Chapter 6
Food 4.0: An Introduction

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ABSTRACT

The fourth industrial revolution is a prospective innovation path for human life to possibly replace human intelligence and manual labour with artificial intelligence and robotics. The concept of 4IR is being embraced and applied in all sectors of human life. The academics are researching intensely into the revolution, while industry captain braces up to the inevitable and fast implementation in energy, automobile, telecommunication, services, security, medicine, and other industrial sectors. Agriculture and food sector, which is termed Food 4.0, being the highest employer of human resources, is a major sector that is expected to benefit tremendously from the concept and application of 4IR in driving the sector into the new era of development.

INTRODUCTION

The First-To-Fourth Industrial Revolutions

Industrial revolution involves the replacement of one or more previous technologies by new inventions whose use and diffusion will cause a sudden change in human development within a short technological progress period (Sung, 2018). Various literatures have highlighted three previous industrial revolu-

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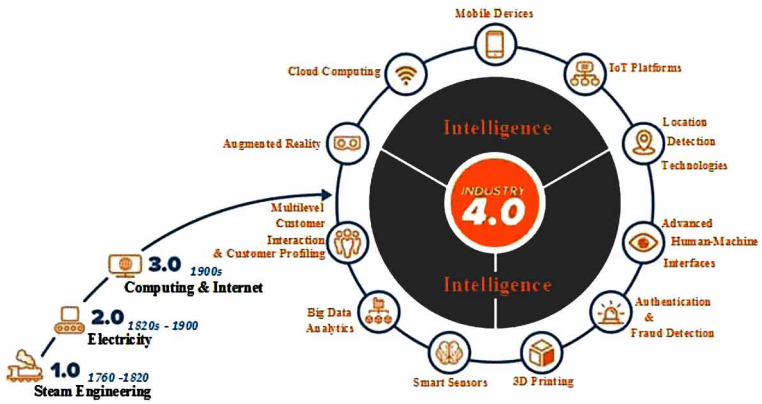
tions, with the fourth already in operation. The first industrial revolution (Industry 1.0) arose towards the windup of the 18th century with the overview of mechanisation through steam and waterpower. The production capacity of various industrial sectors was enhanced through the aid of the mechanised steam engine systems. The second industrial revolution (Industrial 2.0) occurred between the twilight of the 19th century and early 20th century. This phase brought about mass production through electrical energy, the use of conveyor belts, the introduction of telegraph and others. The third industrial revolution, also known as Industry 3.0 brought about automation, the use of electronic devices, computer and information technology. It was consummated in the 1970s from the events of the middle of the 20th century. During this phase, digital advancement was steep. Automation and information technology were the crucial drivers of the economy in the extracting, manufacturing, processing and engineering services (Sung, 2018). The industrial progression from the start of the first industrial revolution through the third industrial revolution spanned over about twenty-five decades. Today, the era of cyber-physical systems known as the fourth industrial revolution otherwise called industry 4.0 or 4IR is in place. It is the era of integrating the real physical to the virtual worlds through technology. The industrial revolution transit from industry 1.0 to Industry 4.0 and the features of each era are as illustrated in Figure 1(ICT works, 2019).

Figure 1. First – Fourth Industrial Revolutions and the Features



The fourth industrial revolution (4IR) is an emerging concept that effect rapid changes in how people live and transact, through disruptive demand-driven business models and supply-driven technological inventions. Germany federal government introduced a high-tech strategy termed 'Industry 4.0' in 2011, which later led to the theme 'Fourth industrial revolution (4IR)' in Davos, Switzerland in 2016. At the World Economic Forum (WEF) annual meeting in 2016, 4IR was argued by its founder and chairman Klaus Schwab, to have arrived as a revolution with entirely different scope and influence, from the previous industrial revolutions. The presentation of the term 'Fourth Industrial Revolution' in his paper has earned him the entitlement of introducing the 4IR. However, the University of Stellenburg Business School (2017) has noted that the term can actually be traced to Rostow (1983), an essay paper presented by W. W. Rostow in 1983.

The scope of coverage of 4IR is far bigger than just the application of technology in the various aspects of our societal development. It is a key component of our immediate future. The concept and the defining