I hereby acknowledge that this project has been accepted as part fulfillment for the Bachelor of

Technology Management (High Technology Marketing) with Honours

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Date : _____

DECLARATION

I declare that this thesis research of title “The Readiness of Entrepreneurs towards Industry 4.0” is the result of my own research except the citied in the reference. The research project has not been for any degree and is not concurrently submitted in candidature of any degree.

DEDICATION

This research paper is lovingly and sincerely dedicated to my parents Muda bin Musa and Maziah binti Abdullah who always give me a continuous support on my studies and always give me source of inspiration doing this research. I feel so honoured to have them both as my parents and also special thanks to all family members who always give me a loving support. I would like to say a lot of thanks to all my friends that give me a moral support during doing this research. Thank you to everyone who complete my degree journey.

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ABSTRACT

Nowadays with the technologies is getting improve day by day, we always heard about the fourth Industrial Revolution where the technologies such as cyber physical system (cps), Internet of Things (IoT) and cyber security are used in this Industry 4.0. In this study, the researcher made a company at Malacca City as their research respondents. With the total of respondents which are 100, the readiness of Industry 4.0 can be identified. In order to get the result for this research, the researcher uses a question online survey in order for the respondents to give their opinion about their company readiness for Industry 4.0. Usually the questionnaire is given two languages which are English and Malay so it can be easy for them to answer. Other than that, this research want to identify the company that have in Malacca City about their basic knowledge about Industry 4.0, the Investments of Industry 4.0, the risks of Industry 4.0 and the strategy of Industry 4.0. That makes the total of Independent Variables for this research have four with the dependent variable is the implementation of Industry 4.0.

ABSTRAK

Kebelakangan ini, dengan teknologi yang semakin meningkat, kita selalu dengar mengenai Industri Revolusi keempat dimana teknologi yang digunakan adalah Cyber Physical System (CPS), Internet of Things (IoT) dan Cybersecurity digunakan di dalam Industri 4.0. Dalam pembelajaran ini, pengkaji telah menggunakan syarikt yng ada di bandaraya Melaka untuk melakukan kajian. Dengan jumlah responden yang digunakan adalah 100, kesediaan syarikat mengenai Industry 4.0 boleh dikenalpasti. Bagi mendapatkan data dalam kajian ini, pengkaji mengedarkan soalan dalam talian bagi memudakan responden untu menjawab soalan soal selidik dan memberi pandangan mereka mengenai Industri 4.0. Soalan sol selidik ini mengandungi dua bahasa iaitu bahasa melayu dan juga bahasa English. Hal ini bagi memedahkan responden untuk membaca soalan dan memilih jawapan mereka. Selain daripada itu, pengkaji ingin mengenalpasti syarikat syarikat yang ada di bandaraya Melaka seperti pengetahuan asas mereka mengenai Indusri 4.0, pelaburan Industri 4.0, risiko Industri dan juga strategi berkaitan dengan Industri 4.0. Dengan ini, ia menjadikan dalam kaji selidik ini, ianya mempunyai 4 independent variable dengan dependent variable adalah pelaksanaan Industri 4.0.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

This study explores the characteristics of Industry 4.0 and the readiness of the entrepreneurs to implement this fourth Industrial revolution amongst entrepreneurs and how the characteristics of Industry 4.0 can influence an entrepreneurs to implement this application at their companies.

Currently, we are experiencing the fourth industrial Revolution. But, before understanding the term of 'fourth industrial revolution' the other three of previous industrial revolutions should be remembered. According to Josef Basl (2017) the first industrial revolution was based on mechanization in industry and also steam power. Then, the revolution that caused by electricity and mass production and connected with 'flexible automation' is the second revolution. The third revolution was based on computers and it was connected with 'flexible automation'. Finally, the fourth revolution is based on ICT but is associated with 'cyber physical systems'.

According to N. Jazdi (2014), the term of Industry 4.0 was created for the first time at the Hannover Fair with the presentation of the 'Industry 4.0' initiative. The first Industrial Revolution known as "Mechanization" means the result of the steam engine invention. Secondly, with the help of electricity known as "Mass Production" and thirdly by the use of Electronics and it known as "Digitization", this means the start of fourth Industrial Revolution is using the cyber physical systems (CPS) and the Internet of Things and Services.

According to Malte Brettel et al. (2014), the other three past industrial revolution has been triggered by technical innovations. The first revolution during the 18th century, the water and steam powered mechanical manufacturing had been introduced. Then, during the second revolution at the beginning of the 20th century the division of labor had been introduced last but not least during 1970s, the introduction of programmable logic controllers (PLC) for automation purposes. Next, for the upcoming industrial revolution, an expert explains that, it will be triggered by the internet which allows the communication between humans and machines in Cyber Physical Systems (CPS) throughout large networks.

1.2 PROBLEM STATEMENT

According to the Michael Rubman, Markus Lorenz (2015), improvement of technologies had improve a lot since the dawn of Industrial Revolution. Now, we are in the middle of fourth wave technological advancement which means the improvement of new digital industrial technologies or better known as Industry 4.0, a transformation that based on nine foundational technology advances. This foundational technology advances consist of big data and analytics, autonomous robots, simulations, horizontal and vertical system integration, the industrial internet of things, cyber security, the cloud, additive manufacturing and augmented reality. But, many an entrepreneur of the company do not know about the basic knowledge about Industry 4.0 at their company. Other than that, the employees of the company also do not sure about this fourth industrial revolution and do not know the existence of Industry 4.0 at their workplace.

Next, the problems that many entrepreneurs will face is the problem of investment in order to apply this Industry 4.0 at their company. According to Selim Erol & Wilfried Sihn (2016), "Investment are mainly needed for the implementation of modern information and communication technology as well as up-to-date machinery, which should result in a digital transformation of the company's entire business operations". Then, the other problems during researcher do the research is, many companies still do not understand about the concept of Industry 4.0. This is because, the entrepreneurs of that companies lack of existence roadmaps and guidance towards the awareness of the vision and concept of Industry 4.0. Selim Erol & Wilfried Sihn (2016).

In addition, according to Keliang Zhou (2015), it is hard to reach an Industrial 4.0. This is because, it is likely take ten or more years to realize. He said, nowadays, this fourth industrial revolution still become a vision for the future because it includes so many aspects and faces a lot of difficulties as well as challenges. As an examples, scientific challenges, technological challenges, economic challenges, social problems and last but not least political issues.

According to Selim Erol & Wilfried Sihn (2016), their research shows that to develop an Industry 4.0 is a challenging mission. Even though, a lot of executives know about the potential of Industry 4.0 about business models and technology, they had a big problem to improve and develop their own company-specific vision. Instead they had the expectation that Industry 4.0 is the solution itself.

Josef Basl (2017), explain that from the information received from a few of select enterprise shows that Czech companies have a high awareness regarding the existence of a trend of Industry 4.0. The problems that company will face is the companies lack of strategy of Industry 4.0. Besides that, the companies also do not hire any staff that experts about the principle of Industry 4.0. By having an existing strategy about this Industry 4.0 implementation is really important. However, many of the companies lack of strategies about this application and some of them do not have strategy at all.

1.3 OBJECTIVE OF THE RESEARCH

The main study objectives have been constructed as per below:

1. To analyze the readiness of entrepreneurs towards implementation of Industry 4.0

2. To identify the obstacles that obstruct the entrepreneurs toward implementing the principles of Industry 4.0.

3. To identify the entrepreneurs strategy regarding the implementation of Industry 4.0.

1.4 RESEARCH QUESTION OF THE STUDY

The main study question has been constructed as per below:

1. Does an entrepreneurs ready about the implementation of Industry 4.0 at their company?

2. What is the obstacles that obstruct the entrepreneurs from applying the principles of Industry 4.0?

3. What is entrepreneurs strategy regarding the implementation of Industry 4.0?

1.5 SCOPE OF THE STUDY

In this research, scope of the study is about to investigate the readiness of an entrepreneur towards Industry 4.0 that can be done through companies around Melaka, Malaysia. This study is important because, currently Malaysia is approaching towards Industry 4.0 and many companies still lacking about the information about application of Industry 4.0. This study and research is done in order to know the level of knowledge amongst entrepreneurs at their companies about Industry 4.0. By doing this study, many companies will be aware about Industry 4.0 that based on technologies and Cyber Physical System. This study is for all the companies and entrepreneur who want to implement this Industry 4.0 application at their company but they do not have enough knowledge about this.

1.6 LIMITATION OF THE STUDY

The limitations that researcher need to face during this research progress is the limited information prepare by the company. Even though, the researcher still can predict the final results based on data collection reading material reference, but by the lacking of evidence from interview of company, it still effect the results. Besides that, since many companies or entrepreneur do not have many knowledge about this application of Industry 4.0, the information needed is less and had made researcher difficult to gather the information.

Other than that, time constraints is also become one of the limitation when carrying out this research. There are only less than one year to do the research and to complete the full report. With the limitation of time to complete the research, the data may not enough. Other than that, the time limitation can make researcher difficult to find the data regarding the survey that had made.

1.7 SIGNIFICANT OF THE STUDY

The significant of the research about the readiness of entrepreneurs toward industry 4.0 is the researcher can explore more about the entrepreneur preference towards their companies. An entrepreneurs can know about the technology used in this industry and also the important of industry 4.0 implementation at their company. This is because, currently Industry 4.0 in Malaysia is still new, so during this study it is important for an entrepreneur and also manufacturer to learn more about this fourth industrial revolution or better known as Industry 4.0. Thus, as for the companies apply this Industry 4.0 application at their companies, they can get a lot of benefits. First of all, it can eases current challenges for manufacturer. Nowadays, we are facing a market volatility, then a companies are seeking to become more flexible for their business. With the existence of this Industry 4.0 and it vision, it can help the companies to ease this challenge. Another challenge that company face include shorter product life cycles, higher product complexity as well as global supply chains.

1.8 SUMMARY

This chapter explain about the introduction of the whole research. It introduces the topic of the study such as the background, the problem statements, the research question, the research objective, scope of limitations of study as well as the importance of the study.

CHAPTER TWO

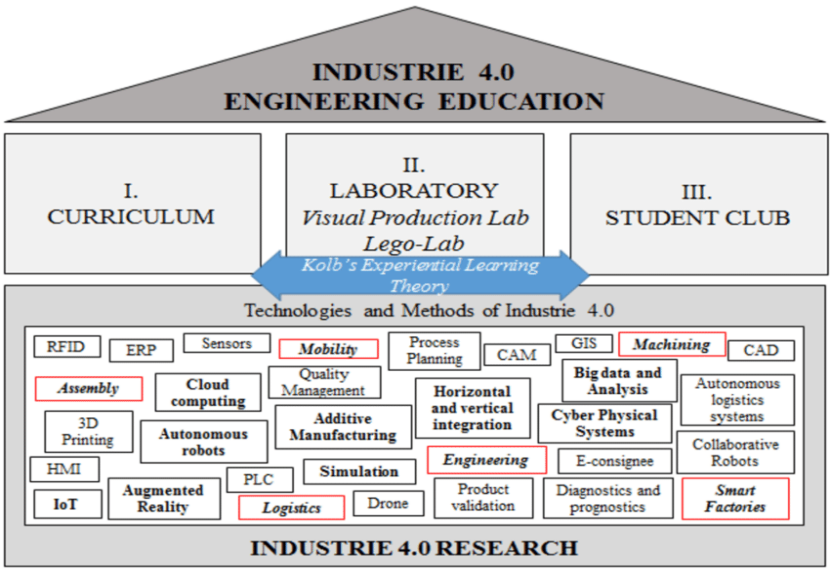
LITERATURE REVIEW

This chapter will described the review of the relevance of the literature review from the past about the acceptance of the entrepreneurs at their companies about the application of Industry 4.0. The aim of this topics discuss about to figure out what is the characteristics that companies must understand in order to implement Industry 4.0 at their companies. Other than that, to establish the theoretical framework by examining the relationship between the characteristics of Industry 4.0 and the readiness of entrepreneurs towards Industry 4.0.

2.1 THEORY

Kolb's Experiential Learning Theory

The generic framework of Industry 4.0 engineering education at Turkish-German University consist of three main stages which are curriculum, laboratory, and student club. These stages are dependent of each other. However, they are surrounded by the theory of Kolb's Experiential Learning Theory as well as Industry 4.0 methods and technologies.



I. **Curriculum** stages. It enables the students to get a basic knowledge about Industry 4.0 and also students can experience the real business cases

II. **Laboratory.** This stage, the students especially from the engineering sectors, they are divided into the groups at the laboratory and each of the groups needs to get a certain task from the instructor about the concept of Industry 4.0. As an example, the students had been ask by the instructor to design an assembly line of digital car factory.

III. **Student Club.** During this stage, it will enable the students to study the different aspects about Industry 4.0 and they will gain more information regarding Industry 4.0. This stage have a few objectives which are, realization of students research project, organization of conference, and events to introduce the concepts of Industry 4.0.