



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**IMPACT OF THE FOURTH INDUSTRIAL REVOLUTION TOWARDS THE  
FUTURE OF WORK IN THE ASPECT OF EMPLOYMENT, WORK STYLE,  
AND BUSINESS**

This report is submitted following the requirement of the Universiti Teknikal  
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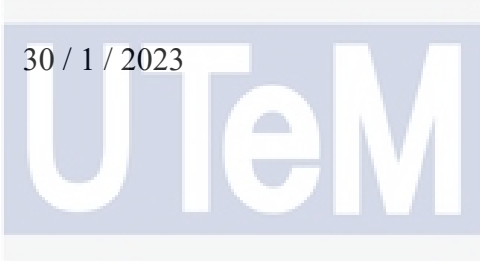
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## DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled “ IMPACT OF THE FOURTH INDUSTRIAL REVOLUTION TOWARDS THE FUTURE OF WORK IN THE ASPECT OF EMPLOYMENT, WORK STYLE, AND BUSINESS” is original done by myself and no portion of the work encompassed in this research project proposal has been submitted in support of any application for any other degree or qualification of this or any other institute or university of learning.

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## ABSTRACT

The Fourth Industrial Revolution has contributed to various impacts on the future of work in the aspect of employment, work style, and business. This research is to study the impact of fourth industrial revolution to the future of work. The researcher was determining the relationship between independent variables (4IR technologies, technological advances, and globalization) and dependent variable (future of work). Data were collected from 190 respondents who are working individuals of different industries, particularly customer service, data entry, food preparation, and manufacturing which consist around the Southern region of Malaysia. Statistical Package of Social Sciences (SPSS) is applied to analyze the data collected from the respondents. Several analysis methods had been used in this research which are Cronbach's Alpha analysis, Pearson's Correlation analysis, and Multiple Regression analysis. The results show that 4IR technologies and technological advances had no significant relationship with the future of work while globalization had shown significant impact to the future of work. Furthermore, this study discussed the opportunities and challenges of the Fourth Industrial Revolution to the future of work. Eventually the researcher can conclude that globalization is an important component in fourth industrial revolution in the future of work.

Keyword: fourth industrial revolution, future of work, impact, employment, work style, business, 4IR technologies, technological advances, globalization

## ABSTRAK

*Revolusi Perindustrian Keempat telah menyumbang kepada pelbagai impak terhadap masa depan pekerjaan dalam aspek pekerjaan, gaya kerja, dan perniagaan. Penyelidikan ini adalah untuk mengkaji kesan revolusi industri keempat kepada masa depan pekerjaan. Pengkaji sedang menentukan hubungan antara pembolehubah tidak bersandar (teknologi 4IR, kemajuan teknologi, dan globalisasi) dan pembolehubah bersandar (masa depan kerja). Data dikumpul daripada 190 responden yang terdiri daripada individu yang bekerja dalam industri yang berbeza, terutamanya perkhidmatan pelanggan, kemasukan data, penyediaan makanan dan pembuatan yang terdiri di sekitar wilayah Selatan Malaysia. Pakej Statistik Sains Sosial (SPSS) digunakan untuk menganalisis data yang dikumpul daripada responden. Beberapa kaedah analisis telah digunakan dalam penyelidikan ini iaitu analisis Alpha Cronbach, analisis Korelasi Pearson, dan analisis Regresi Berganda. Keputusan menunjukkan bahawa teknologi 4IR dan kemajuan teknologi tidak mempunyai hubungan yang signifikan dengan masa depan kerja manakala globalisasi telah menunjukkan kesan yang ketara kepada masa depan kerja. Seterusnya, kajian ini membincangkan peluang dan cabaran Revolusi Perindustrian Keempat terhadap masa depan pekerjaan. Akhirnya pengkaji dapat menyimpulkan bahawa globalisasi merupakan komponen penting dalam revolusi industri keempat pada masa hadapan pekerjaan.*

*Kata Kunci: revolusi perindustrian keempat, masa depan pekerjaan, impak, pekerjaan, gaya kerja, perniagaan, teknologi 4ir, kemajuan teknologi, globalisasi*

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## LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
VR	Virtual Reality
IoT	Internet of Things
UIDs	Unique Identifiers
XR	Extended Reality
FT	4IR Technologies
TA	Technological Advances
G	Globalization



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## CHAPTER 1

### INTRODUCTION

#### 1.1 Introduction

This chapter will discuss about the IMPACT OF THE FOURTH INDUSTRIAL REVOLUTION towards the future of work. The background of study, problem statement, research questions, research objectives, scope and limitation of the study, significant of study and summary will be discussed in this chapter.

#### 1.2 Background of Study

The Industrial Revolution was the transition to new manufacturing processes in Great Britain, continental Europe, and the United States, in the period from about 1760 to sometime between 1820 and 1840. (White et al. 2009) Over the past 70 years, automation and other forms of digitalization have changed the nature of work in Asia and elsewhere. Since 2000, this so-called “Third Industrial Revolution” of computers, Internet communications, robotics, and other digital technologies has enabled globalization and created new wealth by shifting the places, processes, and performers of jobs. Now we see the advent of the “Fourth Industrial Revolution” (4IR), a continuation of the automation of traditional manufacturing and industrial practices that integrates machine learning, artificial intelligence (AI), large-scale machine-to-machine communication, the Internet of Things (IoT), and cyber-physical systems (Schwab et al.2016). The widespread adoption of big data analytics, real-time and predictive analytics, and cloud technology (Karr et al. 2020) underpin 4IR advancements that will again disrupt industries and change the way people live, think, and work.

The main features involved in the Industrial Revolution were technological, socioeconomic, and cultural. The technological changes included the following: (1) the use of new basic materials, chiefly the iron and steel, and (2) the use of new energy sources, including both fuels and motive power, such as coal, the steam engine, electricity, petroleum, and the internal-combustion engine, (3) the invention

of new machines, such as the spinning jenny and the power loom that permitted increased production with a smaller expenditure of human energy, (4) a new organization of work known as the factory system, which entailed increased division of labor and specialization of function, (5) important developments in transportation and communication, including the steam locomotive, steamship, the automobile, the airplane, the telegraph, and the radio, and (6) the increasing application of science to industry. These technological changes made possible a tremendously increased use of natural resources and the mass production of manufactured goods. (Britannica et al. 2022)

The Fourth Industrial Revolution, 4IR, or Industry 4.0, conceptualizes rapid change to technology, industries, and societal patterns and processes in the 21st century due to increasing interconnectivity and smart automation. The term has been used widely in scientific literature, and in 2015 was popularized by Klaus Schwab, the World Economic Forum Founder and Executive Chairman. Schwab asserts that the changes seen are more than just improvements to efficiency, but express a significant shift in industrial capitalism. (Philbeck & Davis et al. 2018) Like previous industrial revolutions, the technological innovations of the 4IR will transform economies and increase productivity. They will also create employment and alter occupations. Asia, home to some of the latest labor-changing innovations, already counts among four of the 10 most automated countries in the world: South Korea, Singapore, Taiwan, and Japan, with China close behind (International Federation of Robotics et al. 2020).

The First Industrial Revolution was triggered by the invention of the steam engine in the 18th century, the Second in the 19th century was powered by widespread electrification, and the Third, in the 1960s, was chiefly the product of advances in computing. Although 4IR which is building on the third, is also the product of technological advances, it is uniquely marked by a fusion of technologies that is blurring the boundaries between the biological, the physical, and the digital realms. Machines 'speak' to each other through the internet of things, processes respond to intelligence devised by algorithms, and humans engage in real-time 'conversations' with mechanical processes through bidirectional interfaces. (Lavopa, Delera et al. 2021)



Online market and labor platforms are creating new opportunities for commerce and employment. Rising consumer demand for consumer goods and technology products has stimulated productivity gains by creating new jobs and offsetting those lost (African Development Bank et al. 2018). Technologies that have driven innovation and economic growth have improved productivity, but “they have also affected income distribution by altering the rate of return on assets, favoring capital over labor, as well as skilled labor over unskilled labor” (Acemoglu et al. 1998).

The future of work is a phrase that is often associated with rapid, transformative change - in work itself, who does the work, and where work is done. Multiple converging forces, including the increasing adoption of technological advances (eg, automation, artificial intelligence, robotics); shifts in demographics; the broadening of the workforce to include a wider array of alternative work arrangements; connectivity; globalization; and empowered consumers will have a profound impact on all industries. Coronavirus (COVID-19) has directly affected and accelerated many future work trends (eg, remote work, expanding employers’ role as “a social safety net”)<sup>5</sup> as employers navigate the return to work.<sup>6</sup> Collectively, these trends raise important questions about optimal ways in which jobs can be redesigned and how critical business operations will shift. (Johnson et al. 2020)

Apart from that, the COVID-19 pandemic forced many other countries, to enforce an extended country-wide lockdown to ensure social distancing and scale down the potential spread of the virus among the people. This long shutdown of the country made organizations around the world realize that the traditional office culture of face-to-face coordination and communication is not a viable model to run an office during this pandemic. Soon enough, most of these organizations, even if resentfully, closed the physical office infrastructure and started working remotely. It is almost as if we have teleported to another universe where everything runs on a digital system and the traditional way of life is out of fashion. This lockdown is also positively influencing people’s attitude towards online shopping, as more and more people are buying their everyday essentials from various online retailers. Managers and leaders of big to small industries and organizations, some of whom were often reluctant to use digital platforms, are learning and adopting digital tools and

technologies to manage and oversee remote work and maximize productivity. (Naim et al. 2020)

This opportunity of continuing office and economic activities during this period of lockdown and social distancing has been made possible by the existing advanced technology and functioning telecommunication infrastructures. People today are realizing that a significant part of the office and economic activities can be done from anywhere with more flexibility, and sitting behind the office desk, direct communication, and physical meetings are not as necessary to do things decently as they were thought. Moreover, going to schools and universities physically to gain knowledge is perhaps also not mandatory. This digital style of working during the lockdown may be considered a forced entry into the fourth industrial revolution (4IR). The 4IR is characterized by a range of new technologies that fuse the physical, digital and biological worlds, changing society as we know it. The 4IR could unwrap endless possibilities for billions of creative and capable people connected by digital devices. By digitizing business and economic operations for all these people, 4IR has the potential to accelerate our economic growth. This global crisis is driving the world to take that leapfrog that many traditional-minded business leaders and directors were unwilling to do until now. This unintentional, unprepared, and forced entry into the framework of 4IR and temporary acceptance of the digital process of remote work may have a long-term impact on the office work culture and economic activities in the post-coronavirus world. (BIGD et al. 2020)

### **1.3 Problem Statement**

The Fourth Industrial Revolution has brought about employees and businesses having to consider the future of work in the aspect of employment, work style, and business. New technology is increasingly being adopted by the worldwide labor market. New technology makes it simpler for businesses to automate regular work, which may disrupt the balance between job duties performed by humans and those performed by robots and algorithms. The Fourth Industrial Revolution has caused employees' skill sets to become irrelevant, resulting in the ambiguity of the skills necessary by employees to survive this revolution. Employees are subjected to varying levels of automation based on their job and the activities they perform. The

world of work will become increasingly complicated due to the loss of millions of jobs. (CHANGE et al 2022)

The Fourth Industrial Revolution (4IR) was already changing many facets of our life before Covid-19, providing both challenges and opportunities. Transformations and disruptions are already occurring within labor markets across the world. People routinely store images and documents in the cloud, our emails remind us to send follow-ups and we can turn on light bulbs with a simple voice command. Over the last twenty years, the use of new technology has caused some roles to disappear while also creating new, previously unheard-of job titles. For example, the rise of online flight comparison sites has drastically reduced the number of physical travel agents, and advancements in mobile technology have made switchboard operators obsolete. On the other hand, technological advancements have also led to the emergence of brand new job titles like app developers, social media marketers, and data scientists. (CHANGE et al 2022)

The 4IR has significant implications for the future of work and skills required in the gig economy. Blockchain technology is set to transform businesses worldwide, which refers to a digital, distributed ledger that keeps a record of all transactions across participating peer-to-peer networks. Therefore, increasingly complex tasks are automated in the 4IR (Autor et al. 2015; Acemoglu & Restrepo et al. 2018; ADB et al.2018). New technologies can displace jobs and also create new jobs and new skills (Autor et al. 2015).

These opportunities and challenges have now been expedited and intensified as a result of the worldwide epidemic. The coronavirus has catalyzed the global deployment of the fourth industrial revolution. The Fourth Industrial Revolution has brought about change as well as innovation at an extremely unpredictable rate, that is fueled by technological advancements such as artificial intelligence which therefore requires employees to continuously improve their skills to keep up with this Revolution (Marr et al. 2018). The fourth industrial revolution (4IR) stands out for the fact that machines have become active, unlike other industrial revolutions where machines were passive (Schwab et al. 2017). With smart technology becoming more mainstream, people need to consider the impact using this new technology will have on our society and workforce. (CHANGE et al. 2022)

## 1.4 Research Questions

The researcher determined three research questions in this study:

- i. What is the awareness level of Fourth Industrial Revolution among Malaysians?
- ii. What are the impacts of the Fourth Industrial Revolution towards the future of work in the aspect of employment, work style, and business?
- iii. What are the opportunities and challenges of the Fourth Industrial Revolution to the future of work in the aspect of employment, work style, and business?

## 1.5 Research Objectives

In this research, there are three research objectives to be figured out:

- i. To explore the awareness level of Fourth Industrial Revolution among Malaysians.
- ii. To identify and examine the factors that impact Fourth Industrial Revolution to the future of work.
- iii. To determine the opportunities and challenges of the Fourth Industrial Revolution to the future of work in the aspect of employment, work style, and business.

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## 1.6 Scope and Limitation of the Study

This research paper is focusing on the impact of the fourth industrial revolution on the future of work in the aspect of employment, work style, and business. This study will be conducted among 384 working respondents of different industries, particularly customer service, data entry, food preparation, and manufacturing from the Southern region of Malaysia. The selected respondents will be chosen randomly. The research will be carried out by distributing questionnaires to the respondents.

The limitation of the study is the inaccurate data from respondents as they were chosen randomly by the researcher. Besides, the researcher experienced a time limitation in conducting the study. The research faced time constraints since the study needed to be completed in a short period.

### **1.7 Significance of Study**

The findings of the study benefited businesses and employees in Malaysia, particularly employees whose jobs are more likely to be affected by the Fourth Industrial Revolution. They will understand the impact of the fourth industrial revolution on the future of work. Besides, academics and practitioners can understand more about 4IR Technologies and the opportunities and challenges of 4IR through this research. In addition, the study provides empirical literature sources to future researchers which carry out a similar topic by adding an existing body of knowledge on the impact of the fourth industrial revolution on the future of work.

### **1.8 Summary**

In conclusion, this chapter has discussed the overview of the study. It discussed the background of the study, problem statement, research questions, research objectives, scope and limitation of the study, and significance of the study. In the coming chapter, the researcher will carry out the literature review of the study. The information will be broader and more understandable.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter will introduce the literature review and relevant theoretical model. The researcher discussed the Fourth Industrial Revolution and 4IR technologies. The literature review is an important element of the report since it provides a summary of the report, as well as theoretical definitions and previous research, in order to support the notion of our title, “Impact of the Fourth Industrial Revolution towards the future of work”. As a result, the focus of this report’s literature study will be on explaining the notion of each independent variable and its link to the dependent variable. There will be evidence to prove and support the idea of dependent and independent variables in every element of this literature review. In general, the literature review’s content will define the fourth industrial revolution as a dependent variable and also the elements that influence this problem as independent variables. There are a total of 3 factors as independent variables in this report which are the fourth industrial revolution technologies, technological advances, and globalization. By reading the relevant kinds of literature, the dependent variables and independent variables were defined. At the end of this chapter, the conceptual framework can describe the concept of this research and develop the hypothesis.

#### 2.2 Fourth Industrial Revolution

The fourth industrial revolution, a term coined by Klaus Schwab, founder and executive chairman of the World Economic Forum, describes a world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives. (Miller et al. 2015) The technological revolution in the modern developing environment in which innovative technologies and trends such as the virtual reality (VR), Internet of Things (IoT), Artificial Intelligence (AI), and Robotics are fundamentally altering the way of living,

working, and relationships to one another, is known as Fourth Industrial Revolution or Industry 4.0 or Industrie 4.0. (Nath et al 2018)

### **2.2.1 Opportunities of Fourth Industrial Revolution**

Some researchers argue that the fourth industrial revolution will shape the future through its impacts on government and business. People have no control over either technology or the disruption that comes with the fourth industrial revolution. However, we can predict the opportunities that come with the fourth industrial revolution: 1) lower barriers between inventors and markets, 2) more active role in the artificial intelligence (AI), 3) integration of different technics and domains (fusion), 4) improved quality of our lives (robotics) and 5) the connected life (Internet). (Xu, David & Kim et al. 2019)

Here, the main concern is that creating new jobs may not be fast enough, so when automation and other systems operated by artificial intelligence replace the existing labor force, the number of existing jobs can be reduced faster than the workforce, so until new jobs are created there would be a significant increase in the unemployment rate. Also, automation and the digital revolution might cause jobs to re-shore from developing countries into advanced economies. The increasing usage of robots in developed countries, as well as new production techniques which demand a sophisticated level of skills, will reduce labor-cost advantages in developing countries. This may lead to the displacement of employment from developing countries to developed countries.

### **2.2.2 Challenges of Fourth Industrial Revolution**

“We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academic and civil society.” (Schwab 2015)

### **2.3. Fourth Industrial Revolution Technologies**

The Fourth Industrial Revolution is a way of describing the blurring of boundaries between the physical, digital, and biological worlds. It is a fusion of advances in artificial intelligence (AI), robotics, the Internet of Things (IoT), 3D printing, genetic engineering, quantum computing, and other technologies. (McGinnis et al. 2020)

#### **2.3.1 Artificial Intelligence (AI)**

Artificial Intelligence, where the assumption was made “that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it”. Artificial Intelligence is “a branch of informatics aiming at realizing cognitive skills such as learning, planning or problem-solving in computer systems using algorithms. (McCarthy et al. 1955).

#### **2.3.2 Internet of Things (IoT)**

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals, or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. (Gillis et al. 2022)

#### **2.3.3 Virtual Reality (VR)**

Virtual reality (VR) is a simulated experience that can be similar to or completely different from the real world. Applications of virtual reality include entertainment (particularly video games), education (such as medical or military training), and business (such as virtual meetings). Other distinct types of VR-style technology include augmented reality and mixed reality sometimes referred to as extended reality or XR. (Goode et al. 2019)

#### **2.3.4 Cloud Computing**

Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user. Large clouds often have functions distributed over multiple locations, each location being a data center. (Ray et al. 2018)