A STUDY ON READINESS OF UNIVERSITY STUDENT TOWARDS INDUSTRIAL REVOLUTION 4.0

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SUPERVISOR'S APPROVAL

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DECLARATION

I hereby declare that the work has been done by myself supported by variety of references and no portion of the work in this research project proposal has been been submitted in support of any application for any other degree or qualification of this or any other university or institute of learning.

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DEDICATION

I would like to dedicate the great appreciation to my beloved family who have been my endless supported and my friends who always give encouragement and helped me to complete this final year project. Besides that, I would like to thank my supervisor, Assc. Prof Dr. Haslinda Binti Musa and panel, Dr. Sitinor Wardatulaina Binti Mohd Yusof who have guided and motivated me all the way to finish this thesis.

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ABSTRACT

Industrial Revolution 4.0 which are most often associated with industrial development is considered as combination of advanced technology like Robotics, Internet of Things, Artificial Intelligence, Cloud Computing, Big Data, 3D printing, Biotechnology and so on. It is very helpful to the industrial field but in the same it also provides the challenges especially for the young generation or university students that have no preparation or much knowledge about this forth industrial revolution. The aim of this research is to study the readiness of university students towards industrial revolution 4.0 and to determine the relationship between independent variables (knowledge, attitude, skills, habits) and dependent variables which is readiness of university students towards industrial revolution 4.0. Therefore, the expected number of respondents that will be collected as data by the researcher is 384 of respondents based on the Table of Krejcie & Morgan (1970) in sampling design. Therefore, the data analysis will be conduct using SPSS Statistics in order interpret and transform the collective data into statistic to more understand and clear to translate the data. The data analysis involving including pilot test, descriptive analysis, reliability analysis, Pearson correlation analysis, multiple regression analysis and hypothesis testing. Then, all of analysis data will be conclude into the best summary.

Keywords: Industrial Revolution 4.0, Student's Readiness

ABSTRAK

Revolusi Industri 4.0 sering dikaitkan dengan perkembangan industri, suatu kombinasi teknologi seperti seperti Robotik, Internet Pelbagai, Kecerdasan Buatan, Pengkomputeran Awan, Data Besar, Percetakan 3D, Bioteknologi dan banyak lagi. Ia sangat membantu dalam bidang industri namun pada masa yang sama ia merupakan cabaran kepada generasi muda atau pelajar universiti yang kurang bersedia atau tidak berpengetahuan tentang revolusi industri 4.0 ini. Matlamat utama kajian ini ialah untuk mengetahui tentang kesediaan pelajar universiti mengenai Revolusi Industri 4.0 dan mengenalpasti hubungan antara pemboleh ubah tak bersandar (pengetahuan, sikap, kemahiran, perlakuan) dan pemboleh ubah bersandar iaitu kesediaan pelajar universiti terhadap revolusi industri 4.0. Jumlah responden yang dijangka direkodkan sebagai data oleh pengkaji ialah seramai 384 orang responden berdasarkan Jadual Krejcie dan Morgan (1970) dalam persampelan data. Oleh itu, data yang akan dianalisis menggunakan Statistik SPSS untuk memastikan data tersebut diterjemah dan diubah kepada data yang lebih mudah difahami dan jelas. Ujian yang digunkan untuk menganalisis data adalah ujian perintis, analisis deskriptif, analisis kebolehpercayaan, analisis korelasi Pearson, analisis regrasi berganda dan ujian hipotesis. Kesimpulan yang terbaik akan dihasilkan daripada kajian ini.

Kata kunci: Revolusi industry 4.0, Kesediaan pelajar

TABLE OF CONTENT

LITERATURE REVIEW

CHAPTER 2

CHAPTER 3 RESEARCH METHODOLOGY

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATION

NO	ABBREVIATION	DESCRIPTION
1	IR	Industrial Revolution
2	SPSS	Statistical Package for Social Science
3	MRA	Multiple Regression Analysis

LIST OF APPENDIX

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will discuss and elaborate about the readiness of university students towards Industrial Revolution 4.0. It also explains about the research background, problem statement, research questions, research objectives, scope, and limitation of study, significant of study and summary.

1.2 Research Background

There have been three distinct kinds of industrial revolutions in the history of the globe, and all of these revolutions was brought about by revolutionary breakthroughs. The first industrial revolution turned our agricultural economy into an industrial one. Products were made for the first time, and processes were automated. During this era, the finding of coal and its mass mining, as well as the invention of the steam generator and iron forge, transformed the production and interchange of products. The first industrial revolution was fueled by coal, whereas the second is powered by the invention of electricity, gas, and oil. These power sources accompanied the development of the internal combustion motor. Nuclear energy and electronics arrive in century. Nuclear power originated in Europe, flourished in Britain and the U.S., and then developed in Asia. As the 4th industrial

revolution continues, the Internet of Things, cloud technology, and AI will evolve, and the virtualized worlds will combine.

Day by day, more and more graduates have graduated, while job opportunities are limited. Then came the increase in unemployment among graduates. According to the Minister of Higher Education, YB Dato 'Seri Idris Jusoh (2017), a total of 54,103 graduates of institutions of higher learning (IPT) in the country are still unemployed within six months after graduating based on the Graduate Tracking Survey system in 2006. Lasakova, Bajzikova, and Dedze (2017) further recommended that in effort to cope with advancement in IR 4.0, the government may consider updating the curricular model by emphasizing the development of the necessary competencies in students based on IR 4.0 requirements.

In line with the Industrial Revolution 4.0, it is expected to have a huge impact on the world of work. According to YB Dato 'Seri Idris Jusoh (2017), the emergence of the cyber-physical system that is plaguing the world will cause 60 percent of the current jobs to disappear by 2050. Therefore, students must have the same mindset in resisting the currents of the Revolution The Fourth Industrial or Industrial Revolution 4.0. Students are also affected by the Industrial Revolution 4.0 where many employment sectors use robotic automation.

1.3 Problem Statement

The degree of students understanding of Industrial Revolution 4.0 and preparation for Industrial Revolution 4.0 challenges is disturbing. The significance of this research is in assessing students understanding of the Industrial Revolution 4.0 and their preparedness to face it. According to Sandrine Kergroach (2017), future technologies will certainly bring massive automated and irreparable work structure adjustments, posing huge issues for labour markets and authorities responsible for encouraging skills and employment.

More individuals losing their employment due to economic issues and new technology is worrying. Banks, insurers, builders, and manufacturers may be impacted.

Malaysia's workforce figures climbed by one percent to 14.7 million individuals last year, up from 14.5 million the year before. According to Dr. Mohd Uzir Mahidin (2017), an increase in the working population of 96,000 persons to 14.2 million people led to the increase. The labor force participation rate (LFPR) in Malaysia was 67.7% in 2016, down 0.2 percentage points from 2015. This is because they are not seeking a job since they are still studying, have a family to support, will complete their education, are disabled, and have no desire.

The country is predicted to gain 1.5 million employment as a result of the Fourth Wave of the Industrial Revolution (industry 4.0). In addition, the government is aiming for around 35% of the total labor necessary. If students are adept at grabbing the chances available, the Industrial Revolution 4.0 will not limit the amount of employment accessible to people, but will instead generate diverse fields of industry that demand more high-skilled occupations (Dato 'Sri Richard Riot Jaem, 2017). Industry 4.0 poses new difficulties for all sectors in Malaysia, which must adapt to digital transformation to remain competitive and guarantee that Malaysia is on pace to reach developed nation status.

Besides that, the advancement of Industrial Revolution 4.0 and disruptive technology which are accompanied by the formation of new value creation networks and redistribution of production facilities that make the processes of technological development and new value chains' formation are turbulent. This will create new technology gaps between developing and developed countries and give a critical impact on national economic growth like productivity, job creation, employment, and population income (Vishnevsky et al., 2019). Based on an article Civil Engineering Graduates Towards Industry Revolution 4.0, the reaction from IR introduction in Malaysia on 18 September 2018 gives impact to the graduating student whom seeking for employment

where specific skills were required by the industry. This creates a gap of skills between them. The finding reveals that the most skill required by the industry are Computational thinking follow by Social Intelligent and Design Mindset based on an analysis (Rashidah et al).

Fourth industrial revolution is causing tremendous uncertainty as the development transform the way of live and work. It is including change the job profiles and therefore requires employees with a wide range of competencies especially to the digital skills that lastly result in the graduate employment rate in Malaysia was more than three times higher than national unemployment (Khan et al., 2021). It is a big challenge especially for graduate students that lack of required skills and knowledge about Industrial Revolution 4.0. The IR 4.0 which introducing multiple tools is great that further streamline workflows and give humans even more freedom to accomplish greater improvement but at the same time, the preparation is very important such as have technical skills sets, problem-solving abilities and strategic capabilities to make sure their digital transition is successful and adaptable to IR 4.0.

In general, the use of technology in the field of education has grown rapidly in the world including Malaysia, and affects people from day to day until it is impossible to imagine today's world without the application of technology in daily life. Therefore, this study is important in identifying students' readiness to understand technology to ensure students' readiness for Industrial Revolution 4.0 in using technology, understanding pedagogy, and integrating technical knowledge into their learning process. In the Industrial Revolution 4.0, the essential tasks of humans will be replaced by robotic energy and millions of people will lose their jobs, especially in the manufacturing sector. Smith and Anderson's report (2014) found that 48% of experts imagine that in 2025, robots and digital agents will cause human unemployment, although another 52% think that technology will not replace jobs but instead believe that human intelligence will provide

new jobs, create industries and new ways of life. If not faced with sufficient knowledge and skills, we will be left behind and unable to compete.

1.4 Research Questions

In this study, to achieve the objectives in line with the title several research questions have been identified:

i. To what extent do students understand the Industrial Revolution 4.0?

ii. Are students given exposure to the Industrial Revolution 4.0?

iii. What is the readiness of students to face the challenges of the Industrial Revolution 4.0?

1.5 Research Objectives

This study was conducted to achieve the following specific objectives:

i. To identify the **understanding** of the Industrial Revolution 4.0 among university students.

ii. To identify the **level of exposure** of Industrial Revolution 4.0 to students.

iii. To identify the **level of readiness** of students to face the challenges of the Industrial Revolution 4.0.

1.6 Scope of the Research

This research paper is focusing the study on the readiness of university students towards Industrial Revolution 4.0. This study was conducted to examine the extent of university students' knowledge of Industrial Revolution 4.0 such as understanding, exposure and readiness based on knowledge, skills, attitude and habits. The researcher will conduct this study in the category of university students in order to small the scope of findings. The researcher will target on university students as main respondents of this study. The targeted respondents will be random from various courses such as management, engineering and soon. Then, the researcher conducted through distributing questionnaires in Google form survey to random respondents of various universities such as UTeM, UiTM, KUIS and others.

1.7 Significance of the research.

This research study can provide information on the importance and perceptions of Industrial Revolution 4.0. This study also aims to understand the challenges of Industrial Revolution 4.0 and the university students' level of readiness in facing the Fourth Industrial Revolution. This study will be beneficial to the community especially for the students to measure how far their readiness to Industrial Revolution 4.0. From this also, the researcher can test respondents' comprehensions to industry revolution. This study will attempt to explore and elaborate this topic as well.

1.8 Summary

In a nutshell, this chapter discussed about the background of Industrial Revolution 4.0. It also discussed about problem statement, research questions, research objectives, scope and limitation of study and significant of study. In the coming chapter, we will discuss on the literature review of this research. The information that is provided will be wider and more understanding.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In the literature of this study, the researcher discusses the theory of writing related to the study conducted by the researcher. The literature of this study is important to obtain accurate information with the title of the study, in addition to ensuring the objectives to be achieved on the study of the knowledge of the Industrial Revolution 4.0 among university students. The term 'Industry 4.0' has been a hotly debated global topic since it was introduced by Germans in 2011. There are too many definitions about it and it can be difficult for the average person to understand its true meaning. Furthermore, by reading the relevant literature, dependent variables and independent variables were defined. The literature review is significant to develop the research method such as qualitative and quantitative method. In this chapter also the proposal research framework is the best described the theory and developing the hypothesis.

The Industrial Revolution 4.0 also had a major impact on the higher education system. According to the World Bank's Chief Higher Education Expert (Francisco Marmolejo, 2017), higher education systems nationwide will also change as a result of the Industrial Revolution 4.0. In the early stages, the Fourth Industrial Revolution or Industry 4.0, digital technology had already entered the physical system as it is today. This includes the placement of computer sensing and communication systems in energy grid management, transportation, manufacturing, and water, as well as the household

appliances we use daily, entertainment systems as well as air conditioning (known as IoT or Internet of Things).

2.2 Industrial Revolution

There are four types or classifications of industrial revolution which are first, second, third and industrial revolution 4.0.

2.2.1 Classification of Industrial Revolution

In this millennium era, we are exposed to industrial revolution that developed phase by phase. It shows the development and improvement of technology itself. The faster the development science and technology, the shorter the age of an industrial revolution. Sutanto (2018) mentioned that the development of industrial revolution began when the steam engine was discovered. Moreover, the industrial revolution continues today to revolution 4.0. It started with first industrial revolution that was marked by the discovery of steam engines and weaving machines in 1784 while for 2.0 industrial revolution was marked by the discovery of electricity in 1870. After that it continued to third industrial revolution began when it was discovered by PLC and last industrial revolution is 4.0 that was marked using smart automation system in 2015. Figure 2.1 showed the transformation of technology in industrial revolution 1.0 until IR 4.0.

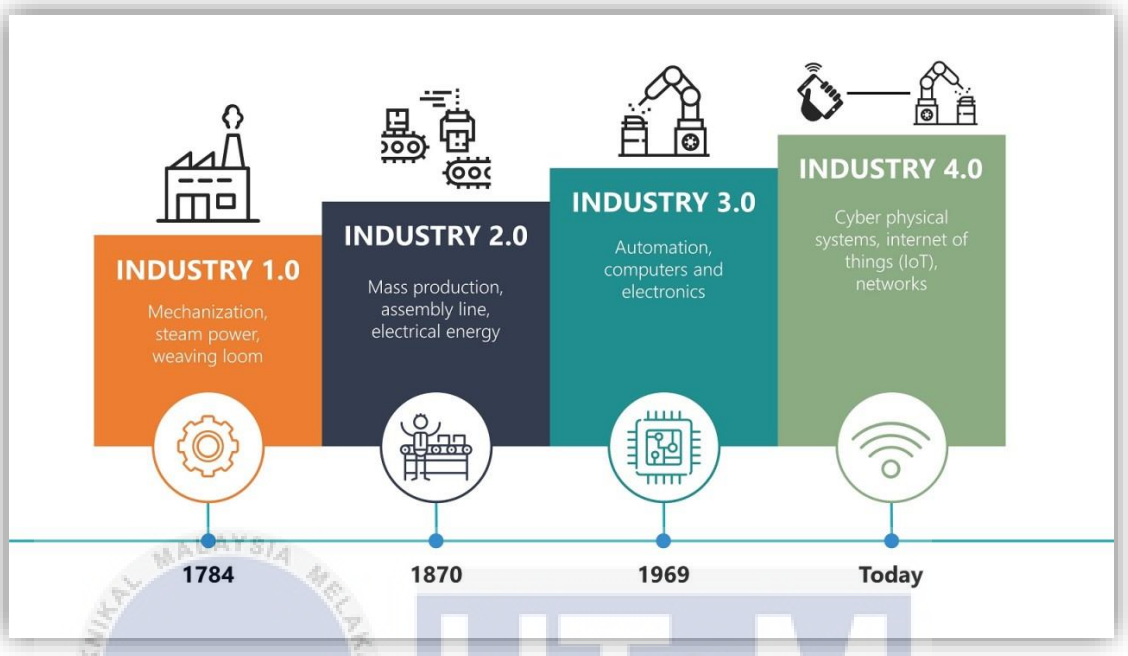

Figure 2.1: Classifications of Industrial Revolution from IR 1.0- 4.0

Source: Ivan Rosenberg (2018)

i. Industrial Revolution 1.0

The first industrial revolution 1.0 lasted 86 years and according to Stentoft et al., (2019) who stated that it determined the evolution from the mercantile city. It grew based on the goods and products exchange that obtained from agriculture to the industrial city which grew refer on in order to increase the productivity. Other than that, this transformation of industrial revolution 1.0 laid to the foundations of modern world and then by changing the human capital social structure and it be simple understanding that economic and social life has been taken over by industry.

Moreover, based on Frey and Osborne, they mentioned that people had a technological unemployment fear. That is why for this reason, several hundred years

passed between the first knitting machine that invented in 1589 by William Lee and the industrial revolution 1.0. But it can be denied that the employees took over the function of supervision, regulation and machines' control. This first industrial revolution also led to the replacement of employees' skills by simplifying their task.

ii. Industrial Revolution 2.0

The second industrial revolution lasted 99 years and it clearly the period is longer than the first industrial revolution which is 86 years. Basically, according to Nancu et al., (2020) have mentioned that second industrial revolution brought the transition from the industrial city of the planned city. In addition, the new type of employees was exempted from the productive processes which involved gross physical labour in the planned city. The gross physical labour that has been replaced by social and security services, total automation and mechanical equipment.

iii. Industrial Revolution 3.0

The third industrial revolution only lasted 46 years that caused a transition from the planned city to the more advances city which is fragmented city. It happened where the industries were increasingly moving away from the markets, thus transforming the economic systems and manufacturing methods. In this phase of IR 3.0, a new economic-social order war born, separating and even more to the housing from the workplace, consumers, urban life and research and innovation institutions (Agarwal et al., 2017).

iv. Industrial Revolution 4.0

The fourth industrial revolution or can be known as IR 4.0 considered as a combination with various technologies such as robotics, artificial intelligence, cloud

computing, big data, linked data, 3D printing, Internet of Things, industrial internet, smart manufacturing, and others. Fekete et al., (2012) have stated that it includes autonomous vehicle, nanotechnology, biotechnology, material science, energy storage and so on.

Furthermore, Rubamann (2015) mentioned that technological advancement has led to dramatic increases in industrial productivity since the beginning of the industrial revolution. Nowadays, we are in the middle of the industrial revolution 4.0 that show a great development that also identified as the enhancement of new digital industrial technology. In addition. Andreas Hirschi (2017) has characterized the IR 4.0 with key technologies such as genetics, AI, cloud computing, nanotechnology and among others. Hence, most of these various technologies have been available currently but in the cost perspectives, it increases, and reliability improvements mean that the use for industrial applications is now more commercially (Roger Strange, 2017).

2.3 Application of Fourth Industrial Revolution Technology

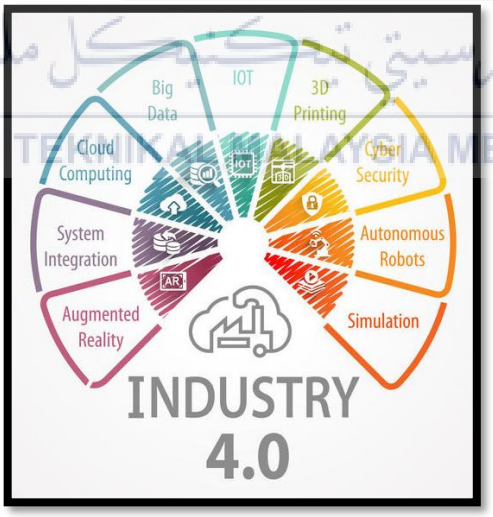

Figure 2.2 Application of Technology in Industrial Revolution 4.0

Source Roche (2019)

The Industrial Revolution 4.0 describes the blurring of the barriers within the practical, technological, and bio worlds. It is a combination of artificial intelligence (AI), robots, the Internet of Things (IoT), 3D printing, genetic modification, and quantum computing, among other technologies (Devon McGinnis, 2020). It is the impetus driving several goods and services which are quickly becoming vital to contemporary living. Consider GPS systems that advise the quickest route to a location, voice-activated chat bots like Apple's Siri, tailored Netflix suggestions, and Facebook's capacity to identify the image of owner and mention owner in a colleague's picture.

In this modern era, industry 4.0 is about to discovery of new advanced technologies. Based on Corders & Stacey (2017), there are about nine thrusts in this revolution era which are autonomous robots, simulation, horizontal and vertical system integration, Internet of Things, cyber security, the cloud, additive manufacturing, big data, augmented data and analytics. In addition, according to the core of industry 4.0, it can dominate the economy nowadays due to the new technology. Even changes in digital transformation also can remain competitive and spur the modern world landscape progress (Nizam, 2018).

Mohtar et al., (2019) stated that whether we are realised or not, fourth industrial revolution is already starting to change the world around us for better or worse. Whether on the World of Work or within the sphere of education, preparing for an era full of disruptions is not easy things because it must be done not only to remain relevant but also to become more competitive. In a time where great changes are happening, seemingly at the blink of an eye, the only should to do is by prepare to face the challenges of tomorrow starting today.

Furthermore, according to Klaus (2016), we are facing the brink of a technological revolution that will fundamentally change the way we live, interact and work. This transformation also be unlike anything ever experienced by mankind before as it is characterized by technology combinations that blurred the lines between the physical

sphere, digital and biology. Hence, IR 4.0 refers to smart factories where the machines are connected through web access to a system that will reflect the automated decision making and whole manufacturing chain.

Fairuz (2017) elaborated that the fourth industrial revolution represents of cyber-physical system, the IoT and a system that will create a new career that may not be relevant to the current job. In addition, he also stated the same things such as other author about this revolution was the discovery of various advanced technologies like cloud technology, IoT and others. Although this revolution offers new opportunities but cannot be deny that provide new obstacles to all sectors and community need to make an adaption that line to the digital transformation in order to remain competitive and also boost their progress on digital landscape. In facts that many diverse workforces today will be abandoned and also not prepare for the future to come.

2.4 Readiness of University Students towards Industrial Revolution 4.0

The readiness is a status which can be characterized as the extension that representatives are seen to have mentalities and properties that make students arranged or prepared in workplace for 12 accomplishment in the adaption on another learning and attitudes upheaval of industry 4.0 (Cabarello & Walker, 2010). According to a survey conducted by Malaysia's Ministry of Education (MOE) in 2020, although 51,000 students graduate each year, nearly 60% remain unemployed a year after graduation. This is because some of the courses available are no longer essential, and students must fight for a spot in this fast-paced market (Chalil, 2019). To address this, the Higher Education Department's director general mandated that lecturers revamp and propose new courses that included IR4.0 to assure their employability. Malaysia is currently in process of establishing Education 4.0 as part of the initiative to restructure the system by implementing Malaysia's Education Blueprint 2020-2025. (Maria, Shahbodin, and Pee, 2018)

Research from INTI University and International Data Corporation (2019) which found 63% of students and alumni couldn't explain what IR4.0 was lends support to this. According to the study, 30% of respondents feel poorly prepared for IR4.0 workplaces, which use technical skills to foster innovation and advancement. Students and recent graduates depend on their universities to give them the procedure for IR4.0, as evidenced by the 28% of students who said that they were very first-time students were engaged to IR4.0 during their college years (Sani, 2019)

Despite the new structure, both undergraduate and postgraduate construction university courses have been unable to completely connect IR4.0 applications. According to Maria et al. (2018), this Industrial revolution 4.0 technologies are more prevalent in electrical, mechanical, and architectural programs unlike in civil engineering and construction programs. As IR 4.0 becomes more entrenched in the educational sector, industries will require more qualified applicants to work in this new industrial revolution period. As a result, the higher education system will need to revise its training techniques to adequately prepare pupils.

Moreover, the theory of understanding, exposure, and readiness can be related to Industrial Revolution 4.0. Several states, including Germany, Canada, the United Kingdom, and Malaysia, have created and implemented IR4.0 preparedness assessments. In Malaysia, the Ministry of International Trade and Industry (MITI) has launched the National Policy on Industry 4.0 (Industry4WRD), which is a strategic initiative to improve Malaysia's production sector and its associated agencies into cleverer, extra strategic, and more durable.

2.4.1 Theory of Understanding

Several definitions of understanding have been revealed by experts. According to Nana Sadjana (2009), comprehension is the result of learning, for example, learners can explain with their sentence structure what they read or hear, give other examples from those that have been exemplified by the teacher and use application instructions in the case. According to Winkel and Mukhtar (2012), comprehension is a person's ability to capture the meaning and significance of the material studied, expressed by parsing the main content of a reading or transforming data presented in a particular form into another form. While Benjami S. Bloom (Anas Sudijono, 2013) says that understanding is the ability of a person to understand or comprehend something after something is known or remembered. In other words, to understand means to understand something and to be able to see it in many ways.

Thus, it can be concluded that a student is said to understand something when he can give an explanation or give a more detailed description of the thing learned using his language. It is even better when students can give an example of what they have learned with the problems around them. In this case, students are required to understand or comprehend what is being taught, know what is being communicated, and be able to utilize the content without the need to connect with other things.

Next are the levels of understanding. Comprehension is one of the competencies that are achieved after students do learning activities. In the learning process, each student has a different ability in understanding what is being learned. According to Prof. Zuchdi Darmiyanti (2017), there are three stages in understanding. The first which means to translate can be interpreted as the transfer of meaning from one language into another. It is also from an abstract conception to a symbolic model to make it easier for people to learn. Second, interpret, this ability is broader than translating this is the ability to recognize and understand. Interpreting can be done by connecting past knowledge with subsequently acquired knowledge. Third, extrapolating (making important statistics based

on serial numbers from past years) demands higher intellectual ability because one is required to be able to see something beyond what is written.

2.4.2 Theory of Exposure

According to Mohd Fairuz Mohd Yusof, Assistant Director of the National Data Bank and Innovation Center (2017), in 2020 with an estimated world population reaching 7.6 billion, current technological developments predict 50 billion electronic devices will interact with each other. The government has made several revelations on Industry 4.0, including declaring 2017 as the year of the Malaysian internet economy. Various programs such as e-commerce system, digital maker movement as well as the introduction of new location categories as Malaysia's digital hub.

According to Rashidah Mustapa, Director of Merlimau Melaka Polytechnic (2018), the boom of Industrial Revolution 4.0 is seen to change the career industry in the future. The program organized by the Industrial Relations and Training Unit (UPLI) and the Corporate Industrial Services and Marketability Center Unit (CISEC) consists of semester 5 students. Organizing dialogues to prepare students to be exposed to the real work environment.

According to Nabil Basaruddin, Metro Reporter (2017), German companies are interested in collaborating with local small and medium enterprises (SMEs) to integrate the Fourth Industrial Revolution (Industry 4.0) in sectors such as aerospace, automotive, biotechnology, petrochemical, and electrical. According to TAPiO's Chairman of Management, Bernhard Schutte (2017), assures that the formation of any such partnership sees local companies in full control of their products.

2.4.3 Theory of Readiness

Dr. Ismail Zain (2018) defines readiness as a type of process including the integration of a person's physical, mental, and emotional (psychological) qualities in completing an activity. A student who is ready to learn, for example, may appreciate and grasp a lesson more readily than a student who is not yet ready, who will be confused after the learning process. Physical readiness includes individual components such as behavior and actions, as well as environmental factors such as loudness or a lack of equipment or supplies that might affect learning readiness.

Mental preparedness relates to the capacity to concentrate, create goals, and think critically and creatively to solve an issue without succumbing to lust. When it comes to making judgments that benefit all parties, a mentally prepared student is receptive, sensible, and intelligent. Emotional preparedness has a significant impact on any activity. The ability to stabilize and prevent oneself from indulging in self-destructive conduct is a sign of peace of mind. Students with more peace of mind are more focused, confident, and ready to study. Baharom (2010) defines readiness as "willingness, willingness, and willingness." In the context of this research, preparedness refers to being prepared to meet the challenges of the Fourth Industrial Revolution. Thorndike's law (1993) states that if a person is willing to execute an activity, the action can provide satisfaction. If he does not do it, he will experience sadness, and if he does it, the subsequent learning will be poor.

The readiness is a status which can be characterized as the extension that representatives are seen to have mentalities and properties that make students arranged or prepared in workplace for accomplishment in the adaption on another learning and attitudes upheaval of industry 4.0 (Cabarello & Walker,2010). Pruitt (2007) mentioned that it different from the pretence of hypocrisy because it uses variable language from the required country and focuses on thinking on the one hand rather than on the shared thinking of both sides for conflict. This will cause a change in development of some new theoretical ideas that laid out in this article and somewhere. Vakola (2013) stated that

readiness is also defined as ‘cognitive precursor to the behaviour of either resistance to or support for a change effort.

Industry 4.0 readiness can refer from any model or theory that the organizations can have two terminal states which are least ready or most ready. Continuous attempts to develop and redevelop self-assessment models that can evaluate the industry 4.0 readiness of organizations by industry and academia in order to perform better. Furthermore, industry and academia researchers also have developed a variety of industry 4.0 readiness models in recent years to successfully master industry 4.0 (Nor Liza Abdullah et al., 2020).

In the perspectives of industry demands, Flory (2017) stated that manufactures are struggling in order to find employees because of lack of student preparations across several different features. The manufacture will benefit from a set of definitions and step-by-step measures as professional organizations and research suggest that all the features are significant. In addition, this approach is reasonable because industry needs skilled employees with strong academic backgrounds and also have problem solving skills. However, Rayner (2015) stated that most of the graduates are unaware of this current phenomenon, which sometimes cannot see the connection to what they are doing in the classroom with real world of work on the future. According to the issue that like maintaining a good grade on the subjects, many students now can spend more time for studying and less getting the right workforce or creating a suitable workplace. Besides that, the level of readiness of student needs in order to enroll and succeed-without remediation- in a credit bearing course at a post-secondary institution that offers a quality certificate programme or bachelor’s degree programme or that enable the students to enter a career pathway which potential future advancement (Bhattacharjee & Ray, 2017).

2.4.4 The Readiness of Students in Various Terms (Knowledge, Attitude, Skills and Habits)

i) Knowledge

Knowledge is a major drive of economic growth in the perspective of global company. Today, the comparative advantages of nations are derived from technical innovation and the use of knowledge is rather than from natural resources or cheap labor as it was in the past (The World Bank, 2002). The knowledge that creates in the higher education sector like universities both in teaching and research, it involves the knowledge transfer. From the teaching perspective, we look at how they train skilled people such postgraduate students and what curricular they provide for undergraduate students to prepare them in the future job market transition. Furthermore, in the fourth industrial revolution, knowledge produced by universities is supposed to lead the field and also change industry paradigm. In addition, in the model of printed knowledge production, articles and books are the example of products of research and learning in fixed publications. However, in today's digitally networked environment, so there is no more excuse or any challenges in order to access the information (Dempsey & Malpas, 2018). Moreover, although the competitive environment has contributed to the rise of research outputs such as number of patents and publications, there is still question that raise as to whether such knowledge truly has social values and relevance for the changing industry structure and labor market (Spence, 2019). Jisun Jung (2019) mentioned that although in the field of higher education did not directly and frequently use the term fourth industrial revolution but they who are the students that was highlighted of the changing environments and also higher education roles in discovering, processing and distribution knowledge. Knowledge is powerful. Furthermore, there are reviews from Asmah et al., (2018) stated that the POLIMAS students of knowledge of IR 4.0 is moderate while for review from Ladin (2018) shows that knowledge of students on forth industrial revolution

at medium level. This clearly show that knowledge of students about industrial revolution 4.0 is at moderate level.

ii) Attitude

Attitude is an act that is referring on the establishment and is the one of the important factors which supporting the activity process. Other than that, attitude also can be defined as a predisposition or tendency to make a response in the certain ways both in the form of individuals and certain projects to the surrounding world. In the simple meaning, attitude also can be understood as respond or reaction on that thing. In addition, the attitude is relatively constant and a bit hard to change it and take a process (Indah Sari, 2019). It can be positive or negative attitude depending on their experiences (Nur, 2010). Self-efficacy can be understood as one of the attitudes. Susanti et al., (2019) stated that self-efficacy which defined that an individual's evaluation of his ability or competence to carry out a task, achieve goals and overcome the challenges. Other than that, they also mentioned that self-efficacy also provides a strong foothold for the person to evaluate themselves to be able to face the work demand and competition dynamically. The self-efficacy also explained describes about a person's mental readiness in dealing the obstacles faced by maximizing their capabilities. In addition, the stronger the level of self-efficacy an individual have, the more prepared a person to face the world of work. Hence, good self-efficacy important to help the students in understanding themselves so that they will be able to show strengths and positive value to get the job like they expect. Majority of graduates are argued to be able to get a job needed confidence, capabilities but self-efficacy also become an essential to get work in future according to industrial revolution that much developed. Moreover, they have stated a few aspects in self-efficacy which are moral and ethical codes of teacher, human value and self-ability that important in attitude perspective.

iii) Skills

Mohtar et al., (2019) stated in their article that the World Economic Forum (WEF) in its biennal 'Future of Jobs Report' which lists about ten critical skills for the Future of Work for year 2020 and beyond. There are ten critical skillsets that have been stated by WEF which are complex problem solving, critical thinking, creativity, people management, coordinating with others, judgement and decision making, emotional intelligence, service orientation, negotiation and cognitive flexibility. For this fourth industrial revolution, these skills are no more seen as soft or even inferior to technical skills but as core skills that are need to not just in survive but also to survive in the future workplace. They also mentioned that if there are no preparation on these critical skills, not only will future workers fail to secure future jobs but they will also fail to contribute to the industry 4.0 economy and society in productive manner. Moreover, failure to acquire these skills will lower the career readiness level of younger generation. The younger generation is like teenagers and IPT students. Besides that, there a study of Mohd Firdaus Yahaya et al., (2018) shows that residential college students will coop the obstacles in the fourth industrial revolution that can be divided into several themes. It includes expert thinking skills, career and personal skills, and forming a global network and communication. These shows that skills are very important nowadays in order to face industrial revolution 4.0.

iv) Habits

Habit is the concept that has been which virtually everyone has their own ideas of what is meant by such a term. Habits were dumped into the procedural memory category along with a few things such as skills, emotional conditioning and perceptual priming. Besides that, habits can be defined as the representations of stimulus-response links which do not refer the objectives or goals. The notion of habits based not so much to 'how the behaviour is performed' but to 'which stimuli elicit the behaviour'. Moreover, both

notions call upon the automatically concept but on different aspects of behaviour. This involve the how it is executed versus what trigger sit or the motivational reasons why the behaviour or habit can be form (Costa et al., 2017).

2.5 Proposed Research Framework

The framework of this study is a summary of all issues related to the knowledge of Industrial Revolution 4.0 among university students. The figure below shows the relationship between the independent variable and the dependent variables. So, the elements for the independent variables are knowledge, attitude, skills and habits that can be factor or perspective term for the readiness of university students towards fourth industrial revolution. Figure 2.3 below showed the proposal research framework.

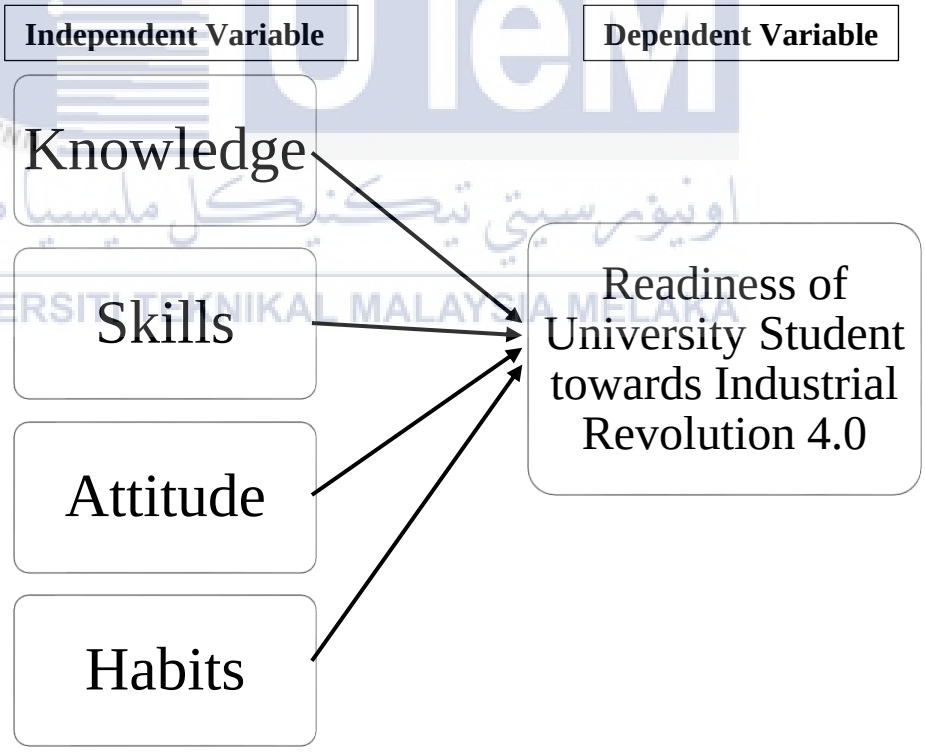

Figure 2.3 Conceptual Framework

2.6 Hypothesis

The hypothesis can be defined as the relationship between the variables that will be tested in this research. Furthermore, this hypothesis also would test whether it answer the research question or not. Then, it also would test whether the research objectives can be achieved oppositely. As listed below, there are four hypothesis that have be illustrated according to the research.

i. Knowledge

H0: There is no relationship between knowledge and readiness of university students towards industrial revolution 4.0.

H1: There is a relationship between knowledge and readiness of university students towards industrial revolution 4.0.

ii. Skills

H0: There is no relationship between skills and readiness of university students towards industrial revolution 4.0.

H2: There is relationship between skills and readiness of university students towards industrial revolution 4.0.

iii. Attitude

H0: There is no relationship between attitude and readiness of university students towards industrial revolution 4.0.

H3: There is a relationship between attitude and readiness of university students towards industrial revolution 4.0.

iv. Habits

H0: There is no relationship between habits and readiness of university students towards industrial revolution 4.0.

H4: There is a relationship between habits and readiness of university students towards industrial revolution 4.0

2.7 Summary

In this chapter, the researcher had discussed about the readiness of university students towards industrial revolution 4.0. This chapter also have discussed about the detail definition about fourth industrial revolution, explained about classifications of IR and also the application of IR 4.0 that provide the challenges itself to the community especially to students in future career. In addition, the researcher applied Knowledge, Attitude, Skills and Habits in order to explain the variables and developed the proposed research framework. Then it continued to the research framework that consists of dependent and independent variables. As have mentioned above, the independent variables like knowledge, attitudes, skills and habits. While for dependent variable is the readiness of graduates towards industrial revolution 4.0. After that, the researcher lists out the hypothesis which explained about the relationship between dependent variables and independent variables. Furthermore, in the next chapter will discussed about more detail in research methodology that consist of research design, methodological choices, questionnaire design and others.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed about the methodologies that used in order to collect the data and information in this research. Igwenagu (2016) stated that research methodology is a technique that used in research and it can guide the researcher in the systematic procedure to choose, process, describes and also analyse the topic information. Then, the researcher will elaborate about subtopic in chapter 3 which are research design, methodological choices, data collection methods, demography, research strategy, time horizon, scientific canons and data analysis method. In addition, this chapter also is intending to ensure that adequate research procedure are follow. Therefore, the results of this research can be better evaluated and understood.

3.2 Research Design

Research design can be defined as a general plan on how to answer the research question and it consists of research objectives, identify the sources from which the researcher plan to gather and analyse data and also elaborate about ethical issues and researcher constraints may inevitably come across such as data access, time, place and money. In addition, there are three classifications of research design which are descriptive, exploratory and explanatory research. Descriptive research is aimed to create an accurate description of situations, persons or events that are relevant to research question while for exploratory is particularly used to explore phenomenon and also acquiring more

understanding about interest topic. Then, the explanatory research is important to analyse an obstacles or situation to clarify relationship between variables (Saunders et al., 2016).

Basically in this research, the researcher chooses explanatory research compared to exploratory and descriptive research in order to test theories and interpret the relationship between variables. Explanatory research design is the study of the impact and cause relationship between independent and dependent variables that related. Hence, both of primary and secondary data from latest and past studies have been analyzed and finally identify the relationship between knowledge, attitude, skills and habits and the readiness of university students towards industrial revolution 4.0.

3.3 Methodological Choices

Saunders (2016) mentioned that there are three types of research methods like qualitative, quantitative and mixed methods. Qualitative method is used to collect non-numerical data via interview and then analyze the data according on categorizing data while for quantitative method is used to collect numerical data via survey or questionnaire analyze data according on graphs or statistics. After that, mixed method is combination of qualitative and quantitative method research to collect and analyze the data.

In this research, the researcher will use the quantitative method to study about the readiness of university students towards industrial revolution 4.0. Quantitative research describes the phenomena by collecting and gathering the numerical data that are interpreted using specific statistics based on mathematical methods (Muijs, 2004). Other than that, quantitative research checks the relationship between variables that are numerically calculated and evaluated using several statistical and graphical techniques. The researcher can test the proposed research framework and determine the relationship between knowledge, attitude, skills and habits and the readiness of university students by using the quantitative method (Saunders et al., 2016). In addition, according to Johnson

and Christensen (2014), quantitative method also can be used to test and verify hypothesis as to why the phenomenon and allow the researcher to generalize the study results.

The researcher's investigation is quantitative. Quantitative research employs numbering, measuring, and relationship methodologies, as well as numerical number-based descriptions. The researcher employed a quantitative approach to this investigation. To collect information and data, a series of survey forms will be created and filled out. Students from university will be given 100 survey questionnaires. To analyze the impact of each target, all data from the set of questionnaires will be gathered and characterized in SPSS software. The descriptive analysis approach helps the researcher to acquire a more succinct and clear image of the study's findings or outcomes. By looking at the frequency distribution or frequency of the data, these descriptive statistics will be able to provide a more effective presentation of data.

3.4 Primary and Secondary Data Sources

There are two types of data sources which are primary and secondary data. Primary data can be defined as the factual and original data that can be collected the undertaking of the research project and it is important to solve problems. The first person that obtain primary data is the researcher based on the questionnaire survey that have been distributed to the targeted respondents among university students in universities in peninsular Malaysia. Ajayi (2017) mentioned that questionnaires, experiments, personal interviews and observations are the examples of primary data. The respondents are given a list of questionnaires which they respond to by choose or ticking their appropriate answer based on their understanding and experiences.

Saunders et al (2016) stated that secondary data is the data that others have already generated or collected and the data sources can be analyzed to get additional or distinct conclusions, knowledge or interpretations. For an example are journal articles, books,

internal records and government publications websites. The researcher uses secondary data collection via Scopus, google scholar website and so on. The researcher utilizes the websites to search and access various journal and article that related to this research in order to get information and literature review from there. It is simpler, easier, cheaper and acquired more information and data quickly compared to primary data. However, it has weakness which is the secondary data assessment may not be helpful in business studies because the data or information that acquires may be incorrect or outdated.

The study will be done using two (2) primary data collecting techniques and secondary data references. Primary data was gathered using a questionnaire as a research tool. The information gathered was for dialysis. Books, journals, and thesis were used to gather secondary data. Researchers also make use of cutting-edge information technology by accessing data over the internet.

Questionnaires were used to collect information, which was then analyzed statistically. The closed-form questionnaire approach was adopted by the researchers. It is a constructed inquiry, and the respondent is simply required to select the response that the researcher has established. This questionnaire is also easier for respondents to complete since the responses are available to the researcher, which makes it easier for the researcher to do a study analysis. The questionnaire was divided into two sections, the first of which had questions on the respondents' personal information, such as gender, age, course, and semester. The second section of the survey asks students about their knowledge, exposure, and readiness for the Fourth Industrial Revolution.

3.5 Demography

This research was conducted in universities which located in the Peninsular Malaysia. There are about 20 public universities and 47 private universities in Malaysia. While for university colleges is 34 in total and 10 foreign university branch campuses

based on the list updated from Education Malaysia Global Services websites as in September 2019. A huge number of universities that existed in Malaysia is located at peninsular Malaysia compared to Sabah Sarawak area. According to the Department of Statistics Malaysia Official Portal, graduates are defined as individuals aged 15 years and over with the highest certificate obtained from universities, colleges, polytechnics and other recognized bodies or tertiary education institutions.

In addition, the total of graduates in Malaysia was 5.36 million persons in 2020 and it increased 4.4 percent from 5.13 million graduates in 2019. Based on the number of graduates from 2019 until 2020, it can assume that number of graduates is increased year by year. So that, it can make assumption that total of graduates in 2022 is higher and absolutely reach more than 1 million graduates. The targeted respondents are university students that likely they also graduate under category of under-graduate students whether they are studied in various courses like engineering and technology management from multiple universities especially UTeM, Melaka in order to determine their readiness towards fourth industrial revolution.

The researcher chooses universities in peninsular Malaysia because the researcher wants to focus more about the readiness of university students as young generation towards industrial revolution 4.0. Therefore, the researcher only focuses on the university students because the researcher confident they are the young generation that become national upholstery that will lead Malaysia nation in the future time. In addition, the researcher also only focuses on the universities in peninsular Malaysia because the researcher can accumulate data and make analysis easier and more convenient and at the same time, the total of universities in peninsular Malaysia is quite high. Via this research, the researcher can gain more knowledge on the readiness' results of university students towards industrial revolution 4.0.

3.6 Research Strategy

Research strategy is a plan of how the researcher answer the research question and achieve the goal. Experiments, survey, case study, archival and documentary research, action research, ethnography, narrative inquiry and grounded theory as the examples of research strategies. Survey was the research strategy that researcher selected. Data collection via survey can be easy to compare, as it uses a questionnaire to allow a large population to collect standardized data. It also can gather quantitative data by analyze descriptive and inferential statistics and then suggest possible relationship among variables (Saunders et al., 2016). After that, the questionnaire will be created and distributed to the responders among university students in order to get their feedback about readiness towards industrial revolution 4.0.

3.6.1 Questionnaire Design

Questionnaire is distributed to the university students in universities in peninsular Malaysia especially UTeM Melaka in order to collect the primary data in this research. Basically, the questionnaire is containing three parts of close ended question. The first part of the questionnaire is investigating the demographic information of respondents which are age, gender, educational level and name of university. Then, the second part is focusing on the independent variables such as knowledge, attitudes, skills and habits. The third part of the survey is questioning about the dependent variable that is the readiness of graduates towards fourth industrial revolution.

Likert scale will be a tool to measure the second and third part of the questionnaire. Likert scale will be five points rating scale in which the higher level of rating from 1 to 5 rating are represented the level of agree in ascending order. In the same meaning, rating scale in which 1 represented “strongly disagree”, 2 represented “disagree”, 3 is “neutral”, 4 is “agree” and lastly 5 represented “strongly agree”. Then, the survey will be distributed

via online by google form to the targeted respondents and share the survey for university students to answer whether in WhatsApp or other platform of social media.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Table 3.1: Five points Likert Scale

3.6.2 Sampling Design

Probability sampling is the sampling design that researcher have select in this research. An unsystematic choice that be linked with survey-based research to address the research question and fulfil the research objectives is definition of probability sampling. Saunders et al (2016) mentioned that sampling design is vital when there are lack of time and money for the researcher to accumulate the data from the big population. Taherdoost (2016) stated that systematic random sampling, multi-stage sampling, simple random sampling, stratified random sampling and cluster sampling are the variety of probability sampling method.

Basically, researcher will choose simple random sampling in this research. This is because it represents the current population of study and researcher can measure sampling errors only by random methods. After that, the researcher also needs to select a sample of university students as respondents because this study focuses on the readiness of university students towards industrial revolution 4.0.

According to the Department of Statistics Malaysia Official Portal, graduates are defined as individuals aged 15 years and over with the highest certificate obtained from

universities, colleges, polytechnics and other recognized bodies or tertiary education institutions. In addition, the total of graduates in Malaysia was 5.29 million persons in 2019 and it increased 6.9 percent from 4.94 million graduates in 2018. Based on the number of graduates from 2018 until 2019, it can assume that number of graduates is increased year by year. So that, it can make assumption that total of graduates in 2021 is higher and absolutely reach more than 1 million graduates.

According to table of Krejcie and Morgan (1970), the researcher will choose more than 384 respondents who are the students of universities that located in peninsular Malaysia especially UTeM Melaka to contribute in this survey. The respondents then must have basic knowledge about industrial revolution 4.0 to determine their readiness towards IR 4.0 based on their knowledge, skills, attitudes and habits that become indicator in this research. Table 3.2 below showed the table for determining sample size of population.

Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*

Table 3.2 Determining sample size of a known population

Source: Krejcie & Morgan (1970)

3.6.3 Pilot Test

According to Saunders et al (2016), pilot testing can be defined as a small-scale trial that allows the researcher to test and comment the survey questionnaire to reduce the problems when the respondents respond to the questions and the fata recording issue. After that, the researcher will select 30 respondents who are university students in order to conduct a pilot testing. The researcher than will test the questionnaires are related to the research study on the respondents. The researcher approximately will use one week to complete this testing. In the final questionnaire of the survey, the feedback and suggestions will be considered and involves in. The purpose of pilot testing is to test the reliability of data and validity of the questionnaire survey (Barlett, 2013). It will be collected in this study before distributed the questionnaire to the targeted respondents among university students.

3.7 Data Analysis Method

Data analysis is the process which statistical tool like SPSS or Statistical Package of Social Science is used by researcher in order to analyze data that collected from respondents (Zikmund, 2003). Other than that, the researcher also used descriptive analysis, Pearson's correlation analysis and also multiple regression analysis as analysis method in this research.

3.7.1 Descriptive Analysis

The descriptive analysis uses comparison of variables and numerical description which target on the central tendency and dispersion. Descriptive analysis also is used to analyze the information from the respondents and convert the data raw into the form that is easier to understand and interpret. Furthermore, it is used to describe the demographic background of respondents by using frequency and percentage (Saunders et al., 2016). In

this research, descriptive analysis is using to differentiate the age, gender, race, educational level and name of university among the university students as respondents.

3.7.2 Pearson's Correlation Analysis

A Pearson's correlation coefficient shows the quality, heading and immensity of the bivariate connections among every one of the factors measured at a provisional or proportion level. Hair et al. (2007) indicated the general guidelines about coefficient extent and the quality of the connections. According to Saunders et al., (2016) stated that Pearson Correlation Analysis empowers researches to assess the linear relationship strength between dependent and independent variables. Pearson's correlation coefficients are used as a statistical test in order to measure the relationship between two variables. It is vital to measure the probability of correlation coefficient occurring by chance alone for data collected from a sample. Pearson's correlation coefficient is between -1 to +1 represent perfect negative and perfect positive correlations. Meanwhile the 0 value is represented perfectly independent correlation. Figure 3.1 below showed the Pearson's Correlation Coefficients.

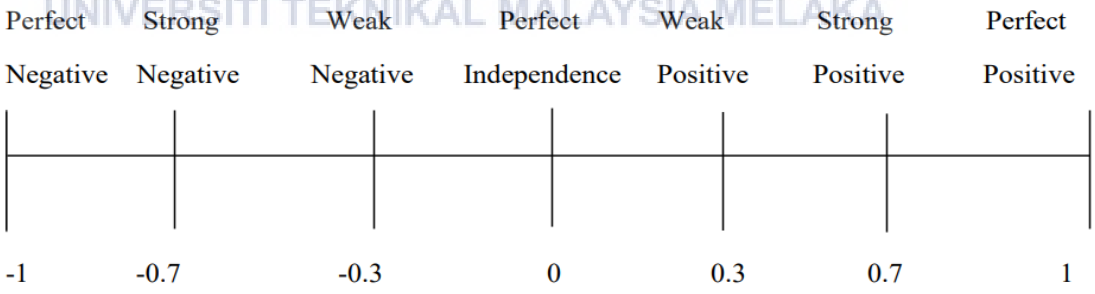

Figure 3.1 Pearson's Correlation Coefficient

Source: Saunders, Lewis and Thornhill (2016)

3.7.3 Multiple Regression Model

According to Saunders et al (2016), multiple regression model is a statistical tool that enables the researcher to assess the effect strength and cause relationship between one dependent variable and four independent variables. The researcher needs to understand the relationship between independent variables (knowledge, attitudes, skills and habits) and dependent variables which is the readiness of university students towards industrial revolution 4.0 in this research. The multiple regression model can help the researcher to determine the four independent 30 variables with the greatest impact on dependent variable. The following is showing the equation of multiple regression analysis.

Equation of Multiple Regression Analysis: $Y = a + bX1 + cX2 + dX3 + eX4$

Where Y = dependent variable (The readiness of university students towards industrial revolution 4.0)

X1, X2, X3, X4 = independent variables

a = constant value or intercept

b = Influence of X1 (knowledge)

c = Influence of X2 (attitudes)

d = Influence of X3 (skills)

e = Influence of X4 (habits)

3.8 Reliabilty

Reliability can be defined as the extent to which data collection techniques that will produce consistent finding (Saunders et al., 2016). It also includes the structure of questionnaire; a reliable questionnaire can result consistency at different conditions and time. In measuring the reliability, there are a few of approaches. Cronbach's Alpha method is used by the researcher in order to measure the reliability of variables. The value contains

an alpha coefficient ranging between 0 and 1. There is something wrong with the data if the result of data shows a negative number. When the values of Cronbach's Alpha show more than 0.7 is considered acceptance, more that 0.9 is considered good and equal or more than 0.9 is considered excellent. While if the Cronbach's Alpha's value demonstrated less than 0.6 is considered poor and less than 0.5 is considered unacceptable. The table below shows was constructed by Saunders et al., (2016) that indicate the Cronbach's Alpha values.

Cronbach's Alpha Value	Interpretation
Excellent	0.91-1.00
Good	0.81-0.90
Acceptable	0.71-0.80
Poor	0.61-0.70
Unacceptable	0.01-0.60

Table 3.3 Cronbach's Alpha Value

Source: (Konting et al., 2009)

3.9 Summary

In conclusion, the researcher discussed how the methodology research that used to collect data and information on this chapter. The researcher will choose explanatory research design and quantitative method in this research. The questionnaire as a primary data will be distributed for graduates via google form survey whereas internet, journal and articles as a secondary data source. This survey will be focus on university students in Malaysia. The researcher will conduct questionnaire design, pilot testing and sampling design. In this chapter also, reliability are also required while the data will be analyzed by using Statistical Package for Social Science or SPSS. Lastly, the part of analysis data will be explained by using Pearson's correlation coefficients and multiple regression model.

CHAPTER 4

4.1 Introduction

This chapter will elaborate about data analysis that produce output from Statistical Package for Social Science (SPSS). The collective data which required from target respondents who are from university students then will be analyze into pilot test, descriptive analysis, reliability analysis, Pearson Correlation analysis and multiple regression analysis to get appropriate result. Moreover, this chapter also discuss about hypothesis testing and summary for chapter 4.

4.2 Pilot Test

Pilot testing is conducting to know how far the survey is achieve reliability and validity of questionnaire. The Cronbach's alpha method is used by researcher to measure the reliability of variables. The value contains an alpha coefficient ranging between 0 and 1. There is something wrong with the data if the result of data shows a negative number. When the values of Cronbach's Alpha show more than 0.7 is considered acceptance, more that 0.9 is considered good and equal or more than 0.9 is considered excellent. While if the Cronbach's Alpha's value demonstrated less than 0.6 is considered poor and less than 0.5 is considered unacceptable. The table below shows was constructed by Saunders et al., (2016) that indicate the Cronbach's Alpha values.

In this testing, the researcher selected first 30 respondents to test the reliability of survey that have been collected are from university students whose study at public or private university in Peninsular Malaysia. This testing will show the result of pilot testing which produced by SPSS Statistics.

Table 4.1: Cronbach's Alpha Values

Cronbach's Alpha	Internal Consistency
$a \geq 0.9$	Excellent
$0.7 \leq a < 0.9$	Good
$0.6 \leq a < 0.7$	Acceptable
$0.5 \leq a < 0.6$	Poor
$A < 0.5$	Unacceptable

Table 4.1.1 Case Processing Summary

		N	%
Cases	Valid	30	17.4
	Excluded [a]	142	82.6
	Total	172	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.1.2 Reliability Statistics of Pilot Test

(Source: SPSS Output)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.959	.960	20

Table 4.1.2 showed the result of reliability statistic for the data that have been collected from 30 university students in Peninsular Malaysia. According to the table above, the Cronbach's Alpha result is equal to 0.959 while based on standardized items it is equal to 0.960 that its value had exceed than the excellent level of Cronbach's Alpha which is equal or more than 0.9. Based on the result, the researcher conclude that the questionnaire of survey was valid and reliable good for researcher to conduct the collective data for the research.

4.3 Descriptive Analysis

Descriptive analysis is used to analyze the collective data from respondents and convert into the data raw into the form that much easier to understand and interpret referring to the frequency and percentage value of demographic questions in section A such as gender, race, age, education level and name of university of respondents.

4.3.1 Descriptive Analysis of Demographic

Table 4.13: Frequencies Distribution of Respondent's Gender

(Source: SPSS Output)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	44	25.6	25.6	25.6
	Female	128	74.4	74.4	100.0
	Total	172	100.0	100.0	

The table above showed about the frequency of male and female of respondents. According to the table, the frequency and percentage of female respondents have the

higher value than male respondents which are recorded 128 and 74.4% respectively from 172 total of respondents. While for male students, their frequency value is 44 only or equal 25.6 percent. This show female students was the majority who are answering the questionnaire.

Table 4.14: Frequencies Distribution of Respondent's Race

(Source: SPSS Output)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	148	86.0	86.0	86.0
	Chinese	11	6.4	6.4	92.4
	Indian	5	2.9	2.9	95.3
	Others	8	4.7	4.7	100.0
	Total	172	100.0	100.0	

The table above showed about the analysis of respondent data by race. From the total of 172 respondents, there are 148 respondents (86.0%) of Malay students and 11 respondents (6.4%) who are Chinese students. While for Indian and other race have recorded 5 respondents (2.9%) and 8 respondents (4.7%) respectively. This clear showed that Malay students are the majority race who responding the survey followed by Chinese and other race in descending order. Besides that, the Chinese respondents have the lowest value of frequency and percentage compared to other race that took part in the collective data. Finally, the researcher can make assumption that Malay students are the majority race in the universities.

Table 4.15: Frequencies Distribution of Respondent's Age (Source: SPSS Output)

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-22 years old	91	52.9	52.9	52.9
	23-27 years old	78	45.3	45.3	98.3
	29 and above	3	1.7	1.7	100.0
	Total	172	100.0	100.0	

The table above showed the frequency distribution from the demographic aspect which is age of respondents. It can simply understand that the respondents who age from 18-22 years old have highest frequency in the collective data which equal to 91 respondents or 52.9% in percentage which recorded more than half of the total respondents. Furthermore, it is followed by the respondents who age from 23-27 years old that recorded 78 respondents (45.3%). Then, the lowest percentage have been recorded is the respondents who are from 29 and above of age which is 1.7% only. It can be concluded that majority of respondents are from the youngest generation who are age from 18-22 years old that have answered the questionnaire.

Table 4.16: Frequencies Distribution of Respondent's Education Level

(Source: SPSS Output)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	11	6.4	6.4	6.4
	Degree	157	91.3	91.3	97.7
	Master	2	1.2	1.2	98.8
	PhD	2	1.2	1.2	100.0
	Total	172	100.0	100.0	

Education level

The table above showed the descriptive analysis that consist of frequency and percentages of multiple of education level such as Diploma, Degree, Master and PhD among the respondents who are from university students itself. Based on the table, the highest percentage is equal to 91.3% which is among Degree respondents with 157 of frequency. Moreover, Diploma students have recorded the second highest value of frequency and percentage which are 11 and 6.4% respectively. While for Master and PhD students have showed the same value of both frequency and percentage which are 2 respondents or equal to 1.2 percent respectively. The researcher can conclude that the biggest total of respondents are degree students who become majority in the university compared to Master and PhD students which recorded the lowest value of percentage of respondents that took part in this research.

Table 4.17: Frequencies Distribution of Respondent's University

(Source: SPSS Output)

University

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UTeM	136	79.1	79.1	79.1
	UMT	1	.6	.6	79.7
	UTHM	2	1.2	1.2	80.8
	UniKL	2	1.2	1.2	82.0
	UMK	1	.6	.6	82.6
	UPM	1	.6	.6	83.1
	UNISEL	3	1.7	1.7	84.9
	UKM	4	2.3	2.3	87.2
	UM	2	1.2	1.2	88.4
	USM	3	1.7	1.7	90.1
	USIM	5	2.9	2.9	93.0
	UiTM	9	5.2	5.2	98.3
	UPSI	2	1.2	1.2	99.4
	UniSZA	1	.6	.6	100.0
	Total	172	100.0	100.0	

The table above showed the frequency and percentage distribution of respondent's university that consist of various universities such as UTeM, UMT, UTHM, UniKL, UMK and so on. For extra information, the researcher has listed out about 20 universities in the questionnaire but only 14 universities that involved in this research. UTeM has recorded the highest value of respondents with frequency 136 or 79.1 percent who took part answering the survey. The second highest of frequency is recorded by UiTM students which is 9 respondents (5.2%). After that, the highest value in descending order is continued by university from USIM (5 respondents, 2.9%), UKM (4 respondents, 2.3%), UNISEL and USM with same value of frequency which is 3

respondents (1.7%). Then the value of 1.2% (2 respondents) is shared by UTHM, UniKL, UM and UPSI students that recorded as second lowest of percentage who responded the questionnaire according to the table above. Besides that, the respondents who are from UMT, UMK, UPM and UniSZA have the lowest percentage which is 1 respondent or equal with 0.6% in descriptive analysis.

4.3.1 Descriptive Statistic of Independent Variable

4.3.1.1 Descriptive Statistic of Knowledge

Table 4.18: Statistics of Knowledge

		K1	K2	K3	K4
N	Valid	172	172	172	172
	Missing	0	0	0	0
Mean		4.08	4.308	4.23	4.04
Median		4.00	4.000	4.00	4.00
Mode		4	4.0	4	4
Std. Deviation		.809	.7119	.817	.939

Table 4.19: Frequencies of K1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	4	2.3	2.3	3.5
	Neutral	26	15.1	15.1	18.6
	Agree	87	50.6	50.6	69.2
	Strongly agree	53	30.8	30.8	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the first question in first independent variable, Knowledge in section B of questionnaire. According to the table above, majority of the respondents was agreed for the question of K1 with highest frequency which is 87 (50.6%). While for the lowest frequency is for the scale strongly disagree which recorded 2 of respondents (1.2%) only. While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency 53 (30.8%), 26 (15.1%) and 4 (2.3%) respectively.

Table 4.2: Frequencies of K2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.6	.6	.6
	disagree	1	.6	.6	1.2
	Neutral	16	9.3	9.3	10.5
	Agree	80	46.5	46.5	57.0
	Strongly agree	74	43.0	43.0	100.0
	Total	172	100.0	100.0	

The table above showed the descriptive statistics for K2. It was clearly showed that most of respondents was agree for K2 question with the highest frequency which is 80 respondents or equal 46.5%. It was different for the opinion of strongly disagree and disagree which recorded the lowest of frequency with equal 1 respondent (0.6%). In addition, the second highest of frequency is for strongly agree that recorded 74 respondents (43%). While for other statement like neutral has recorded 16 respondents (9.3%).

Table 4.21: Frequencies of K3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	3	1.7	1.7	2.9
	Neutral	21	12.2	12.2	15.1
	Agree	74	43.0	43.0	58.1
	Strongly agree	72	41.9	41.9	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the third question in first independent variable, Knowledge in section B of questionnaire. According to the table above, majority of the respondents was agreed for the question of K3 with highest frequency which is 74 (43%). While for the lowest frequency is for the scale strongly disagree which recorded 2 of respondents (1.2%) only. While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency 72 (41.9%), 21 (12.2%) and 3 (1.7%) respectively.

Table 4.22: Frequencies of K4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	9	5.2	5.2	7.0
	Neutral	27	15.7	15.7	22.7
	Agree	72	41.9	41.9	64.5
	Strongly agree	61	35.5	35.5	100.0
	Total	172	100.0	100.0	

The table above showed the descriptive statistics for K4. It was clearly showed that most of respondents was agree for K2 question with the highest frequency which is 72 respondents or equal 41.9%. It was different for the opinion of strongly disagree which recorded the lowest of frequency with equal 3 respondents (1.7%). Besides, the second highest of frequency is for strongly agree that recorded 61 respondents (35.5%). While for other statement like neutral and disagree has recorded 27 respondents (15.7%) and 9 respondents (5.2%) respectively.

4.3.1.2 Descriptive Statistic of Attitude

Table 4.23: Statistics of Attitude

		A1	A2	A3	A4
N	Valid	172	172	172	172
	Missing	0	0	0	0
Mean		4.22	4.17	4.17	4.23
Median		4.00	4.00	4.00	4.00
Mode		5	4	4[a]	5
Std. Deviation		.877	.833	.861	.838

a. Multiple modes exist. The smallest value is shown

Table 4.24: Frequencies of A1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	6	3.5	3.5	4.7
	Neutral	21	12.2	12.2	16.9
	Agree	66	38.4	38.4	55.2
	Strongly agree	77	44.8	44.8	100.0
	Total	172	100.0	100.0	

The table above is frequency table of A1 question from independent variable of Attitude. According to the table above, strongly agree statement was recorded the highest frequency which is 77 (44.8%) while for the lowest frequency has 2 respondents (1.2%) that recorded from strongly disagree statement. Furthermore, the second lowest is disagree Likert scale which frequency 6 or 3.5%. Lastly, the other opinions like neutral and agree have frequency 21 (12.2%) and 66 (38.4%) respectively.

Table 4.25: Frequencies of A2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	3	1.7	1.7	2.9
	Neutral	26	15.1	15.1	18.0
	Agree	73	42.4	42.4	60.5
	Strongly agree	68	39.5	39.5	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the second question in second independent variable, Attitude in section B of questionnaire. According to the table above, majority of the respondents was agreed for the question of A2 with highest frequency which is 73 (42.4%). While for the lowest frequency is for the scale strongly disagree which recorded 2 of respondents (1.2%) only. While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency 68 (39.5%), 26 (15.1%) and 3 (1.7%) respectively.

Table 4.26: Frequencies of A3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	2	1.2	1.2	2.9
	Neutral	27	15.7	15.7	18.6
	Agree	70	40.7	40.7	59.3
	Strongly agree	70	40.7	40.7	100.0
	Total	172	100.0	100.0	

The table above showed the descriptive statistics for A3. It was clearly showed that most of respondents was agree and strongly agree for A3 question with the highest frequency which is 70 respondents or equal 40.7%. It was different for the opinion of disagree which recorded the lowest of frequency with equal 2 respondents (1.2%). Besides that, the second highest of frequency is for neutral that recorded 27 respondents (15.7%). While for other statement like strongly disagree has recorded 3 respondents (1.7%).

Table 4.27: Frequencies of A4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	1	.6	.6	2.3
	Neutral	24	14.0	14.0	16.3
	Agree	70	40.7	40.7	57.0
	Strongly agree	74	43.0	43.0	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the last question in second independent variable, Attitude in section B of questionnaire. According to the table above, majority of the respondents was strongly agreed for the question of A4 with highest frequency which is 74 (43.0%). While for the lowest frequency is for the scale disagree which recorded 1 respondent (0.6%) only. While for other Likert scale such as agree, neutral and strongly disagree have recorded frequency in descending orders 70 (40.7%), 24 (14%) and 3 (1.7%) respectively.

4.3.2.3 Descriptive Statistic of Skills

Table 4.28: Statistics of Skills

		S1	S2	S3	S4
N	Valid	172	172	172	172
	Missing	0	0	0	0
Mean		4.27	3.99	4.10	4.05
Median		4.00	4.00	4.00	4.00
Mode		5	4	4	4
Std. Deviation		.773	.879	.765	.897

Table 4.29: Frequencies of S1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.6	.6	.6
	Disagree	3	1.7	1.7	2.3
	Neutral	19	11.0	11.0	13.4
	Agree	74	43.0	43.0	56.4
	Strongly Agree	75	43.6	43.6	100.0
	Total	172	100.0	100.0	

The table above is frequency table of S1 question from independent variable of

Skills. According to the table above, strongly agree statement was recorded the highest frequency which is 75 (43.6%) while for the lowest frequency has 1 respondent (0.6%) that recorded from strongly disagree statement. Furthermore, the second lowest is disagree Likert scale which frequency 3 or 1.7%. Lastly, the other opinions like neutral and agree have frequency 19 (11%) and 74 (43.6%) respectively.

Table 4.3: Frequencies of S2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.6	.6	.6
	Disagree	6	3.5	3.5	4.1
	Neutral	43	25.0	25.0	29.1
	Agree	66	38.4	38.4	67.4
	Strongly agree	56	32.6	32.6	100.0
	Total	172	100.0	100.0	

The table above showed the descriptive statistics for S3. It was clearly showed that most of respondents was agree for S3 question with the highest frequency which is 66 respondents or equal 38.4%. It was different for the opinion of strongly disagree which recorded the lowest of frequency with equal 1 respondent only (0.6%). Besides that, the second highest of frequency is for strongly agree that recorded 56 respondents (32.6%). While for other statement like neutral and disagree has recorded 43 respondents (25%) and 6 respondents (3.5%) respectively.

Table 4.31: Frequencies of S3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	0	0	0	0
	Disagree	3	1.7	1.7	1.7
	Neutral	33	19.2	19.2	20.9
	Agree	79	45.9	45.9	66.9
	Strongly agree	57	33.1	33.1	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the third question in third independent variable, Skills in section B of questionnaire. According to the table above, majority of the respondents was agreed for the question of S3 with highest frequency which is 79 (45.9%). While for the lowest frequency is for the scale strongly disagree which zero recorded. While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency in descending orders 57 (33.1%), 33 (19.2%) and 3 (1.7%) respectively.

Table 4.32: Frequencies of S4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.6	.6	.6
	Disagree	10	5.8	5.8	6.4
	Neutral	29	16.9	16.9	23.3
	Agree	72	41.9	41.9	65.1
	Strongly agree	60	34.9	34.9	100.0
	Total	172	100.0	100.0	

The table above is frequency table of S4 question from independent variable of Skills. According to the table above, agree statement was recorded the highest frequency which is 72 (41.9%) while for the lowest frequency has 1 respondent (0.6%) that recorded from strongly disagree statement. Furthermore, the second lowest is disagree Likert scale which frequency 10 or 5.8%. Lastly, the other opinions like neutral and strongly agree have frequency 29 (16.9%) and 60 (34.9%) respectively.

4.3.2.4 Descriptive Statistic of Habits

Table 4.33: Statistics of Habits

		H1	H2	H3	H4
N	Valid	172	172	172	172
	Missing	0	0	0	0
Mean		3.94	3.97	4.03	3.91
Median		4.00	4.00	4.00	4.00
Mode		4	4	4	4
Std. Deviation		.938	.917	.908	.948

Table 4.34: Frequencies of H1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	6	3.5	3.5	5.2
	Neutral	45	26.2	26.2	31.4
	Agree	63	36.6	36.6	68.0
	Strongly agree	55	32.0	32.0	100.0
	Total	172	100.0	100.0	

The table above is frequency table of H1 question from independent variable of Habits. According to the table above, agree statement was recorded the highest frequency which is 63 (36.6%) while for the lowest frequency has 3 respondents (1.7%) that recorded from strongly disagree statement. Furthermore, the second lowest is disagree Likert scale which frequency 6 or 3.5%. Lastly, the other opinions like strongly agree and neutral have frequency 55 (32.0%) and 45 (26.2%) respectively.

Table 4.35: Frequencies of H2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	9	5.2	5.2	6.4
	Neutral	36	20.9	20.9	27.3
	Agree	71	41.3	41.3	68.6
	Strongly agree	54	31.4	31.4	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the second question in last independent variable, Habits in section B of questionnaire. According to the table above, majority of the respondents was agreed for the question of H2 with highest frequency which is 71 (41.3%). While for the lowest frequency is for the scale strongly disagree which recorded frequency 2 (1.2%). While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency in descending orders 54 (31.4%), 36 (20.9%) and 9 (5.2%) respectively.

Table 4.36: Frequencies of H3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.6	.6	.6
	Disagree	9	5.2	5.2	5.8
	Neutral	35	20.3	20.3	26.2
	Agree	66	38.4	38.4	64.5
	Strongly agree	61	35.5	35.5	100.0
	Total	172	100.0	100.0	

The table above is frequency table of H3 question from independent variable of Habits. According to the table above, agree statement was recorded the highest frequency which is 66 (38.4%) while for the lowest frequency has 1 respondent (0.6%) that recorded from strongly disagree statement. Furthermore, the second lowest is disagree Likert scale which frequency 9 o5.2%. Lastly, the other opinions like strongly agree and neutral have frequency 61 (35.5%) and 35 (20.3%) respectively in descending orders.

Table 4.37: Frequencies of H4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	10	5.8	5.8	7.0
	Neutral	43	25.0	25.0	32.0
	Agree	63	36.6	36.6	68.6
	Strongly agree	54	31.4	31.4	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the last question H4 in last independent variable, Habits in section B of questionnaire. According to the table above, majority of the respondents was agreed for the question of H4 with highest frequency which is 63 (36.6%). While for the lowest frequency is for the scale strongly disagree which recorded frequency 2 (1.2%). While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency in descending orders 54 (31.4%), 43 (25%) and 10 (5.8%) respectively.

4.3.2 Descriptive Statistic of Dependent Variable

Table 4.38: Statistics of Readiness

	R1	R2	R3	R4
N Valid	172	172	172	172
Missing	0	0	0	0
Mean	4.20	3.88	4.15	4.06
Median	4.00	4.00	4.00	4.00
Mode	4	5	4	4
Std. Deviation	.770	.984	.810	.843

Table 4.39: Frequencies of R1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.6	.6	.6
	Disagree	3	1.7	1.7	2.3
	Neutral	22	12.8	12.8	15.1
	Agree	81	47.1	47.1	62.2
	Strongly agree	65	37.8	37.8	100.0
	Total	172	100.0	100.0	

The table above is frequency table of R1 question from dependent variable of Readiness of university students towards IR 4.0. According to the table above, agree statement was recorded the highest frequency which is 81 (47.1%) while for the lowest frequency has 1 respondent (0.6%) that recorded from strongly disagree statement. Furthermore, the second lowest is disagree Likert scale which frequency 3 or 1.7%. Lastly, the other opinions like strongly agree and neutral have frequency 65 (37.8%) and 22 (12.8%) respectively.

Table 4.4: Frequencies of R2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.2	1.2	1.2
	Disagree	11	6.4	6.4	7.6
	Neutral	49	28.5	28.5	36.0
	Agree	53	30.8	30.8	66.9
	Strongly agree	57	33.1	33.1	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the second question in last dependent variable, Readiness towards IR 4.0 in section C of questionnaire. According to the table above, majority of the respondents was strongly agreed for the question of R2 with highest frequency which is 57 (33.1%). While for the lowest frequency is for the scale strongly disagree which recorded frequency 2 (1.2%). While for other Likert scale such as agree, neutral and disagree have recorded frequency in descending orders 53 (30.8%), 49 (28.5%) and 11 (6.4%) respectively.

Table 4.41: Frequencies of R3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	2	1.2	1.2	2.9
	Neutral	21	12.2	12.2	15.1
	Agree	86	50.0	50.0	65.1
	Strongly agree	60	34.9	34.9	100.0
	Total	172	100.0	100.0	

The table above is frequency table of R3 question from dependent variable of Readiness of IR 4.0. According to the table above, agree statement was recorded the highest frequency which is 86 (50%) while for the lowest frequency has 2 respondents (1.2%) that recorded from disagree statement. Furthermore, the second lowest is strongly disagree Likert scale which frequency 3 or 1.7%. Lastly, the other opinions like strongly agree and neutral have frequency 60 (34.9%) and 21 (12.2%) respectively in descending orders.

Table 4.42: Frequencies of R4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	0	0	0	0
	Disagree	6	3.5	3.5	3.5
	Neutral	38	22.1	22.1	25.6
	Agree	68	39.5	39.5	65.1
	Strongly agree	60	34.9	34.9	100.0
	Total	172	100.0	100.0	

The table above showed the frequency of the last question R4 in section C of questionnaire. According to the table above, majority of the respondents was agreed for the question of R4 with highest frequency which is 68 (39.5%). While for the lowest frequency is for the scale strongly disagree which recorded zero frequency. While for other Likert scale such as strongly agree, neutral and disagree have recorded frequency in descending orders 60 (34.9%), 38 (22.1%) and 6 (3.5%) respectively.

4.3.4 Descriptive Analysis of Mean and Std. Deviation

Furthermore, the descriptive analysis uses comparison of variables and numerical description which target on the central tendency and dispersion. Mean, median and mode is involving in the ways to measure central tendency while variance, standard deviation and percentage involve in the dispersion measure.

Table 4.43: Descriptive Statistics of Independent Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge	172	1.75	5.00	4.1628	.66805
Attitude	172	1.00	5.00	4.1991	.73793
Skills	172	2.25	5.00	4.1032	.66603
Habits	172	1.00	5.00	3.9608	.81801
Valid N (listwise)	172				

The table above showed the descriptive statistics of independent variables which are knowledge, attitude, skills and habits. The range of mean was 3.9608 to 4.1991. The independent variable of attitude recorded the highest mean which is 4.1991 with standard deviation 0.73793. While the lowest mean is 3.9608 that recorded from habits with standard deviation's value is 0.81801. Besides that, for other statement which are knowledge and skills have mean 4.1628 with 0.66805 standard deviation and 4.1032 with 0.66603 standard deviation respectively.

Table 4.44: Descriptive Statistics of Dependent Variable

	N	Minimum	Maximum	Mean	Std. Deviation
ReadinessIR4.0	172	1.50	5.00	4.0727	.73086
	172				

Based on the table above, it showed the mean and standard deviation of dependent variable which is the Readiness of university students towards fourth industrial revolution that are 4.072 with standard deviation 0.73086.

4.4 Reliability Analysis

Reliability analysis is important to be conducting to know how strong the reliability of survey.

Table 4.45: Case Processing Summary

		N	%
Cases	Valid	172	100.0
	Excluded [a]	0	.0
	Total	172	100.0

a) Listwise deletion based on all variables in the procedure.

Table 4.46: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.958	.958	20

The table above showed the result of reliability statistic for the data that have been collected from university students in Peninsular Malaysia. According to the table above, the Cronbach's Alpha result is equal to 0.958 same with standardized items which the value had exceed than the excellent level of Cronbach's Alpha which is equal or more than 0.9. Based on the result, the reliability of questionnaire is excellent.

4.5 Pearson Correlation Analysis

Pearson's correlation coefficients are used as a statistical test in order measure the relationship between two variables. In other word, it is conducting to know the linear relationship strength between two different variables of dependent and independent variables. It is vital to measure the probability of correlation coefficient occurring by chance alone for data collected from a sample. Pearson's correlation coefficient is between -1 to +1 represent perfect negative and perfect positive correlations. Meanwhile the 0 value is representing perfectly independent correlation. Figure 3.1 below showed the Pearson's Correlation Coefficients

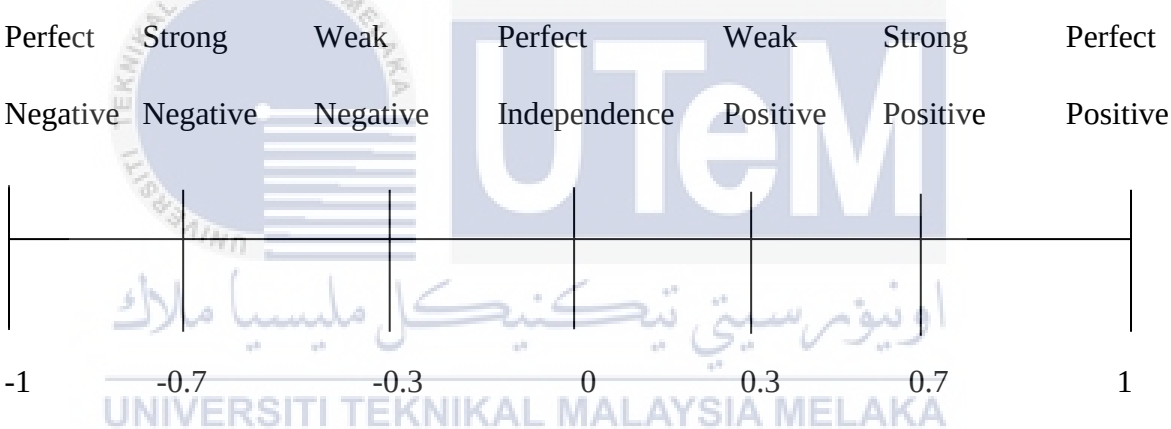

Figure 4.1: Pearson's Correlation Coefficient

Source: Saunders, Lewis and Thornhill (2016)

Table 4.47: Correlations

		Knowledge	Attitude	Skills	Habits	Readiness IR 4.0
Knowledge	Pearson Correlation	1	.767**	.599**	.665**	.717**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	172	172	172	172	172
Attitude	Pearson Correlation	.767**	1	.696**	.677**	.747**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	172	172	172	172	172
Skills	Pearson Correlation	.599**	.696**	1	.827**	.753**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	172	172	172	172	172
Habits	Pearson Correlation	.665**	.677**	.827**	1	.767**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	172	172	172	172	172
Readiness IR4.0	Pearson Correlation	.717**	.747**	.753**	.767**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	172	172	172	172	172

**. Correlation is significant at the 0.01 level (2-tailed).

The table above about the correlation coefficient value between all the independent variables which consists of 4 that are knowledge, attitudes, skills and habits with the dependent variable which is readiness of university students towards IR 4.0. From the result, all the independent variables have positively and significant relationship as the value of $p<0.05$ with dependent variable. In addition, all the independent variables

have strongly positively relationship with dependent variable which the correlation coefficient (r) value were higher than 0.5. In addition, correlation coefficient of independent variables are strongly positive with dependent variable because it showed the value was higher than 0.7 which were 0.717, 0.747, 0.753, 0.767 and 1.

4.6 Multiple Regression Analysis

Multiple regression model is a statistical tool that enables the researcher to assess the effect strength and cause relationship between one dependent variable and four independent variables refer to Saunders. The researcher needs to understand the relationship between independent variables (knowledge, attitudes, skill and habits) and dependent variables which is the readiness of graduates towards industrial revolution 4.0 in this research. The multiple regression model can help the researcher to determine the four independent variables with the greatest impact on dependent variable. The following is showing the equation of multiple regression analysis.

Equation of Multiple Regression Analysis: $Y = a + bX1 + cX2 + dX3 + eX4$

Where Y = dependent variable (The readiness of graduates towards industrial revolution 4.0)

X1, X2, X3, X4 = independent variables a = constant value or intercept

b = Influence of X1 (knowledge) K c = Influence of X2 (attitudes) A

d = Influence of X3 (skills) S e = Influence of X4 (habits) H

Table 4.48: Model Summary b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.846[a]	.715	.708	.39466

a. Predictors: (Constant), Habits, Knowledge, Attitude, Skills

b. Dependent Variable: ReadinessIR4.0

The table above showed the model summary, the higher the value of R or correlation coefficient so the greater the influence of independent variables on dependent variable. According to the table, the value of R is 0.846 and it can conclude that it is strong as the value is higher than 0.05. It showed the strong correlation between all the variables in this research. Besides that, the R square recorded 0.715 which means that all the independent variables such as knowledge, attitude, skills and habits have 71.5% of variance affected the dependent variable which is the readiness of university students towards IR 4.0. For the remaining variance 28.5% were by other factor or indicator that did not include in this research.

Table 4.49: ANOVA a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	65.331	4	16.333	104.862	.000[b]
	Residual	26.011	167	.156		
	Total	91.342	171			

a. Dependent Variable: ReadinessIR4.0

b. Predictors: (Constant), Habits, Knowledge, Attitude, Skills

The above table is the Anova Analysis which showed the result of F-test value was 104.862 and the significant level was 0.000. From the value of significant level which lower than 0.05 give meaning that there was significant relationship between model indicator and readiness of university students towards fourth industrial revolution. Furthermore, because of the value of significant level did not exceed than 0.05 so automatically the null hypothesis was rejected.

Table 4.5: Coefficients a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.088	.218		.403	.687		
	Knowledge	.240	.074	.219	3.222	.002	.369	2.709
	Attitude	.229	.072	.232	3.192	.002	.324	3.086
	Skills	.264	.086	.240	3.079	.002	.280	3.572
	Habits	.238	.071	.266	3.361	.001	.272	3.682

a. Dependent Variable: ReadinessIR4.0

The table above showed the estimated coefficients was beta (constant) was 0.088 which beta of knowledge was 0.240, attitude beta was 0.229, beta skills was 0.264 and beta of habits was 0.238. The equation of the multiple regression analysis according on the data above was form as below:

$$\mathbf{Y = a + bX1 + cX2 + dX3 + eX4}$$

Readiness of Uni. Students Towards IR4.0 = 0.088 + 0.240K + 0.229A + 0.264S + 0.238H

The equation above with the meanings of every indicator of knowledge would lead to 0.240 increased in readiness of university students towards IR 4.0, every indicator of attitude would lead to 0.240 increased and it same goes with other indicator which are skills and habits that would lead to increase as much 0.264 and 0.238 respectively.The table above also showed that skills as the independent variable that had highest value of beta value which was 0.264. This conclude that skills was the best model indicator of readiness of university students towards IR 4.0. Furthermore, attitude as the independent variable that have lowest beta value which was 0.229 which means attitude gave least influence towards readiness of university students towards fourth industrial revolution.

Table 4.51: Collinearity Diagnostics [a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	Knowledge	Attitude	Skills	Habits
1	1	4.954	1.000	.00	.00	.00	.00	.00
	2	.022	15.149	.54	.00	.00	.01	.18
	3	.013	19.290	.19	.19	.23	.08	.10
	4	.007	26.270	.01	.45	.45	.18	.20
	5	.004	34.051	.27	.35	.32	.73	.52

a. Dependent Variable: ReadinessIR4.0

Table 4.52: Residuals Statistics [a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.5678	4.9407	4.0727	.61810	172
Std. Predicted Value	-4.053	1.404	.000	1.000	172
Standard Error of Predicted Value	.033	.156	.063	.025	172
Adjusted Predicted Value	1.5780	4.9396	4.0723	.61863	172
Residual	-2.07359	1.12941	.00000	.39001	172
Std. Residual	-5.254	2.862	.000	.988	172
Stud. Residual	-5.428	2.933	.000	1.019	172
Deleted Residual	-2.21298	1.18650	.00035	.41516	172
Stud. Deleted Residual	-5.963	3.003	-.004	1.049	172
Mahal. Distance	.182	25.726	3.977	4.611	172
Cook's Distance	.000	.539	.014	.058	172
Centered Leverage Value	.001	.150	.023	.027	172

a. Dependent Variable: ReadinessIR4.0

4.7 Hypothesis Testing

The hypothesis is the relationship between the variables that will be tested in this research. Furthermore, this hypothesis also would test whether it answer the research question or not. Then, it also would test whether the research objectives can be achieved oppositely.

Table 4.53: Coefficient Table (Source: SPSS Output)

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.088	.218		.403	.687		
	Knowledge	.240	.074	.219	3.222	.002	.369	2.709
	Attitude	.229	.072	.232	3.192	.002	.324	3.086
	Skills	.264	.086	.240	3.079	.002	.280	3.572
	Habits	.238	.071	.266	3.361	.001	.272	3.682

a. Dependent Variable: ReadinessIR4.0

i) Knowledge (K)

H0: There is no relationship between knowledge and readiness of university students towards industrial revolution 4.0.

H1: There is a relationship between knowledge and readiness of university students towards industrial revolution 4.0.

The table above showed about the regression analysis of knowledge which become the indicator of readiness of university students towards IR 4.0 in universities that located in Peninsular Malaysia. The p-value or significant level of knowledge was 0.002 which was lower than 0.05 that clearly meant that knowledge had significant relationship with readiness of university students towards IR 4.0. From the result, researcher accepted the alternative hypothesis, H1 and rejected the null hypothesis, H0.

ii. Attitude

H0: There is no relationship between attitude and readiness of university students towards industrial revolution 4.0.

H2: There is a relationship between attitude and readiness of university students towards industrial revolution 4.0.

The table above showed about the regression analysis of attitude which become the indicator of readiness of university students towards IR 4.0 in universities that located in Peninsular Malaysia. The p-value or significant level of attitude was 0.002 which was lower than 0.05 that clearly meant that attitude had significant relationship with readiness of university students towards IR 4.0. From the result, researcher then accepted the alternative hypothesis, H2 and rejected the null hypothesis, H0.

iii. Skills

H0: There is no relationship between skills and readiness of university students towards industrial revolution 4.0.

H3: There is relationship between skills and readiness of university students towards industrial revolution 4.0.

The table above showed about the regression analysis of skills which become the indicator of readiness of university students towards IR 4.0 in universities that located in Peninsular Malaysia. The p-value or significant level of skills was 0.002 which was lower than 0.05 that clearly meant that skills had significant relationship with readiness of university students towards IR 4.0. From the result, researcher then accepted the alternative hypothesis, H3 and rejected the null hypothesis, H0.

iv. Habits

H0: There is no relationship between habits and readiness of university students towards industrial revolution 4.0.

H4: There is a relationship between habits and readiness of university students towards industrial revolution 4.0.

The table above showed about the regression analysis of habits which become the indicator of readiness of university students towards IR 4.0 in universities that located in Peninsular Malaysia. The p-value or significant level of habits was 0.001 which was lower than 0.05 that clearly meant that habits had significant relationship with readiness of university students towards IR 4.0. From the result, researcher then accepted the alternative hypothesis, H4 and rejected the null hypothesis, H0.

4.7.1 Summary of Hypothesis Testing

Table 4.54: Summary of Hypothesis Testing

Hypothesis	Result
H1: There is relationship between knowledge and readiness of university students towards industrial revolution 4.0.	Accept
H2: There is a relationship between attitude and readiness of university students towards industrial revolution 4.0.	Accept
H3: There is a relationship between skills and readiness of university students towards industrial revolution 4.0.	Accept
H4: There is a relationship between habits and readiness of university students towards industrial revolution 4.0.	Accept

4.8 Summary

This chapter explained the results of data analysis using SPSS Statistics. Firstly, for the result of pilot test which value of Cronbach's alpha exceed 0.9 that prove the questionnaire of survey was valid and reliable good for researcher to conduct the collective data for the research. Other than that, descriptive analysis explained the frequency of every demographic question. Then, in the part of Pearson Correlation Analysis showed all the independent variables have positively and significant relationship as the value of $p<0.05$ with dependent variable. The table in multiple regression analysis showed that skills as the independent variable that had highest value of beta value which was 0.264. This conclude that skill is the best indicator of readiness of university students towards IR 4.0. According to model summary, the R square recorded 0.715 which means that all the independent variables such as knowledge, attitude, skills and habits have 71.5% of variance affected the dependent variable which is the readiness of university students towards IR 4.0. For the remaining variance 28.5% were by other factor or indicator that did not include in this research. Lastly for the hypothesis testing, all alternative hypothesis were accepted while for null hypothesis were rejected as the significant values were less than 0.05 and automatically explained that all independent variables have significant relationship between dependent variable which is the readiness of university students towards IR 4.0.

CHAPTER 5

5.1 Introduction

This chapter will discuss about summary of the study and discussion of major findings which involving the three research objectives. It also will conclude the result of data analysis that had been done on chapter 4. Moreover, in the chapter 5 also elaborate about the implication, limitation study, recommendation for further study and brief conclusion.

5.2 Summary of the Study

Table 5.1: Description Analysis of Respondent's Demographic

Demographic	Frequency with highest value	Frequency	Percentage (%)
Gender	Female	128	74.4
Race	Malay	148	86.0
Age	18-22 years old	91	52.9
Education Level	Degree	157	91.3
University	UTeM	136	79.1

The table above showed the description analysis of respondent's demographic which consist of five demographics such as gender, race, age, education level and university. The total of respondents are 172 respondents with various background personal information. According to the table, it clearly showed that most of respondents are from female gender with frequency 128 (74.4%) compared to male respondents. Furthermore, the next demographic which is race that mostly they are Malay respondents with frequency 148 or equal 86.0 percent compared to other race like Chinese, Indians and others. Then, 18-22 years old are recorded the highest value of frequency which is 91 respondents (52.9%). Moreover, the respondents from degree showed the majority in education level demographic compared to Diploma, Master and PhD with frequency 157 (91.3%). Last demographic which is university showed that UTeM as the highest total of respondents among university students compared to other universities like UM, UKM, UiTM and so on. It was recorded 79.1% or equal frequency 136.

5.3 Discussion of Major Findings

The purpose of this research was to know the readiness level of university students towards IR 4.0 refer to independent variables which are knowledge, attitude, skills and habits. Other than that, the purpose of the research also is to define the solution of the research and answering to the research objectives that have been listed out in the research. The result findings that have been analyse by using SPSS Statistics on chapter 4 have already answered some research questions.

RO1: To understand the perception of university students towards industrial revolution 4.0.

RO2: To identify the challenges of Industrial Revolution 4.0 faced by university students.

RO3: To identify university students' level of readiness in facing the IR 4.0.

Moreover, the hypothesis also has been testing in order to identify their relationship between independent variables and dependent variable. The hypothesis of alternative and null for each independent variables were identified whether they are rejected or accepted based on the significant value of each independent variables.

RO1: To understand the perception of university students towards industrial revolution 4.0.

The first research objective was achieved by refer to the mean score analysis from the data that collected from survey. Definition of mean is the average of data. Respondents were answered the questions according to the Likert scale to show the level of agreement on the model indicator towards IR 4.0 that represent strongly disagree to strongly agree in ascending order of scale from scale 1 to 5.

Table 5.11: Mean Score Analysis (Source: SPSS output)

	Knowledge	Attitude	Skills	Habits
Mean	4.1628	4.1991	4.1032	3.9608
Std. Deviation	.66805	.73793	.66603	.81801

The table above showed the mean score analysis of independent variables which are knowledge, attitude, skills and habits. The perception of university students towards IR 4.0 can be consider have same meaning with responded answer from respondents to survey of model indicator at section B. The range of mean was 3.9608 to 4.1991. All the independent variables as the model indicator of readiness of university students towards IR 4.0. The independent variable of attitude recorded the highest mean which is 4.1991. In addition, the attitude is relatively constant and a bit hard to change it and take a process (Indah Sari, 2019). It can be positive or negative attitude depending on their experiences (Nur, 2010). This showed that attitude is playing important aspect in the perception of university students towards IR 4.0. While the lowest mean is 3.9608 that recorded from habits. Besides that, for other statement which are knowledge and skills have mean 4.1628 and 4.1032 respectively.

The result showed that average of data or feedback of respondents were 3 that represent neutral scale and majority scale which was 4 that represent agree. From these, the researcher can conclude that perception of university students towards knowledge, attitude and skills were agree to the question involved in section B while for the habits question was neutral.

RO2: To identify the challenges of Industrial Revolution 4.0 faced by university students.

The multiple regression model can help the researcher to determine the four independent variables with the greatest impact on dependent variable. So, the researcher uses this type of data analysis to answer the second research question.

Table 5.12: Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.088	.218		.403	.687		
	Knowledge	.240	.074	.219	3.222	.002	.369	2.709
	Attitude	.229	.072	.232	3.192	.002	.324	3.086
	Skills	.264	.086	.240	3.079	.002	.280	3.572
	Habits	.238	.071	.266	3.361	.001	.272	3.682

a. Dependent Variable: ReadinessIR4.0

The table above showed the estimated coefficients was beta (constant) was 0.088 which beta of knowledge was 0.240, attitude beta was 0.229, beta skills was 0.264 and beta of habits was 0.238. The equation of the multiple regression analysis according on the data above was form as below:

Y = a + bX1 + cX2 + dX3 + eX4

Readiness of Uni. Students Towards IR4.0 = 0.088 + 0.240K + 0.229A + 0.264S + 0.238H

The equation above with the meanings of every indicator of knowledge would lead to 0.240 increased in readiness of university students towards IR 4.0, every indicator of attitude would lead to 0.240 increased and it same goes with other indicator which are skills and habits that would lead to increase as much 0.264 and 0.238 respectively.

The table above also showed that skills as the independent variable that had highest value of beta value which was 0.264. This conclude that skills is the best model indicator of readiness of university students towards IR 4.0. Furthermore, attitude as the independent variable that have lowest beta value which was 0.229 which means attitude

gave least influence towards readiness of university students towards fourth industrial revolution.

This clearly show that skill is the most challenging compared knowledge, habit and attitude as skill has greatest impact on the readiness of university students towards fourth industrial revolution. In addition, Czarnecki (2013) stated that the poor result of the model is not just an issue of knowledge and skills but also includes poor attitudes and habits. So, it same goes to the application of the readiness of students towards fourth industrial revolution based on their performance of students in knowledge, attitude, skills, and habits which become challenges towards IR 4.0.

Rashidah stated that the most skill required by the industry are Computational thinking follow by Social Intelligent and Design Mindset based on an analysis. It is a big challenge especially for graduate students that lack of required skills about Industrial Revolution 4.0. The preparation is very important such as have technical skills sets, problem-solving abilities and strategic capabilities to make sure their digital transition is successful and adaptable to IR 4.0. Furthermore, the advancement of Industry 4.0 and its enabling technologies like IoT, Cyber-Physical Systems and Big Data Analytics pose new obstacles to the simulation field due to increasing complexity of systems to be modelled (Ferreira et al., 2021).

RO3: To identify university students' level of readiness in facing the IR 4.0.

Multiple regression model is a statistical tool that enables the researcher to assess the effect strength and cause relationship between one dependent variable and four independent variables refer to Saunders. The researcher needs to understand the relationship between independent variables (knowledge, attitudes, skill and habits) and dependent variables which is the readiness of university students towards industrial revolution 4.0 in this research. So, the researcher using this type of data analysis to

identify university students' level of readiness in facing the IR 4.0 refer to table of model summary.

Table 5.13: Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.846[a]	.715	.708	.39466

a. Predictors: (Constant), Habits, Knowledge, Attitude, Skills

b. Dependent Variable: ReadinessIR4.0

The table above showed the model summary, the higher the value of R or correlation coefficient so the greater the influence of independent variables on dependent variable. According to the table, the value of R is 0.846 and it can conclude that it is strong as the value is higher than 0.05. It showed the strong correlation between all the variables in this research. Besides that, the R square recorded 0.715 which means that all the independent variables such as knowledge, attitude, skills and habits have 71.5% of variance affected the dependent variable which is the readiness of university students towards IR 4.0. For the remaining variance 28.5% were by other factor or indicator that did not include in this research.

In a journal, Vakola (2013) stated that readiness is also defined as 'cognitive precursor to the behaviour of either resistance to or support for a change effort. Independent variables which is Knowledge, Attitude, Skills and Habits that refers to a summary of what determines an individual's behaviour at a workplace (Hughes, 2012). Industry 4.0 readiness can refer from any model or theory that the organizations can have two terminal states which are least ready or most ready. This conclude that all independent variables affect university students' level of readiness in facing the IR 4.0.

5.4 Implication of Study

The main implication of this research is to discuss the readiness of university students towards Industrial Revolution 4.0 due to the main problem statement of this research that creates a gap of skills between graduates. Based on an article Civil Engineering Graduates Towards Industry Revolution 4.0, the reaction from IR introduction in Malaysia on 18 September 2018 gives impact to the graduating student whom seeking for employment where specific skills were required by the industry. The finding reveals that the most skill required by the industry are Computational thinking follow by Social Intelligent and Design Mindset based on an analysis (Rashidah et al).

The readiness level of university students should be point and discuss details in order to provide more information to improve the knowledge and also awareness about IR 4.0 for university students that will be leader and successor generation later. This study will be beneficial to the community especially for the students to measure how far their readiness to Industrial Revolution 4.0. From this also, the researcher can test respondents' comprehensions to industry revolution. This study compatible to this era as which majority of students are expose to the Internet of Things, IoT and other various kind digital technology of Industrial Evolution 4.0. This study will attempt to explore and elaborate this topic as well.

Moreover, the theoretical framework of this research is provide more deeply understanding on the independent variables of this research which are Knowledge, Attitudes, Skills and Habits. By using this theoretical framework, the readiness of university students towards IR 4.0 can be explain more easily and quickly. Other than that, the research question that have been listed out by researcher have elaborated well in discussion part in chapter 5 that explain the answers by using data analysis and supported by several related literature review. It can effectively help the community especially university students to improve their awareness and readiness towards IR 4.0 by improve their knowledge, attitude, skill and habit.

The Coefficient table showed that skills as the independent variable that had highest value of beta value which was 0.264. This conclude that skills was the best indicator of readiness of university students towards IR 4.0. Furthermore, attitude as the independent variable that have lowest beta value which was 0.229 which means attitude gave least influence towards readiness of university students towards fourth industrial revolution. From the above results, university students should make preparation on their skills as fourth industrial revolution really need various skills including critical thinking skill, problem-solving skill and communication skill in future career. This clearly shows that university students cannot only focus on their study and pointer but also to focus on how to improve their skills as well.

5.5 Limitation of Study

In anything research of course have their limitations in the progress of completing research. It included in this research which focused on the readiness of university students towards Industrial Revolution 4.0. First and foremost, the researcher has limitation in the process of collecting data to get 384 respondents. The researcher only received 172 of total respondents. Even with the power of social media and effort by researcher to blast the survey into a few of WhatsApp group and random personal message to university students but it still does not achieve the target total of respondents.

Furthermore, other limitation is the process of gathering secondary data like journal and other references that consuming much time. The researcher needs to rush to make sure the target timeline needs to follow. Researcher had to spend more time to on searching and collecting secondary data to point out the literature review. That process is very important to provide theory understanding about related variables and proof of this research by each discussion part so that the results of data analysis have supported.

5.6 Recommendation for Future Study

There is recommendation that would suggest by researcher in this research such as make sure there are participants in the questionnaire survey from other university which does not have respond at all like UNITEN and others that have listed out in the option of demographic questions. This suggestion is benefit for the collective data of target respondents so that this research involving all participants from all universities in Peninsular Malaysia. Furthermore, the recommendation for future study is to try collect sufficient data successfully based on Krejcie & Morgan Table as required.

5.7 Conclusion

In conclusion, chapter 5 elaborated much about discussion of every research objective. First research objective use mean score analysis to understand the perception of university students towards industrial revolution 4.0. While for second research objective use equation of multiple regression analysis to identify the challenges of Industrial Revolution 4.0 as skill is the best indicator and most challenging compared knowledge, habit and attitude. Skill has greatest impact on the readiness of university students towards fourth industrial revolution. Then, for the third research objective use model summary table that provide result which showed that model indicator have 71.5% of variance affected the dependent variable which is the readiness of university students towards IR 4.0 in identify level of readiness facing Industrial Revolution 4.0 among university students. The implication, limitation and recommendation also have been explained in this chapter 5. Last but not least, the aim of this research have achieved successfully as the study on the readiness of university students towards fourth industrial revolution and all of the research objectives have proven with related data analysis using SPSS.

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APPENDIX

GANTT CHART I (FYP 1)

TASK	WEEK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Idea Development															
Topic Confirmation															
RQ & RO Construction															
Information Processing (Chapter 1)															
Construct Chapter 1															
Information Processing (Chapter 2)															
Construct Chapter 2															
Information Processing (Chapter 3)															
Construct Chapter 3															
Prepare Slide Presentation															
Submission for Report and Slide Presentation															
Presentation For FYP 1															

GANTT CHART II (FYP 2)

TASK	WEEK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Discuss about Questionnaire															
Make Correction															
Collect samples for Pilot Study															
Run SPSS for Pilot Study															
Collect samples															
Run SPSS for 172 respondent															
Construct Chapter 4															
Construct Chapter 5															
Prepare Slide Presentation															
Submission for Report and Slide Presentation															
Presentation For FYP 2															

CONSTRUCTIONS OF MEASUREMENT

	CONSTRUCT	SUB-CONSTRUCT	COMMENTS	MEASUREMENT OPERATIONAL	QUESTIONS
1	Knowledge	-Understanding the classification of industrial revolution -Impact of industrial revolution -Benefits of industrial revolution -Differentiate type of industrial revolution.	Knowledge is powerful. Jisun Jung (2019) mentioned that in the field of higher education did not directly and frequently use the term fourth industrial revolution but they who are the students that was highlighted of the changing environments and also higher education roles in discovering, processing and distribution knowledge.	Each defined of sub-construct has the following measuring option: 1) Strongly Disagree 2) Disagree 3) Neutral 4) Agree 5) Disagree	**SECTION B** 1. I understand the classification of industrial revolution 2. I know the technological revolution will fundamentally change the way of live, interact and work in future 3. I know the benefits of IR 4.0 which transform the global technology. 4. I able to differentiate the type of IR 4.0 technologies such as Internet of Things (IoT), 22Artificial Intelligence (AI), Robotics, Mobile Technologies and Cybersecurity
2	Skills	-Digital skills -Problem solving skills	Mohtar et al., (2019) stated in their article that the World Economic Forum (WEF) in its biennal 'Future of Jobs	Each defined of sub-construct has the following measuring option:	1. I should be ready to face the challenges in the IR 4.0 like expert in digital skills for my future.

		-Communication and leadership skills	Report' which lists about ten critical skills for the Future of Work for year 2020 and beyond. There are ten critical skillsets that have been stated by WEF which are complex problem solving, critical thinking, creativity, people management, coordinating with others, judgement and decision making, emotional intelligence, service orientation, negotiation and cognitive flexibility.	1) Strongly Disagree 2) Disagree 3) Neutral 4) Agree 5) Disagree	2. I have a sharpen complex problem solving skills which is important in the era of IR 4.0. 3. I can adapt and have prepared well for the different situations that occur in the industry that advanced in technology 4.0. 4. I have communication and leadership skills.
3	Attitude	-Interestest -Motivated -Satisfied -Happy	Preparing for the anticipated impact of IR 4.0 calls for a need to improved education and training systems able to effectively train a highly skilled workforce while also retool and upskill the labor force, while also cultivating soft skills and a lifelong learning attitude (Steven &	Each defined of sub-construct has the following measuring option: 1) Strongly Disagree 2) Disagree 3) Neutral 4) Agree 5) Disagree	1. I am interested in an advanced technology like Robotics and Artificial Intelligence (AI). 2. I am motivated to study about IR 4.0 technologies 3. I feel satisfied and excited when accessing IR 4.0 technology. 4. I am happy to communicate and create networking with

			Danny, 2020). Attitude is relatively constant and a bit hard to change it and take a process (Indah Sari, 2019).		friends using IR 4.0 technologies.
4	Habits	-Study schedule -Focus -Additional references -Notes	The notion of habits based not so much to 'how the behaviour is performed' but to 'which stimuli elicit the behaviour'. both notions call upon the 5automatically concept but on different aspects of behaviour. This involve the how it is executed versus what trigger sit or the motivational reasons why the behaviour or habit can be form (Costa et al., 2017).	Each defined of sub-construct has the following measuring option: 1) Strongly Disagree 2) Disagree 3) Neutral 4) Agree 5) Disagree	1. I have a regular study schedule for the subject that related to IR 4.0 Technologies. 2. I always focus in the classroom especially when the lecturers are teaching about IR 4.0. 3. I look for additional references and extra knowledge from variable sources about IR 4.0. 4. I often make brief notes and try to understand hardly in order to familiarize myself about IR 4.0 Technologies such as the advantages of Cybersecurity
5	Readiness towards IR 4.0	-Adapt -Preparation -Awareness -Effort	Industry 4.0 readiness can refer from any model or theory that the organizations can have two terminal states which are least ready or	Each defined of sub-construct has the following measuring option:	**SECTION C** 1. I believe that I able to adapt on mental and skills which required in workplace in future.

			most ready. Industry and academia researchers also have developed a variety of industry 4.0 readiness models in recent years to successfully master industry 4.0 (Nor Liza Abdullah et al., 2020).	1) Strongly Disagree 2) Disagree 3) Neutral 4) Agree 5) Disagree	2. I have much preparation on knowledge of IR 4.0. 3. I aware of the IR 4.0's challenges such as complexity task and high demands of requirement skills in future carrier. 4. I make effort to enter a career path way which potential future advancement in 4th industrial revolution.

QUESTIONNAIRE SURVEY

A STUDY ON READINESS OF UNIVERSITY STUDENT TOWARDS INDUSTRIAL REVOLUTION 4.0

Hi and Assalamualaikum wbt.

I am Nurul Jannah Binti Mohd Udin, a final year student of the Bachelor of Technology Management and Technopreneurship, UTeM. I am conducting "A STUDY ON READINESS OF UNIVERSITY STUDENT TOWARDS INDUSTRIAL REVOLUTION 4.0".

This study focuses on university students in Peninsular Malaysia and this use will take about 5-10 minutes to complete. The information provided from this request will provide better attention to us in connection with this research.

Your help and cooperation in completing this see questionnaire is greatly appreciated. The information provided will be kept confidential and used for academic purposes only. Thank you.

In case of any queries, you may contact me at below:

Nurul Jannah Binti Mohd Udin

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DEMOGRAPHIC AND GENERAL INFORMATION.

Section A (Background of student)

This section is for respondent demographic background. Please read carefully, and choose ONE to represent you.

1. Gender

-Male ( )

-Female ( )

2. Race

-Malay ( )

-Chinese ( )

-Indian ( )

-Others ( )

3. Age

-18-22 years old ( )

-23 -27 years old ( )

-29 and above ( )

4. Education level

-Diploma ( )

-Bachelor Degree ( )

-Master ( )

-PhD ( )

5. Name of University

- UTeM ( )

- UNISEL ( )

- UKM ( )

- UM ( )

- USM ( )

- USIM ( )

- UiTM ( )

- UPSI ( )

- UniSZA ( )

- UMT ( )

- UIAM ( )

- UTHM ( )

- UniKL ( )

- UNITEN ( )

- UMK ( )

- UUM ( )

-UMP ( )

-UPM ( )

SECTION B (A STUDY ON READINESS OF UNIVERSITY STUDENT TOWARDS INDUSTRIAL REVOLUTION 4.0)

This section is to get your opinion on the indicator of The Readiness of University Students in Various Terms towards IR 4.0 are which are Knowledge, Attitude, Skills and Habits. Please read carefully, and answer these question based on Likert Scale below:

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

KNOWLEDGE

No.	Statement	1	2	3	4	5
1.	I understand the classification of industrial revolution.					
2.	I know the technological revolution will fundamentally change the way of live, interact and work in future.					
3.	I know the benefits of IR 4.0 which transform the global technology.					
4.	I able to differentiate the type of IR 4.0 technologies such as Internet of Things (IoT), Artificial Intelligence (AI), Robotics, Mobile Technologies and Securities					

ATTITUDE

No.	Statement	1	2	3	4	5
1.	I am interested in an advanced technology like Robotics and Artificial Intelligence (AI).					
2.	I am motivated to study about IR 4.0 technologies.					
3.	I feel satisfied and excited when accessing IR 4.0 technology.					
4.	I am happy to communicate and create networking with friends using IR 4.0 technologies.					

SKILLS

No.	Statement	1	2	3	4	5
1.	I should be ready to face the challenges in the IR 4.0 like expert in digital skills for my future.					
2.	I have a sharpen complex problem solving skills which is important in the era of IR 4.0.					
3.	I can adapt and have prepared well for the different situations that occur in the industry that advanced in technology 4.0.					
4.	I have communication and leadership skills.					

HABITS

No.	Statement	1	2	3	4	5
1.	I have a regular study schedule for the subject that related to IR 4.0 Technologies.					
2.	I always focus in the classroom especially when the lecturers are teaching about IR 4.0.					
3.	I look for additional references and extra knowledge from variable sources about IR 4.0.					
4.	I often make brief notes and try to understand hardly in order to familiarize myself about IR 4.0 Technologies such as the advantages of Cybersecurity.					

SECTION C

This section is to get your opinion on the readiness towards IR 4.0. Please read carefully, and select ONE based on the Likert scale to represent your agreement.

No.	Statement	1	2	3	4	5
1.	I believe that I able to adapt on mental and skills which required in workplace in future.					
2.	I have much preparation on knowledge of IR 4.0.					
3.	I aware of the IR 4.0's challenges such as complexity task and high demands of requirement skills in future carrier.					
4.	I make effort to enter a career path way which potential future advancement in 4th industrial revolution.					