishing, Media and Commercial Printing are part of Creative Industry.

2. *Standardization ASEAN curriculum in this major (Graphic Arts and Imaging Printing) based on IT and Digital.*

Curriculum is the basic and guidance what kind product that University give to them. Our major is Graphic Arts and Imaging Printing. It means we cannot give them old models, today all informatics technology based, mostly all continent tend to teach IT based. What is the current trend and future trend? Technology always develop and growth fast. IT era must the newest. Standardization is needed for curriculum among university in ASEAN. After the curriculum has been same with others, hopefully the quality of skill workers also standard. In the future ASEAN Country Industry under Native control, not foreign.

3. *Creating many young peoples, innovative, and creative.*

SMEs in creative industry, especially in Printing still have high opportunity and chance. Compare with other major, printing still favorable, studying printing can give chance in SMEs, for example, material supplier, consultant, printing house, digital printing, product design, etc. University must prepare them not only have

high grade also entrepreneurship too. This tend to them more innovative and creative. Customization order much more favorable compare with mass production in small quantity job order. In the Future, SMEs become regenerate and the industry still running on.

4. *Creating many entrepreneurs which has specification on this industry*

Related with point number 3, entrepreneurs will be support the industry life cycle, the industry will always regeneration and develop. Without any SMEs or young entrepreneur, the industry possible going down. Based on Indonesia experience when economic crisis 1998, almost all big companies collapse, only SMEs survive at support the Indonesia economic running. Innovation and Creativity is needed. Now how the education can support and effort? Giving them the best education.

5. *Tend to innovative, creative and technology based, no more labor based with conventional models.*

Innovation, creativity, IT based become consideration for industry. Labor based was leave it no more hire so many labor in one company in order to boost production capacity with high operational cost. Many companies tend to reduce the operational cost by efficiency and effectivity concept. Single mass production product, today cannot give warranty for future. Today customization product push the company produce many product variations, especially in paper packaging and flexible packaging. Unique product was favorable, seems like product design with art touch. Thailand printing industries mostly innovation and technology based. They investing technology and hire smart skill workers, multitalented skill worker. Reducing the operational cost but the company income increased by produce specific and special product. For example, Sritong Nameplate Company, Ltd. Their product only them can produce with export quality. Research and Development Department now needed in industry. Building R&D Department need smart and skill worker who has research based soul. This is push the education to build it in together with industry. Chulalongkorn University has succeeded on it.

6. *Getting support from Indonesia Government on this creative industry.*

Government concern and support is the key of success in any industries, without their support and concern is impossible the industry can growth. Getting Government attention should be from Education and Industry synergy and working together. Thailand Government can mix between Education and Industry with their printing association in the middle and make communication bridge among 3 parties. Thai Gasma have important role in this. Now after we did workshop in Thailand it become our case sample how to optimize Indonesian Printing Association (PPGI) seems like THAI-GASMA in order to get pay attention from Indonesian Government stronger.

7. *Enhancing International network, academic and industry.*

Networking also have very important key roles in the development, not only the education, also industry and trade sectors. Academic (Education) need international network for standardization and upgrade their human resource and curriculum. Industry and Trade sector need to enhance International network in order to get International concern and market for local product, knowing international standard and needed. Education side possible make MOU with foreign university who have high grade in education. UNISBANK, POLIMEDIA and UiTM, Puncak Alam Malaysia developing the cooperation with CHULA in many aspect, especially in Imaging Printing which become our concern. Industry also developing G to G cooperation and with association. Without any international network, the industry could be stuck without any information for outside.

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