

Challenges and Collaboration Strategy of Industry in the Development of IR4.0 Skills for TVET

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Abstract

The arrival of the 4IR needs further action on identifying industry trends, job demands and possibilities that may arise in parallel with this revolution. The skill sets required for TVET occupations in the new industry revolution change and transform in most industries. The main objective of this research is to gather information about challenges and industry collaboration strategy in the development of 4th Industrial Revolution (IR4.0) skills for TVET to prepare labor force in the IR4.0. The research employed Focus Group Discussion (FGD) was conducted through a conference involving 18 panels from the Industry Lead Body (ILB) and academicians from TVET institutions. The data was collected using audio and was transcribed and analyzed using qualitative thematic analysis technique. Findings from the FGD show that Industry should be involved extensively in development and endorsement of the curriculum, and teaching and learning approach of TVET. The institution also must be open and create a platform to accept industry opinions and appoint experts from industries for skills development. The involvement of industries is essential to develop students' employability skills-besides sharing resources (skills, knowledge, facilities, and funding) by industries with TVET institution.

Keywords: Industrial Revolution, Involvement Industry Factors, Skills, TVET, Focus Group Discussion.

Introduction

According to Klaus Schwab, the founder and executive chairman of the World Economic Forum, "Governments will have to deal with ever-growing unemployment and inequality, as well as businesses with a shrinking consumer base, unless urgent and targeted action is taken today to manage the near-term transition and build a workforce with futureproof skills (Schwab, 2016). According to experts, one of the reasons is that our abilities aren't evolving with the latest technological developments (OECD, 2018). Over the course of an individual's life cycle and, collectively, the whole population. According to *white paper* from World Economic Forum (2017) states that three fundamental interrelated aspects have an impact

on how talent is developed and used in the world now and in the future. First, business models across all industries are being drastically altered by technology and globalisation, speeding up both the creation and loss of jobs. Second, the education and training systems are mostly insufficient for these new requirements since they have been stagnant and underfunded for decades. Third, barriers are produced, especially when it comes to gender, by antiquated but still prevalent cultural standards and bureaucratic inertia.

In 2021, the COVID-19 pandemic continued to have a significant impact on the world economy, impeding a complete and balanced recovery of the employment markets (Dewan et. al, 2022). Since the amount to which the virus has been limited has greatly influenced how quickly economic activity has rebounded, the recovery is taking varied forms across regions and industries. However, problems arise with every new epidemic. Prior advances in decent employment have been severely affected by the pandemic, and pre-existing decent job deficiencies are dimming the chances of a long-lasting recovery in many areas (Dieppe, 2021). Most sectors will see a shift in the skill sets needed for both new and existing vocations, which will have an impact on who works where and how (McKinsey Global Institute, 2018). Understanding people's concerns about jobs, skills, and education on a global scale as well as in relation to established and developing economies is essential. According to Kohnova and Salajova (2023) stated that the swift evolution and development of technology is altering how individuals and businesses conduct commerce with one another and to remain competitive, businesses must cooperate, collaborate, and share the benefits of digital manufacturing technologies to reduce expenses, increase productivity, or comply with industry regulations. Companies and institutions will collaborate through industry partnerships in the fields of smart manufacturing and digital production process networks, as well as the development of standardised cooperation, security, and intellectual property (Yang et. al, 2021). This partnership's primary objective is to support the development of the National Skills Qualification Framework in three important economic sectors in order to acquire information about the industry's qualified labour force requirements. It is essential to encourage private sector participation in enhancing the status of skill development (Vecchi et al., 2020). Through the engagement and participation of the private sector, the partnership programme can be conceptualised with the aim of bolstering the labour market for skilled workers. In light of the imminent advent of the fourth industrial revolution, it is abundantly evident that industry participation in the development of skills is much more pressing (Adznir, 2017). For Malaysia to realise its goal of becoming a country with a high standard of living and affluence, industry cooperation is essential if the nation's industries are to adapt to the 4th Industrial Revolution.

Methodology

The research employed Focus Group Discussion (FGD) was conducted through a conference involving 18 panel from the Industry Lead Body (ILB) and academicians from TVET institutions. The data was collected using audio and was transcribed and analyzed using qualitative thematic analysis technique.

A qualitative research design within a focus group was used to collect data for this report. The focus group method entails small groups of participants contributing to moderated group discussions on a certain topic. This method is an economical, fast, and efficient method for obtaining data from multiple participants (Jansen, 2010). The total participants in this focus group session consist of academicians from different universities and industry experts from

various industries such as construction, marine and agriculture. The data was collected using audio. The entire audio was transcribed and analyzed.

In getting the data for this report, the focus group method gives a benefit to identify the issues and ideas in skills development for 4.0 Industrial Revolution. Researcher also looks at the interaction and social dynamics that occur in the group as suggested by Seale et al., (2004) to see patterns that can show the participants know what is being said, the relationship between the moderator and the participants, the relationship between the participants with the topic and the conversation that takes place. Likewise with repetition of affirmations, silence for a moment before continuing the sentence and others that warm the discussion and attract the audience to speak.

Therefore, when analyzing the transcripts, the researcher looked at the entire transcript, recalled the situation that occurred in the discussion and studied the form of interaction of the discussion participants (Seale et al., 2004). Recording transcripts can help researchers analyze discussions where:

- All sentences must be transcribed using plain language (not simple sentences).
- Repetitive words, incomplete or meaningless sentences such as uh uh, mm and the like do not need to be included.
- Phrases or paragraphs that are difficult to understand need to be researched and re-confirmed.
- There is no need to indicate stopped conversation, short sentences, high or low tone of voice, form of intonation except for conventional emphasis.

However, Liamputtong (2012) reminds that the main purpose of FGD is more to generate ideas rather than finding mutual agreement for each issue discussed. Similarly, the agreement of the FGD panel will make it easier for the researcher to evaluate a matter or issue.

Results and Discussion

The results from the focus group discussions to identify the challenges and types of collaboration for skills development in 4th Industrial Revolution are as below

1. *The challenges facing by Industry for the development of IR4.0*

Some of the industries are aware of IR4.0, but the concern is, to transform, it involves a range of conflicts such as money, policy, and incentives. In general, unlike other developed countries, most of the sectors in Malaysia in the industry acts as user of the technology, not creating new technology to be used by others. To keep up with the new technologies, it is very challenging. Experts for each sector should provide proper training, information and sharing experiences.

To keep up with IR4.0, the use of new technology, machines, devices play an important element, however, those new technologies are very expensive. Government policy must restrict the number of foreigner workers in the company or industry to increase chances for local workers to work in the industry by using technology. Besides that, young workers/graduates must change their negative working attitudes, for example lack of work commitment, low self-motivation, and lack of discipline. They tend to quit work if it is not complied with their social lifestyle. Currently, the graduates can perform up to local standards, however they still cannot occupy with the international standards and need ample time to keep up with 4IR.

2. *The type of collaboration between industry and TVET institution in the development of IR4.0 Skills*

Active collaboration with the industries to make sure that students are being provided the opportunities to enhance their skills by using new and current technologies, techniques and skills labour. These are some of the opportunities that should be given to the students from the focus group discussion are

- i. Experts should act as supervisors or mentors to practical students.
- ii. Equipped trainer/instructor in TVET institution with suitable training regarding the IR4.0 needs for the industry.
- iii. Students are allowed to enhance/upgrade their IR4.0 skills by attending certified public training provided by the company.
- iv. Industry should give space and opportunity for students to work on certain projects (simple or complex) to spark their interest and they can apply skills that they have learned.
- v. On The Job training would be the best compared to formal training in enhancing the skills for students.
- vi. Collaborations with companies and factories in learning new technologies, skills, and others.

Overall, the results of the focus group discussions of panel from the Industry Lead Body (ILB) and academicians from TVET institutions demonstrate that sharing of experts knowledge from the industry regarding IR4.0 is necessary and very important to develop students IR4.0 skills. This clearly indicates that contextual learning is very important to be embed as part of TVET program which involve industry process and experts experience. This finding supports previous studies which found that by collaborating between organisations and institutions can strengthen their networks, thereby fostering the capabilities required to successfully capitalise on market opportunities and manage human capital (Roshani, Lehoux, & Frayret, 2015). This was support by Bikse (2022) mention that advanced technologies place high demands on people's education, professionalism, and skill shows there is a growing need for everyone to develop employability and digital competences skills in order to acquire and implement new technologies by collaborating and sharing knowledge between industry and institution of education in order to develop future high skills workers. Taken together, these findings suggest that experts from industries should share their experienced with institution to help students and institution to develop the IR4.0 skills.

Thus, the type of collaboration between industry and TVET institution in the development of IR4.0 skills are ~~also~~:

- i. Industry should be involved extensively in development and endorsement of the curriculum, and teaching and learning approach of TVET.
- ii. Institutions must be open and create a platform to accept industry opinions.
- iii. Appoint experts from industries for IR4.0 skills development.
- iv. Involved industries to develop students' IR4.0 employability skills to be employed.
- v. Sharing IR4.0 resource (skills, knowledge, facilities, and funding) by industries with TVET institution

The study revealed that Industry should be involved extensively in development and endorsement of the TVET curriculum. The finding suggest that institution should involve experts from industries in so many ways. Institutions should create a platform to accept industry opinions and appoint experts from industries for IR4.0 skills development to enhance

students' employability skills. Sharing IR4.0 resource (skills, knowledge, facilities, and funding) by industries with TVET institution is essential. clearly, this finding inline of those previous research indicating that the institutions need a motivation to collaborate with industries to improve teaching, access to funding, reputation enhancement, and access to empirical data from industry (Sohimi et al, 2019), which is crucial for ensuring its relevance, effectiveness, and alignment with the needs of the job market. Industry engagement helps to bridge the gap between education and industry requirements, resulting in better-prepared graduates who possess the skills and knowledge required by employers (Lange, Hofman & Di Cara, 2020). The results are also consistent with findings by Hussain (2021) shows that TVET institutions can establish partnerships with industries to provide apprenticeship and internship opportunities to students. These practical experiences allow students to apply their theoretical knowledge in real-world settings, gain hands-on skills, and develop industry-specific competencies. Industries can provide feedback on the effectiveness of the curriculum based on the performance and capabilities of the students during their apprenticeships or internships. In general, industry participation to inculcate IR4.0 skills is crucial by involving experts in TVET curriculum development and practices in TVET institutions.

Conclusion

The results provide information on how TVET educators and training facilities may emphasise these five industry participation criteria that have been recognised as a guidelines for developing skills among skilled people in industries so that they can adapt and contribute fully to their job. Effort should be focusing more on sharing resource (skills, knowledge, facilities and funding) by industries with TVET institution, involved industries to develop students employability skills to be employed, appoint experts from industries for skills development, institution must be open and create platform to accept industry opinions and industry should be involved extensively in development and endorsement of the curriculum, teaching and learning approach of TVET. For the purpose of building a workforce that is outfitted with the information and competences necessary in the quickly evolving technology world, these should be provided to and mastered by all skill employees. TVET universities may make sure that their programmes meet industry demands and use the most recent technological breakthroughs by working closely with companies. Industry participation may help with curriculum creation, work-based learning opportunities, trainer training, the supply of cutting-edge infrastructure and equipment, and alignment with industry certification and standards. These elements work together to help TVET institutions create IR4.0 capabilities, ensuring that graduates are well-equipped to fulfil industry expectations and contribute to the continuing digital revolution.

This research simply identifies the components of the industry engagement elements that need to be developed in order to be ready for the fourth industrial revolution. Future studies on the precise "know how" and evaluation of these elements should be worthwhile to pursue. Governments and regulators will need to quickly adapt to the rapidly changing 4IR landscape and provide the enabling environment, safeguards, investment, and oversight to guide the future that is being built. The fourth industrial revolution (4IR) is the coming together of cyber networks with physical networks to create new autonomous systems. It is also known as to be the first sustainable industrial revolution. Thus, one of the initiatives to make the 4IR successful is the creation of new skills. However, it is important to support and nurture human potential for skill development in 4IR. The findings have shown five factors that can be used as a guideline by the Department of Skills Development in order to develop skills for 4IR which

are sharing resource (skills, knowledge, facilities and funding) by industries with TVET institution, involved industries to develop students employability skills to be employed, appoint experts from industries for skills development, institution must be open and create platform to accept industry opinions and industry should be involved extensively in development and endorsement of the curriculum, teaching and learning approach of TVET. Further study is needed to make sure these strategies can be used and implemented successfully.

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