DOI: 10.6994/JET.202112_3(2).0005

The Graduates' Competency Development Towards Industry Revolution 4.0 in Malaysia
马来西亚毕业生在工业革命4.0的能力发展探讨

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Abstract: As the world economy towards industrial revolution 4.0 (IR4.0), which means the world is entering a new century of advanced technology. Each party which includes individual, business and government will get involved in the evolution of technological and influencing human daily life. The employment trend will also be changed due to this impact. The new trend of employment will require new skills and knowledge that meet the requirements of new trend of jobs and the demand of skilled talent will get increasing in labour market. Therefore, the professional skills training and vocational education become a very important part in developing the skilled workforce. The graduates' competency will be crucial for the progress and advancement of IR4.0.

This research report will explore and analyse the graduates' competency development towards IR4.0 in Malaysia which may bring a country in the move towards a developed country. Advanced

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technology or high-end technology is the core element to generate higher productivity, increase the income of the country and people as well as improve the quality of life. This study will identify the issues of graduates' competency development and propose opinions and suggestions. We hope the findings of this study will aid Malaysia in ensuring that graduates are capable of meeting critical elements and needs in the development and expansion of the emerging industrial revolution.

Keywords: Industrial Revolution 4.0, Graduates' Competency, New Employment Trend, Reskilling and Upskilling

摘　要：随着世界经济走向工业革命4.0（IR4.0），这意味着世界正在进入一个新世纪。每一方都将涉及和参与到技术方面的发展并给人类的日常生活带来影响，就业趋势也将因为这个影响而带来改变。新的就业趋势需要新的技能和知识来适应和满足，因此劳动力市场对技能型人才的需求将越来越大，职业技能培训和职业教育将成为培养技能型劳动力的重要部分。毕业生的能力对于工业革命4.0的发展和进步至关重要。本研究报告将探讨和分析马来西亚毕业生在工业革命4.0方面的能力发展。

本研究报告将讨论和分析一个国家迎来工业革命并走向发达国家的重要性。先进技术或高端技术是产生更高生产力、增加国家和人民收入以及改善生活质量的核心要素。本研究将找出毕业生的能力发展的问题并提出意见和建议，并期待这项研究的结果能够帮助马来西亚确保毕业生的能力能够满足发展和扩大新兴工业革命的重要因素和需求。

关键词：工业革命，毕业生的能力发展，新兴劳动市场，技能再培训和提升

1. Introduction

In 2013, Germany Schwab proposed the concept of the Fourth Industrial Revolution. The nine pillars of Industry 4.0 when it was first announced are cyber-physical systems, Internet of Things, Big data, 3D printing, robotics, simulation, augmented reality, cloud computing and cyber security. This phenomenon that emerges at the turn of the twentieth century is based on the digital revolution that is driven by computer networks. These networks are becoming ubiquitous and powered by ever smaller and less expensive chips (Wong, 2019). The world is preparing for the advent of IR4.0 and to cope its implications and consequences.

All industrial revolution affects social and economic development in a long period of time. IR4.0 will embrace all aspects of technological innovation, social progress, economic development, and will create an increasing demand for talents, especially scientific and technological talents (Hong, Qin, & Zhou, 2019). IR4.0 will drive to change the socio-economic especially education system which is playing a very important role in cultivating the talents and skilled labour for the emergence of new digital era. In other words, IR4.0 will give impacts and influences directly to the education system of a country. The countries may need to review and change its existing education system in order to cultivate the required workforce in the coming new era.

This research mainly explores the importance of graduates' competency development, and then analyses the challenges of graduates' competency development in Malaysia. Local education institutes produce a large number of graduates each year, and their skills are

critical in developing a competitive workforce that meets the requirements of IR4.0 jobs. Therefore, the possible methods and strategies will be proposed to deal with the issues and challenges for competency development of graduates in Malaysia.

This research report is divided into five parts. The first part is a research summary and will describe how the rise of the fourth industrial revolution will affect and change the world and mankind; explaining the training of technical professionals is crucial element for developing the industrial revolution. The second part discusses the vocational education and technical training, clarifies the importance of vocational education and technical training in cultivation of talents. The third part discusses the importance of graduates' competency development in Malaysia and explains the improvement of graduates' competency may growth and improve Malaysia's economics. I will make further analysis from the aspect of the importance of reskilling and upskilling training and the graduates need to accept reskilling and upskilling training for fulfilling the job demands in IR4.0. The fourth part analyses the challenges that Malaysia may faces in providing the reskilling and upskilling training for the graduates. The fifth part proposes opinions and suggestions and summarizes the results of this research.

2. The Fourth Industrial Revolution

In recent years, many scholars have paid attention to and carried out more and more research on the Industrial Revolution 4.0. Usually, artificial intelligence (AI) is a hot topic for research. Artificial intelligence is

profoundly in affecting and changing human production and life with unprecedented development momentum (Xue, Zhang, & Si, 2020). Nowadays, AI is playing an essential role in our everyday life. We can unlock our smart phone's screen by using face ID; AI will personalise, figuring and filtering the information and data that we have visited on our social media platform; our home will be getting "smart" in future because the AI will learn about our habits and preferences to control the appliances or smart devices in our home. The application of AI in our daily life will make human being more convenient and change their living habits and lifestyles.

Internet is one of the great inventions in human history. Internet connect everyone in entire planet and there is no more barrier for communication between people. We almost use internet to do everything in our daily life, visit websites, send email, instant messaging with friends, order foods, purchase goods, etc. The Internet of Things (IoT) is another development made possible by IR 4.0 to provide an all-embracing integration of things of different forms and functions. It's actually using the mobile internet and various platforms to establish the relationships between objects and humans (Wong, 2019). Now we able to control an object by just using our smartphone and easy to use. For example, now we can turn on the air conditioner before we return to home. We also can monitor the condition of our house by time to time though CCTV by using our smartphone. The technology of internet now is not only for connection between people but also integrate a people with objects. People can operate and control a thing even in long distance.

3. Vocational Education and Technical Training

Technical and vocational education (TVET) is forming the development characteristics of vocational academic education and vocational training. As a key task, vocational education emphasises the cultivation of morality, intelligence, physical education, and art, and aims to establish a higher-level training model for technical skills. On the other hand, vocational education is also responsible for the important task in cultivating a large number of qualified and high-level talents that are urgently needed for economic and social development (Ma & Guo, 2019). When artificial intelligence continues to affect and change human production and life profoundly, technical and vocational education as one of the core suppliers of skilled workforce, we must think actively how to cope with the arrival of the artificial intelligence era (Xue, Zhang, & Si, 2020). As a provider of skill and knowledge to a workforce, the educational sector will have to adjust the way students are trained in order to prepare them so that they can be qualified for the future employment trends (Maria, Shahbodin, & Pee, 2018). The immediate working environment changes are requiring the graduates to acquire new skills and qualifications. This makes it more critical that the graduates have to reskill or upskill in order to equip them with new capabilities to qualify for the new employment.

The biggest challenge is no longer the level of campuses, school buildings and equipment, but the lack of binding professional and curriculum construction standards, the lack of professional curriculum systems and high-quality teaching materials that meet the needs of development and the characteristics of the times and accelerate the

enrichment of professional teaching standards and other quality. The high standard of professional curriculum and high-quality teaching materials will be the core elements as starting point for deepening the reform of vocational education and teaching and become a key link to improve the quality of vocational education and talent training (Ma & Guo, 2019). Of course, we believe tertiary education level will has the direct connection to employment market after students' graduation. Thus, the education in college or university shall be able to produce and cultivate the required talents. The graduates' competencies shall cope with the demand of new employment trend. With the rapidly change of environment, the demand for new skills and knowledge will increase. Thus, the graduates should not stop learning during their working to acquire new skills and knowledge. Otherwise, they may get eliminated from their job position as their skills and knowledge may already outdated and unable to qualify to the new requirements. Therefore, upskilling and reskilling are needed to keep the graduates to acquire new skills and knowledge to avoid falling behind to the new trend of job demands.

4. The Importance of Graduates' Competency Development in Malaysia

Graduates' competency is one of the crucial elements in industrial revolution, Malaysia must put efforts in improving the graduates' competency in order to meet the rapidly changing demands in IR4.0. The importance of graduates' competency development will be discussed from the aspects of acquire new required skills and knowledge,

enhance innovation and creativity, increase effectiveness and efficiency of job tasks, and maintain productivity growth.

4.1. Acquire New Required Skills and Knowledge

According to a report "The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution" from World Economic Forum, the accelerating pace of technological, demographic and socio-economic disruption is transforming industries and business models, changing the skills that employers need and shortening the shelf-life of employees' existing skill sets in the process. For example, technological disruptions such as robotics and machine learning—rather than completely replacing existing occupations and job categories—are likely to substitute specific tasks previously carried out as part of these jobs, freeing workers up to focus on new tasks and leading to rapidly changing core skill sets in these occupations. From this report, we can realise that the skills and knowledge that a graduate learnt from tertiary education may not be able to meet the required demands in existing employment trends. Therefore, the graduates have to reskill or upskill themselves in order to fulfil the new jobs' requirement. Otherwise, these graduates may be eliminated from the labour market because the skilled graduates will replace them. The graduates should keep learning new skills and knowledge to increase their competitiveness in labour market.

4.2. Enhance Innovation and Creativity

Innovation and creativity play a crucial role in the development of human beings. It can change human being life habits and bring more convenience to daily life as well as bring huge revolutionary changes

to the entire environment. From the early mobile phones invented to smart phones today which the first-generation technology (1G) only allow the mobile phone for calling, until today we can almost do anything from the smartphone and influencing our daily habits. By using the smartphone, we can work, read, instant messaging, visit websites, connect with people on social media application, buy necessities, order food, etc. Hence, smartphone is becoming an essential tool for human being. This is the result from innovative and creativity of mankind which brought a great contribution during this process, that means the development and progress of technology is advancing to higher level. Based on the trend of technological innovation in new digital era, skilled labour and talents are the important element in driving the evolution of industry and growth of economic. Thus, reskilling and upskilling training are becoming more and more important for graduates to create a high quality of workforce. The future scientific and technological talents need to have scientific sentiment, strategic thinking, original ability, and new scientific research ability (Hong, Qin, & Zhou, 2019). The graduates need to equip themselves by attending reskilling or upskilling training frequently in order to fulfil the new demands of skilled workforce in labour market. The reskilling and upskilling training will also help the graduates to enhance their innovation and creativity which are required to create and invent new technology for the new digital era.

4.3. Increasing Effectiveness and Efficiency of Job Tasks

In the context of vocational and professional education, Martin Mulder mentions that professional competence is seen as general,

integrated and internalized capabilities to deliver suitable and effective performance (e.g. problem solving, realizing innovation, and creating transformation) in a certain professional domain, job, role, organizational context and task situation. In other words, Martin Mulder interprets that professional competence includes the ability to perform self-transformation when facing new work patterns. From his point of view, the demands for various skills and knowledge are getting high in new job market trends, the graduates are required to possess different competency for fulfilling a job position. Most people may think that practical skills are very important for the new trend of labour market, however, soft skills such as interpersonal, communication, teamwork and problem solving are also a important element to a graduate. Nowadays, a graduate is required to possess both practical and soft skills which the graduate can practise hand on job and at the same time to implement soft skills to complete its work tasks. Thus, in the rapidly changing for new employment trends, the graduates need to ensure themselves to be reskilled or upskilled and equipped with new skills and knowledge in order to avoid being eliminated from the competitive environment.

4.4. Maintain Productivity Growth

Robots play an important role in Industry 4.0. Depending on different requirements, it can be robotics arms, a whole assembly line, vehicle-type rover, android or legged patrol robots. Many can already be seen in the fields of chemical processing, pharmaceutical manufacturing, food and beverage productions. Automated machinery is aimed to perform repeated actions with high speed and precision as well as be able to work where human workers are restricted (Yang & Gu, 2021).

Robots or automated machinery is one of the important parts for technological advancement that help people to make the job tasks to become easier, fast, and more accurate. These technologies will help in maintaining the quality of works and growing the productivity. The graduates hard to improve their productivity by just using their both hands, thus, they need the assistance from technology. They have to learn how to operate the robots or apply the automated machinery or tools to boost up their productivity. Furthermore, maintaining the robots or automated machinery is a huge costing to a company. To avoid the huge costing in maintaining, the graduates must be trained well to ensure zero mistakes from their operation or production. Besides that, from the view of economic growth, application of robots and automated machinery in production is believed to boost up the development of economic to a country. Therefore, there is important to keep the graduates learning new skills or upskill themselves due to rapid technological change as well as generate the growth of economic.

5. The Challenges of Graduates' Competency Development in Malaysia

Talent training has always been not a simple task, there are many factors involved. We can analyse the challenges of graduates' competency development in Malaysia from the aspects of the readiness of graduates towards the future of work, the gaps between competence and employability skills, the funding for reskilling and upskilling training, and the quality of training instructors. All these challenges to be discussed and then propose suggestions and solutions to these challenges.

5.1. The Readiness of Graduates Towards the Future of Work

We can evaluate and analyse their attitude and readiness towards the IR4.0 or future of work and the findings can be sorted out from previous studies. According to a study "Industry 4.0 Skillsets and 'Career Readiness': Can Malaysian University Students face the Future of Work?" (Rahmat, 2019), the study's result of Descriptive Statistics and Correlation Coefficient of students' skillsets as shown in Table 1, there are 190 respondents from several public universities were participated in this survey. This study focuses on the graduates' career readiness for the future of work.

Table 1: Descriptive Statistics and Correlation Coefficient of Students' Skillsets

	Items	Means	SD	Cronbach's Alpha (α)
1. Complex Problem Solving	5	18.97	2.526	0.68
2. Critical Thinking	4	18.83	2.978	0.86**
3. Creative Thinking	4	19.75	6.391	0.80**
4. People Management	4	20.01	2.473	0.67
5. Coordinating with Others	4	19.31	2.799	0.76
6. Emotional Intelligence	5	23.67	3.765	0.73
7. Decision Making	5	23.46	3.280	0.81**
8. Service Orientation	4	18.75	2.882	0.80**
9. Negotiation	4	19.39	2.694	0.82**
10. Cognitive Flexibility	4	19.08	3.213	0.87**

Note: The value marked with ** shows high Cronbach's Alpha (α) values in Column 5. Cronbach's Alpha value >0.80 are good indication for internal consistency.
Source: Ainol Mardhiyah Rahmat, et al., 2019

From the result above, the students believe they possess the expected and adequate knowledge and skills that required by the job demands of IR4.0. The students believe they possess high level of skills for critical thinking, creative thinking, decision making, service orientation, negotiation, and cognitive flexibility.

Another study "Factors Influence The Students Readiness on Industrial Revolution 4.0" (Abd Rahman Ahmad, 2019) as Table 2 show the study's result of Universiti Tun Hussien Malaysia (UTHM) students' readiness towards industrial revolution which there are 200 respondents were participated in this research.

Table 2: UTHM Student Readiness Towards Industrial Revolution

Questions	Mean	Standard Deviation	Readiness Scale
I am ready to adapt with changes during Industrial Revolution 4.0.	4.18	.385	Ready
I am ready to apply technical skills in job task required during Industrial Revolution 4.0.	4.43	.496	Ready
I am ready to learn new knowledge provides by management for Industrial Revolution 4.0.	4.43	.496	Ready
I am ready to do my tasks in an innovative way towards Industrial Revolution 4.0.	4.18	.385	Ready

I am ready to change my working style during Industrial Revolution 4.0.	4.43	.496	Ready
I am ready to attend training provide by the institute for Industrial Revolution 4.0.	4.18	.385	Ready

Source: Abd Rahman Ahmad, et al., 2019

Based on the result above indicate that the students from UTHM are ready towards IR4.0 after completed their tertiary education. The students are prepared to the new trend of employment and believe they are able to meet the requirements of job demands of IR4.0. From previous studies, we realise that the graduates from tertiary education believe the knowledge and skills they leant are demanded and adequate for the requirements of future work. However, there is an issue arise whether those graduates' competency is able to meet the new requirements of job demands in IR4.0? If the skills and knowledge that those graduates leant from their university unable to fulfil the demands of IR4.0, are the graduates are ready for reskilling and upskilling training?

According to the PwC's 'Hopes and Fears Survey 2021' with 2,003 Malaysian participants, the result indicated that 71% of the respondents feared their jobs at risk because of automation. There were only 19% of the respondents said they have the digital skills to equip them on jobs, 57% of them said they had acquired adequate digital skills since the pandemic began and 11% said they don't have the adequate digital skills to perform their jobs. With the survey result

of this report, it is important for the graduates to know and understand the issue of their competency's development. They need to realise that the reskilling and upskilling training are necessary and preparing them for the future of jobs.

5.2. The Gaps Between Competence and Employability Skills

This issue will be the new challenge for those graduates were lack of technical skills and knowledge. There is a gap between their competence and the required employability skills for job placement of IR4.0. A graduate may never have learned how to use application software to perform a task during their higher education, hence, they may need to acquire a new skill to use application software to complete a task. This may also need those graduates to spend a couple of months to learn the new skill by attending training course. The costing for a company may increase due to the graduates need to be trained before really can perform their job. This costing may involve in term of money and time. If the graduates had learnt the technical skills that required in new jobs trend during their tertiary education, they able to cope in the job quickly without any issue. From previous studies, we can find that the rapid change in technological is driving the changing in new employment environment.

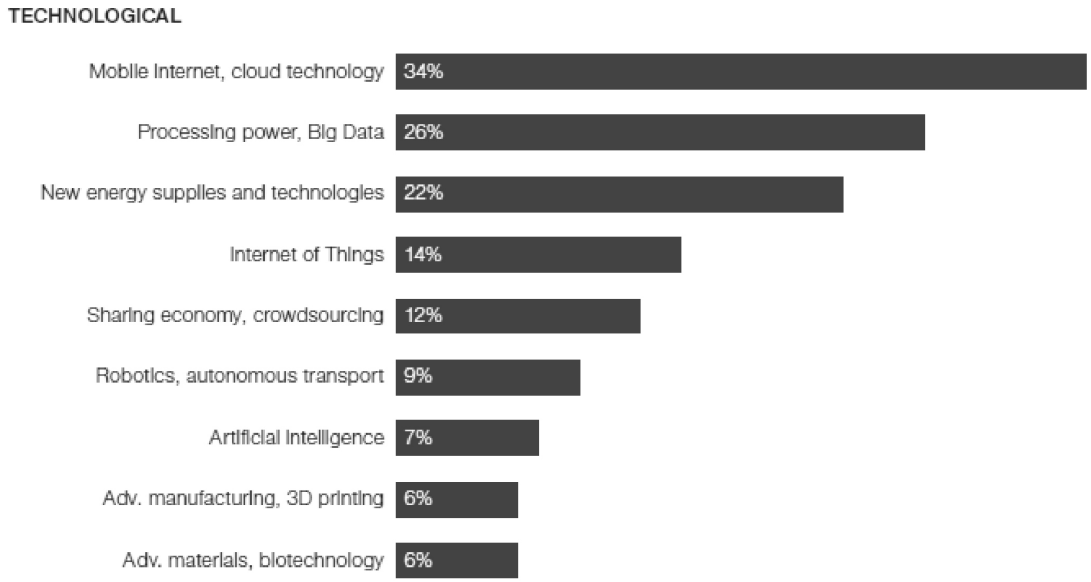

Figure 1: The Driver of Change for The Jobs

Source: Future of Jobs Survey, World Economic Forum.
Note: Names of drivers have been abbreviated to ensure legibility.

According to a report from "Future of Jobs Survey, World Economic Forum - the Driver of Change for the Jobs" as shown in Figure 1, all elements of the technological have driven the smart systems which involve in industries, homes, agricultures, or entire cities. This technological revolution will the affect the socio-economic, geopolitical, and demographic developments which each will interact with each another. Hence, the jobs will undergo a fundamental transformation and create a new series of occupations. In other words, the technological is playing a crucial impact in new trend of jobs or employment and the new jobs placement are all will be related to technical parts that the employees need to know how to deal with it. Therefore, the graduates need to be alerted to the latest changes in current environment and

keep themselves continuous learning to acquire the updated skills and knowledge.

5.3. The Funding for Reskilling and Upskilling Training

There is no gain saying that TVET is a practically suffused programme that requires vast funds for its implementation. For TVET to produce quality graduates with adequate technical and saleable skills; it must be well funded, and all tools, equipment, machines, materials and educators must be on ground (Oviawe, 2020). Similar to TVET, reskilling and upskilling training especially technical based are also required huge money to prepare the expensive equipment, facilities or laboratories. Government or policy maker has to create a long-term plan for reskilling and upskilling training. Without the support or assistance from government, there is very difficult for private institute to provide the expensive equipment and facilities due to profit maximisation oriented is the private institute's main objective. From the point of view of business, the private institute will evaluate and analyse if this investment can generate profit before the businesses is willing to inject capital into the equipment and facilities which needed for training. Hence, without the huge fund injection into the training may not successful or unable to provide a qualified graduate to fulfil the requirements of new job market in IR4.0.

5.4. The Quality of Training Instructors

To become a qualified technical training instructor in Malaysia, the personal has to obtain a government-certified Vocational Training Officer (VTO) through the Department of Skills Development (Jabatan Pembangunan Kemahiran, referred to as JPK) managed by the Ministry

of Human Resources (Kementerian Human Manusia). The instructors can apply with their several years of work experience in related fields and participate in the technical instructor training courses offered by JPK to become a government-certified VTO. Although some instructors may have more than 20 or 30 years of work experience, it is unknown whether the skills and technical knowledge of these instructors up to date with the latest or newest innovative and advanced technology. This may cause the quality of training to be greatly reduced if the instructors unable to manage and master the latest skills and knowledge of technology to meet the needs of the emerging industrial revolution. Therefore, the quality of technical training instructors is very important, and they need to be trained from time to time to ensure they are mastering the latest skills and knowledge before provide training to the graduates. Even a huge number of technical training instructors can be trained but if their quality and ability unable to meet a certain level, it will not help the development of the emerging industrial revolution.

6. Recommendation and Suggestion

With the emerging industrial revolution and the rapid development of science and technology, the reskilling and upskilling training have become a crucial part that cannot be ignored to train qualified graduates to the new employment trend. Although we will face various problems and challenges in the process of reskilling and upskilling training, as long as we take seriously to some problems and find out the corresponding solutions, we believe Malaysia able to train a huge number of qualified graduates to the emerging of IR4.0 workforce.

6.1. Cooperation Between Government Bodies and Private Technical and Vocational Colleges to Provide Reskilling and Upskilling Training

Government or policy maker should look for a collaboration with private institute in order to produce a good quality of training system. The government bodies such as The Department of Skills Development can play the key role to connect the national technical and vocational college with private technical and vocational colleges to provide reskilling and upskilling training. These institutes can provide the reskilling and upskilling training to the graduates that not from TVET after their university or college education. The national or private technical and vocational colleges may have the tools, equipment, machinery, or facilities to provide technical related training that academic based university or college may not have. Both national and private technical and vocational college can collaborate for combining resources, exchanging the latest information and data, and providing each other with suggestions and solutions for better quality of reskilling and upskilling training. The government or policy maker should also provide the financial aid to private institutes in providing the expensive equipment and facilities which the private institutes may not be able to afford. This may have influence on the training provided without a better quality of equipment and facilities.

6.2. Strengthening Industry-University Cooperation

In the past few years, many countries have begun to focus on the relationship between universities and society. Based on the model of industry-university cooperation from a study “Promoting System

of Academia-Industry Cooperation Projects at Universities" (Chen, 2011), combining resources and information exchanges can drive the economic development directly. It is necessary to connect with enterprises through the mode of industry-university cooperation to increase the students' practical knowledge directly, improve practical experience effectively, increase productivity and drive economic development. The benefits of industry-university cooperation are as follows:

Table 3: The Benefits of Industry-University Cooperation

	University/College/School	Industry
Technical	1. Rely on technology in the industry to improve R&D efficiency. 2. Utilize special equipment and technology in the industry. 3. Improve the breakthrough and progress of school research and development.	1. Complementation of school research equipment and technology. 2. Obtain technical guidance and contact the latest developments. 3. Establish technical standards through innovative technologies.
Financial	1. Government subsidies for school research and development funds to reduce the resulting gap. 2. Industry-vocational school cooperation provides a source of self-raised funds for the	1. Master the status of technological development, reduce research and development expenditures, and reduce costs. 2. Obtain funding subsidies from the government.

	school. 3. Obtaining government-industry cooperation awards. 4. Royalties income through technology transfer.	3. Disperse business risks and save costs.
Training	1. Improve graduate employment opportunities through exchanges. 2. Rely on industry experience to obtain market information. 3. Provide opportunities to teachers to learn new technologies. 4. Teachers' extra duties to train students to become labours that meet the requirements of the enterprise.	1. Recruit high-quality human resources. 2. Obtain the knowledge of competitors indirectly. 3. Obtain R&D talents, knowledge, and technology. 4. Train employees and managers to leverage the coordination of R&D and production and sales.
Strategy	1. The key technologies connect to the practical of the industry. 2. Strategic alliances between schools to cultivate core departments. 3. Establish practical characteristics of technical and vocational schools. 4. Enhance the competitiveness of technical schools.	1. Establish a database of corporate employee. 2. Stimulate competitiveness. 3. Build a good image. 4. Enhance the public image of the company.

Source: Chen, 2011

From the past study as shown in Table 3, we realise that the model of industry-university cooperation could bring many benefits for both parties directly and may also has a positive influence in employment market indirectly. This model may change the education or training system in future which each university or college has collaborate with at least a company to work together in producing talents or skilled labour. This model could overcome the issues of funding for reskilling and upskilling training and graduates' competency towards IR4.0 which the industry is willing to invest in the expensive equipment and facilities if the universities or colleges are able to produce sufficient talents to them. From the point of view of return on investment, the industry can save the costs in term of money and time. The duration of the training can be shortened and a huge cost can be saved from the reskilling and upskilling training as the graduates are able to perform the new trend of jobs just after their graduation without any further reskilling and upskilling training needed.

6.3. Expand The Scope of Industry-University Cooperation Model to Foreign Countries

From the past research and studies, we can find that the value brought by industry-university cooperation cannot be underestimated. Malaysia's university or college should expand this cooperation model to foreign countries, collaborate and connect with foreign companies as well as create value sharing, so that Malaysia has the opportunity be in touch with the advanced technology. Through this cooperation, local graduates can be sent to foreign companies for training, they can learn and master the latest scientific and technological knowledge and

technical skills, after that they may bring the foreign innovative technologies back to Malaysia. In addition, these graduates can also play the role of technical training instructors after returning from foreign countries. This will improve the quality of technical training instructors and cultivate more local technical professionals through reskilling and upskilling training, which is conducive to the development of science and technology in Malaysia. Besides that, the industry from foreign countries may also will invest in advanced equipment and facilities if the costing for setting up the training base in Malaysia is cheaper relatively to its or other countries. The industry can cultivate the talents and skilled labour they need with lower cost and will benefits Malaysia in workforce and economic development.

6.4. Increase the Technical Instructor Training College

Over the last few years, the number of students attending technical and vocational colleges are increasing. Including the reskilling and upskilling training, the demand for technical training instructors will be getting higher. There is a difference between academic education and vocational education which the academic education is focus on coursework, however, vocational education is focus on practical and hand on works. Unlike academic education, the instructor or trainer from vocational education unable to conduct the lesson with so many students in a class. For academic education, an instructor can give a lecture up to 500 students will not be an issue. But for practical lesson, an instructor unable to guide and instruct so many trainees in a class. The ideal number of trainees for practical lesson is not more than 25 pax and this number also set and regulated by JPK. Whereas

to ensure each trainee is able to learn and master all the practical skills and knowledge and no one will fall behind. Therefore, the sufficient of technical training instructors is important in producing the skilled workforce. It is necessary for the government to confront to the existence of the problem which the shortage of technical instructor training college may lead to issues of training's quality. Hence, the government needs to establish more technical instructor training colleges to produce and train more instructors. Besides that, semi-private technical instructor training colleges can be set up through the industry-vocational school cooperation model. Through this cooperation model, the staff from industry can be trained as an instructor or trainer. The staffs already possess the skills and knowledge with their extensive experience, this is one of the good ways to train them become trainers and give training to the trainees. Other than the skills and knowledge they can teach the trainees, they also can share their experience with the trainees. This way can cultivate high quality of skilled talents. Moreover, the government can provide assistance and financial aid to encourage the industry to set up private technical instructor training colleges to help in producing more quality technical training instructors. With sufficient of instructors or trainers, a huge number of qualified graduates can be cultivated and trained to the emerging labour market. Besides that, the quality of the reskilling and upskilling training for graduates also will be improved which important to keep the graduates with latest and updated skills and capabilities.

7. Conclusion

The present and future will be relying on innovative and advanced technology to drive the industrial revolution. A country's economic development and human life will be inseparable from the advancement of technological such as artificial intelligence and big data. A huge number of talents and skilled labours are needed to drive the new digital world. Thus, the education system for undergraduate and upskilling and reskilling for graduates are crucial for the new employment trend in IR4.0. The skills and knowledge that the graduates learnt from their university or college as well as they continue upskill and reskill are enable them to meet the requirements and demands of the new trend jobs. More research and further studies of vocational education and training for Malaysia are very much needed because the IR4.0 is ongoing and Malaysia must speed up for the emergence and evolution of new industries to avoid falling behind. Nevertheless, Malaysia must clearly to recognize and confront to the various problems and potential challenges in cultivating and training of qualified technical professionals as well as continue to work hard in exploring and gathering resources to cultivate and train more talents to create a bigger and efficient workforce for industrial revolution. The result will lead in growth of economic and improve the social welfare.

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