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Industry Revolution 4.0 and Job Creation for the University Students

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ABSTRACT

The Industrial Revolution brought a radical change to the world, from the agricultural-based economy to the production of goods using the machine and technology. The revolution occurred driven by advanced technology with innovations. A number of mature-age students are pursuing university education all around the world. The need to raise their status in society, need for belonging, security at their workplaces, masterly of their teaching subjects, and self-actualization among others, motivate mature-age students to enroll for university education. Changes are norms at workplaces. Malaysia aspires to enhance the value chain to become a high-income economy and must significantly improve the ability of a skilled workforce to meet the rapidly changing industry needs. As a result, globalization and technological advances require workers to be highly skilled. Graduates find it difficult to get a job after graduation because they have no job skills that match market needs. Therefore, the need to establish job skills among university students is important. Either in a developed and developing country the unemployment among graduates emerging from higher education institutions which have become the major social development problems that need to be overcome with the new knowledge and skill that fit with the market.

Key words: Industry 4.0, Job Creation, University, Students

1. INTRODUCTION

The digitalization of work is not just something that lies ahead. It has swapped more jobs over the past few years, e.g. making it more mobile. Challenges are not limited to the financial investments required for the acquisition of new technologies but also in relation to the availability of qualified personnel at all levels of the organization that is able to cope with the increasing complexity of the future production system [8]. Thus the organization should have identified the qualified candidates that suitable for the company in the future. While mutual consent there is a need for technological advances in production technology and business models in the sense of Industrial Revolution 4.0, the main obstacle lies in the complexity and abstracts seen in part that inhibits rapid changes into industrial practices.

Jobs created in the future will be different from those of the past. Routine jobs will be limited, and outsourcing, contract work, and flexible work arrangements will be the norm [13]. A report by the Business-Higher Education Forum, 2003 contrasts skills shift from the 1950s when 80 percent of available jobs required less than a college education (unskilled) to the present economic climate where 85 percent of jobs require at least a two- year degree (skilled). The jobs remaining require more education and skills of potential employees [9].

Recent studies have identified the readiness of the future as an area of increased relevance to the recruitment of graduates, and the increasingly valued employers of today's employers. Given the changing nature of work, the extent to which "getting ready" graduates are seen as demonstrating their potential in terms of job performance and career progression [6]. Student readiness is increasing as it is used to predict the performance of postgraduate potential jobs and career advancement in the workplace [7]. Students should acquire certain basic work readiness skills before graduating. To prepare students for work environments, polytechnics and universities have implemented training schemes in their curriculum to provide students with the opportunity to use knowledge and learning skills from schools in real-world situations and to gain practical experience of real life.

2. HUMAN CAPITAL DEVELOPMENT

In terms of human capital development, increased financial spending as well as increasing the number of institutions of higher learning is a positive indicator to create greater opportunities for people to get higher education and therefore the growth of human capital accumulation. However, the increase in the number of graduates is in line with the prospects of education and similar learning areas. It defines that the country's higher education is less successful in producing a workforce that fits the needs of the market. This is Malaysia's dilemma shared by the same developing countries when the rise of highly educated students is unable

to meet the available job market requirements [22]. The inequality in supply to the demand for this graduates' labor market creates many problems. It is not just the role of higher education institutions and the courses offered but also the quality of graduates.

Many studies discuss the important issues of the fourth industrial revolution among students. Most of the previous studies has shown and more focused on the readiness among graduate students are needed to overcome the new technology of Revolution 4.0 in future through quality education in higher education such as sharpen the skills, to be seekers of new knowledge and gain good employment [22]. However, there are no significant statistical outcomes stated about the factors influence the readiness of students on industrial revolution 4.0.

In addition, another gap in this study is most of the studies related to industrial revolution 4.0 is highlight the lack of skills. Lack of skills among graduates reported as a reason for employers unconcerned to hire them [1]. According to the National Economic Advisory Council, the lack of skill is consistently the main repelling factors faced by firms [22]. The skills can be divided into technical and non-technical skills. Technical skills refer to the ability to use specialized tools, procedures, and techniques. Another skill is non-technical skills or generic skills. Generic skills are used alternately with related terms including "core skills", "basic skills", "transferable skills" and "job skills". It refers to the various types and capabilities that are considered important in preparation for work in almost any job. Examples of generic skills include communication, problem-solving, and working with others [12]-[6].

[16] has discussed two main issues in the study. The first issue discussed in the study is about field-specific knowledge and technical skills on their own are not sufficient to label graduates on readiness. The second issue highlighted that graduates have to develop certain capacities beyond their qualifications that would enable them to deal with the stressful nature of the work environment. Indeed they has suggested that future related research on readiness skills should employ a control group and use a variety of data collection methods. Quantitative analysis can identify relationships between structured work experience interventions and student achievement on measures of work-readiness. Qualitative studies can be used to provide rich description to facilitate understanding among the relationships between the variables.

Moreover, World Economic Forum 2017 had discussed that a well-functioning economy requires innovative companies which infrastructure will be more efficient if latest technologies are available, and innovation cannot be undertaken without the right skills. Fourth Industrial Revolution implies ensuring that the entire population has the infrastructure to access digital technologies and the skills to leverage it. The instructions delivered by a faculty is vary where everyone is expected to learn the same thing at the same pace [19]-[3]. While this fits well into the fixed term structure of the educational programs of today, it does not meet the student expectations and enhance the readiness towards Industrial Revolution 4.0.

3. INDUSTRIAL REVOLUTION

The attraction for the Industrial Revolution 4.0 doubled. First, for the first time the industrial revolution is predicted a-priori, not ex-post. This provides various opportunities for research companies and institutes to shape the future actively. Second, the economic impact of this industrial revolution is supposed to be significant, as Industry 4.0 promises significant operational improvements as well as the development of entirely new business models, services, and products [11].

The IR 4.0 will create new challenges for the business entities, including human capital or talent development. Human capital is among the hundreds of aspects that must be emphasized by an organisation. This is because human capital can provide an overview of the performance of an organisation. Among the issues outlined by [20] in relation to human capital and the IR 4.0 were the issue of a gap of skills, threats to poor manpower and managing changes.

In order to face with the challenges, we need to promote lifelong learning, an important element that will support the ability to thrive together with the future jobs. Hence, the nation's economic development, will be influence by the ability to adapt and meet the increasing demand for quality skilled talent that is critical during the IR 4.0.

At any rate, it seems reasonable to assume that for the "Fourth Industrial Revolution" to see the full resurgence, issues regarding data management and integrity on the open web need to be addressed as stated in figure 1 [10]. It seems clear that digitization and automation may be one of the most important issues to shape the future of career choice, career development, and career counselling [12]. Industry revolution 4.0 improves competitiveness through smart devices, leveraging information on high wage sites, demographic changes, resources, energetic competencies, and city production [18], [2]. While this change will not occur overnight, and may not affect everyone equally, yet it is still critical for researchers and career practitioners to actively engage in conversations about what improves the digitization and automation of work for our employees and fields, and how research and practice can address this new trend.

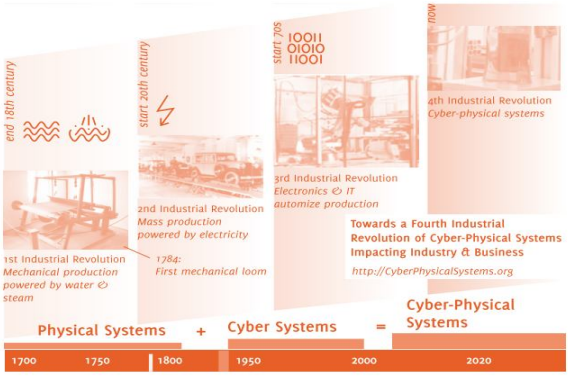

Figure 1: Phase of Industrial revolution [5]

In fact, what might be the new jobs that will available and do the country be able to prepare the industry needs in a short period of time. No doubt the government and private sector should work together to meet the needs of the IR 4.0 through retraining and enhancement of existing manpower skills to minimize retrenchment in certain jobs and to overcome the risk of a shortage of manpower in new job areas. Today technology produces devices that can be independent and functional without human interaction. The devices interact and communicate between devices through the Internet. This is among the results of a physical-cyber system. This is known as The Internet of Things or IoT capable of increasing productivity, cost-saving, and create a new business model for a variety of jobs or operations and life activities. This is the transformation of the industrial era of the 4.0 industry.

4. READINESS MODEL

The readiness model is based on the four dimensions of Industry 4.0 as defined in figure 2 Dimensions and related fields of Industrial Revolution Skills 4.0. This workshop identifies two additional, universally dimensionally utilized ones that are also considered: strategies and organizations, and workers. Overall, the model looks at six strategies and dimensions organizations, smart factories, smart operations, smart products, data-based services, and employees.

Each of these six dimensions is further defined in the field, which is then run with the appropriate instructions. They form the basis for measuring the readiness of industry 4.0 companies. The internal ring shows six basic dimensions. The outer circle shows the field associated with each of six dimensions. A total of 18 fields were measured using the appropriate instructions.

Figure 2: Dimensions and associated fields of Industry Revolution 4.0 Skill [14]

The Teaching and Learning system should be more innovative and appropriate in order to fit with the digital revolution in order to produce innovation, capability, and highly skilled students. Hence, academic sustainability must be enhanced by digitalises elements in teaching and learning. This will surely help students ' achievements as well as educate their minds to be more prepared for career and life in the future.

Technology diversification in IR 4.0 will create a new range of careers. McKinsey Global Institute estimates between 400 million up to 800 million existing occupations will be replaced in the year 2030. According to World Economic Forum, a report has predicted to have a strong job in developing sectors such as artificial intelligence, robotic, block chain, and also in non-tech positions such as customer service, sales, marketing, training, and skill development [17],[4]

5. CONCLUSION

In conclusion, student readiness is very important in the development of an institution in Industry Revolution 4.0. Moreover, the implementation of Industry 4.0 in learning institutions may help to drive a higher education level system and can create or prepared top performers among the students who will be well prepared in the working environment. At the same time, these studies may help the institutions which can divide the job tasks according to the level of readiness student on Industrial revolution 4.0 and increase the level of readiness among the students.

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REFERENCES

1. Ahmadl-, E., & Suhaili, P. (2015). **Perception Lecturers of the soft skills of engineering students in Malaysian Polytechnics**.
2. Alla Lysachok , Iryna Onopriienko , Iryna Koval, Liudmyla Rudenko , Valentyna Chaikovska, (2020). **Innovative development in IT Sphere in the Context of the Industry 4.0 Concept: the Case of Ukraine**. International Journal of Advanced Trends in Computer Science and Engineering. Vol.9 No.1 (2).
3. Ahmad, A.R., Segaran, Soon, N.K., Sapry, H.R.M., & Sarah, S., (2019). **Factors influence the students' readiness on industrial revolution 4.0.** International Journal of Recent Technology and Engineering Volume 8, Issue 2 Special Issue, July 2019, Pages 461-468
4. Arvanitakis, J., Judd, M. M., Kinash, S., de St Jorre, T. J., & McCluskey, T. (2019). **Research into the diversification of university careers in learning and teaching and intentionally closing-the-loop on graduate employability**. Journal of Teaching and Learning for Graduate Employability, 195-212.
5. Bloem, J. (2015). **The Fourth Industrial Revolution Things to Tighten the Link Between it and ot**.
6. Caballero, C. L., & Walker, A. (2010). **Work readiness in graduate recruitment and selection : A review of current assessment methods**. Journal of Teaching and Learning for Graduate Emploability, 1, 13–25.
7. David K, M. G. and J. C. (2011). **Work Readiness : A Study of Student Intern's Self-Perception**, 2011–2013.
8. Erol, S., Jäger, A., Hold, P., Ott, K., & Sihn, W. (2016). **Tangible Industry 4.0 :** a scenario-based approach to learning for the future of production. Procedia CIRP, 54, 13–18. http://doi.org/10.1016/j.procir.2016.03.162
9. Folds, L. D. (2013). **Work Readiness Characteristics of High School Seniors**, (February 2011).
10. Frederick, D. E. (2016). **Library Hi Tech News**.
11. Hermann, M., Pentek, T., & Otto, B. (2016). **Design Principles for Industrie 4.0 Scenarios**. http://doi.org/10.1109/HICSS.2016.488
12. Hirschi, A. (2017). **The Fourth Industrial Revolution : Issues and Implications for Career Research and Practice**, 1–13.
13. Https://www.tasc.tas.gov.au/. (2018). **Work Readiness**.
14. Lichtblau, K., Prof. Stich, V., Dr. Bertenrath, R., Blum, M., Bleider, M., Millack, A., … Schröter, M. (2015). Impuls **Industrie 4.0 Readiness**. *Vdma*, 1–76
15. Ridzuan Md Sham, Zizah Che Senik, Muhammad Alief Danial (2019), **Exploring Engineering-Educators' Perceptions and Challenges on the IR 4.0 at a Technical University in Malaysia.** International Journal of Advanced Trends in Computer Science and Engineering, Vol. 8 No.1 (6).
16. Masole, L., & van Dyk, G. (2016). **Factors influencing work readiness of graduates: An exploratory study.** Journal of Psychology in Africa, 26(1), 70-73.
17. Muscio, A., & Ciffolilli, A. (2020). **What drives the capacity to integrate Industry 4.0 technologies? Evidence from European R&D projects**. Economics of Innovation and New Technology, 29(2), 169-183.
18. Roblek, V., Meško, M., & Krapež, A. (2016). **A Complex View of Industry 4.0.** http://doi.org/10.1177/2158244016653987
19. Saxena, R., Bhat, V., & Jhingan, A. A. (2017). **Leapfrogging to Education 4.0: Student at the core**.
20. Sung, K.S. (2018). **Industry 4.0: A Korea perspective**. Technological Forecasting and Social Change, 132, 40-45
21. World Economic Forum. (2017). **Realizing Human Potential in the Fourth Industrial Revolution An Agenda for Leaders to Shape the Future of Education, Gender and Work,** (January), 35. unesco.org/e-forum/CompetenceStandardsforTVET.pdf
22. Yusof, N., & Jamaluddin, Z. (2015). **Graduate employability and preparedness : A case study of University of Malaysia Perlis (UNIMAP**), Malaysia, 11(11), 129–143.