

Transforming Industry through E-Commerce: Lessons from the COVID-19 Pandemic

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ABSTRACT

The aim of this paper was to explore the 4.0 industrial revolution and globalization and their role in e-commerce as well as the current challenges facing e-commerce represented by the Coronavirus. The industry had gone through revolutions that contributed to its development, thus creating distinct and qualitative moves in it, and the matter had begun to shift from physical activity to mental creativity. Data for this study were obtained from existing literatures on industrial revolution of Coronavirus. The methodology heavily relied on existing previous literature on the subject being dealt with. The findings indicate that the economy has been affected and closely related to the results of the 4.0 industrial revolution, whether in a trade directly such as electronic commerce or by monitoring trade-related operations, analysing big data, and finding appropriate solutions. Moreover, the accomplishments achieved through them contributed significantly to increasing the benefit to people as the previous revolutions contributed at the time.

Keywords: E-commerce, Industrial Revolution, Coronavirus, Artificial Intelligence, Globalization, Technology.

INTRODUCTION

The industry is one of the sources to support the economy of any country. The industry has gone through revolutions that contributed to its development, thus creating distinct and qualitative moves in it, and the matter has begun to shift from physical activity to mental creativity. The industry has witnessed four industrial revolutions phase until today. The first is in the eighteenth century, in the emergence of steam engines. The 2.0IR phase witnessed internal combustion engines that run on diesel. Later on the 3.0 IR experience the changes in the middle of the twentieth century and that was considered a technological revolution and computers, up to the 4.0 industrial revolution which involves in very high-technology revolution like artificial intelligence and 3D printing (Prisecaru, 2016).

Over time, new terms and concepts have emerged, such as globalization, which has brought about essential changes in the corporate environment. It increased the competitive opportunities for companies, especially the global ones, provided more options for consumers, and expanded business and profits (Bowen et al., 2015). Besides, the concept of electronic commerce has emerged as a trade dependent on technology and artificial intelligence, which is one of the results of the fourth industrial revolution and played a significant role in electronic

commerce by analysing data and finding connections between products and consumers. In addition to the desires of consumers in a particular product and increase the demand for it (Lingam, 2018).

In order to face this new phase revolution of industry, it is needed for more advanced and superior robots that can help in doing the business; but what is the most important thing is companies must have highly skill and qualified workers to operate those robots. Thus, there will be a significant approach from leaders to manage those skilled workers to make things go well. Besides that, leaders must also be prepared to diverse management skills and create a balance in the workspace. In a way to cope with the rapid changes, it requires continuous innovation that is relevant with the era. With the ongoing process of digitization and automation, it indirectly will create many business opportunities but will not forget the challenges that will occur. In any sector, challenges that companies face will lead to the changes of their business model and strategies that need to be taken that can give an impact to the organization (Slavik, 2015).

The IR 4.0 concept is very relatable to the global environment that we are living in right now. The advancement in technologies that had happened since the first Industrial Revolution has greatly improved the lifestyle of all humans. Moreover, for companies, the adoption of technology is something that is futile to reject. Technology can ease the management and processes involved and it certainly can be used for profit-gain purposes, for example production and marketing. Although technology is inevitable, the transition application from analogue or manual to technology has not always been effortless. For example, the music sharing service, Napster became a global hit when it first came out in 1999. But, due to lack of proper management and overlooked the implication of legal complications, by 2002, the company has declared liquidation and shutdown of business (Wingfield, 2002). On the other hand, the use of technology has evidently helped in increased sales. In the case of Procter & Gamble (P & G), they began selling their products – Pantene shampoo, Pampers diapers, Cover Girl cosmetics and Gillette razors, among others – via online in 2010. This has further maximized their sales because it also targeted customers outside from retailers (Birchall, 2010). With that in mind, companies must strategize the adoption of IR 4.0 in accordance with the company's prospects to ensure the impact that they gain would be beneficial and profitable to the companies.

The 4.0 industrial revolution and globalization and their role in e-commerce are discussed in this paper as well as the current challenges facing e-commerce represented by the Coronavirus (COVID-19).

LITERATURE REVIEW

According to Ghobakhloo (2020), the 4.0 IR of the 21st century has impressed industrialists and governments. It is a digital industrial revolution and a significant shift in business worldwide. In the 4.0 IR, the work environment has become electronic devices, whether they are computers, smart devices, or even smart machines, and these devices connected with an intelligent system and digital communication capable of selecting, developing and exchanging information without the need for human intervention to do that. As a result, it helped increase production and reduce waste.

Besides, unique products have emerged in the 4.0 IR, which is digital products and services. It has led to a change of both strategies and organization of companies, also changing the nature of work to suit the digital transformation. New methods of production have emerged by connecting devices, robots, and production machines, plus communicating them via artificial intelligence. Thus, real-time availability and no-time loss provided, organization of services, increased production and control through data processing and analysis (Horváth & Szabó, 2019; Islam et al., 2024).

According to Lee et al. (2018), the dependence with the beginning of the 4.0 IR on artificial intelligence in the industry has become very important, and it has made significant changes in this sector. It is one of the crucial elements on which the 4.0 industrial revolution depends, and this importance came because of the ability of artificial intelligence to deal with the techniques used and emanating from the 4.0 industrial revolution such as big data analysis, high ability to deal with images, robots, machine learning and processing all these things. Therefore, it became of great importance and influence on production in quantitative terms as well. Darko et al. (2020), explain the importance of the role of artificial intelligence in the 4.0 industrial revolution, as it works to secure an active connection between the physical world and the digital world. Artificial intelligence became included in all smart machines and devices. Also provides excellent opportunities to improve production with a very high percentage, because relying on artificial intelligence to analyse big data very quickly and with high accuracy, thus saving time and effort and reducing the error rate.

According to Surugiu and Surugiu (2015), Globalization can describe as international integration, which has evolved due to increased exchange in services and products. Globalization has been affected over the years by the development and progress that has taken place in various fields. The world in all its countries has become increasingly interconnected due to globalization.

In addition to the significant impact of globalization on the economy, it increased international trade and increased the flow of services and goods. Consequently, the high rate of economic growth, improving living standards, as well as increasing access to global markets.

Moreover, globalization has gone through many stages throughout history. It started a long time ago and was represented by the Silk Road, which starts from China, through India, to the Mediterranean. As it was a commercial network between different countries of the world, and its purpose was commercial. Over time, it evolved and was affected by the changes taking place. It expanded significantly, and the global interconnection became broader and stronger, so the world became interconnected through technology by mobile devices, social media programs, electronic media and the Internet (Mir et al., 2014; Alshammari and Islam, 2014; Islam and Patwary, 2013).

According to Lin et al. (2019), e-commerce has becoming one of the most important and common methods of marketing products and technology have played an essential role in this field. The technology included various electronic devices, such as mobile phones, computers, tablet devices, the Internet, means of processing and transmitting information, and related electronic payments. E-commerce has helped to reduce the cost of service, which is the cost between institutions and consumers, also increased the time savings and the performance of business quickly using technology and its means.

Besides, the relationship between the use of technology and e-commerce is in terms of marketing efficiency and providing more opportunities. The Internet has become the tool for doing e-commerce through the necessary applications or social media, which has increased interaction between people (Lin et al., 2019). Despite all the benefits brought about by the 4.0IR, such as increasing production and finding new marketing methods represented by technology and the Internet, on the other hand, it has its disadvantage and fears. For example, it will lead to an increase in resource and energy consumption and an increase in the level of pollution. Also pose a threat to jobs by relying on digitization (Ghobakhloo, 2020). Through our intensive reading of many articles and topics, we have found that the most prominent challenges to e-commerce are traditional topics.

According to Khan (2016), the challenges relate to confidence in dealing, system security, electronic penetration, different cultures between countries, which represents in negotiating the price that is not present in e-commerce, and other challenges facing e-commerce. In contrast, we did not find any mention of the topics and challenges related to non-traditional threats, such as the recent spread of the Coronavirus (COVID-19) and its effects on e-commerce.

Industrial Revolution and Debate

Industrial Revolution (IR)

According to Roblek et al. (2016), the 4.0 industrial revolution presented for the first time in Germany in 2011 as a suggestion to develop German economic policy, based on high-tech strategies. The 4.0 industrial revolution based on concepts and technologies of electronic, physical systems, such as the Internet of Services (IoS) and the Internet of things (IoT), and that is through continuous communication via the Internet that allowed interaction and the exchange of information in a continuous manner, whether between humans, between man and machine and between devices themselves. The 4.0 industrial revolution characterized by digitization and the use of electronics and information technology in the process of manufacturing and providing services.

Besides, Vuksanović et al. (2016) explained that in the 4.0 industrial revolution, smart digital devices linked with raw materials, products, machines, robots, and men through communication networks. Also, Tay et al. (2016) discussed the impact of the 4.0 industrial revolution on the efficiency of manufacturing products and raising their efficiency, by collecting data, analysing them, and then making the right decision based on modern technologies. That represented by the role and function of artificial intelligence (AI) in the 4.0 industrial revolution. The 4.0 industrial revolution included many different sectors, as it entered the field of manufacturing robots, 3D printing, advanced manufacturing systems, Internet of things (IoT) and other.

Artificial Intelligence (AI)

According to McCarthy (1955) defined the term of artificial intelligence (AI) as the science and engineering of making intelligent machines (Hamet & Tremblay, 2017). Artificial intelligence (AI) is one of the computer science branches of that seeks to achieve its goal by creating a smart machine that can perform several tasks by using its intelligence (Yadav et al, 2017).

Artificial intelligence can solve complex problems in a time that does not exceed seconds, deal with data regardless of its size, and make the right decision without any mistakes. Artificial intelligence is a system that can accomplish specific goals from specific ones by humans, by collecting data, analysing and processing them, and making the right decision at a very high speed (OECD, 2019). Finally, it can be said that (AI) can deal with machines, smart technology devices and the analysis of massive data to reach accurate and correct results quickly and in a short time.

Globalization and Technology

It is a process of integration between countries, and this integration is social, political, cultural, economic, political, and technological integration. Its goal is to create a single global entity, without any restrictions or limits, and to increase the ease of movement of capital, trade, investment, and information transfer quickly and easily. Moreover, modern technology has contributed to a considerable increase in globalization (Luthans & Doh, 2018).

Akram et al. (2011) explained that technology played an essential role in expanding and strengthening the concept of globalization. Through electronic devices spread around the world, and their interconnection with the Internet, information and communication has become more accessible and more quickly and without any restrictions, and the border crossing process has increased more. It is evident from this that globalization and technology in our era are highly interconnected; also, that technology has taken an essential role in globalization by increasing communication, correlation, and transcending borders and making the world more like one country.

E-Commerce (Electronic Commerce)

As mentioned by Ashokkumar (2018), e-commerce is the process of selling, buying, or exchanging products, services, or information via the Internet through electronic devices that connected via the Internet. The e-commerce also includes electronic payment transactions, transfer of money, and sending it via the Internet between different countries. E-commerce has many benefits, such as exchanging information, goods, and selling it electronically without any barriers, which facilitates buying and selling operations and reduces the time it takes to trade from far away. It is available all the time, easy access to it by electronic devices and modern technology such as mobile phones and computers, and access to sources of sale via the Internet, hence saving effort and time. Also, providing many opportunities for consumers through displaying more than one product and comparing them, choosing the most appropriate, and continuous updating of the products, their specifications, prices and others (Abidin et al., 2016; Islam et al., 2016). In contrast, this does not mean that it does not contain problems and threats. E-commerce face many risks, such as the security threat to credit cards, electronic payment, theft of electronic user accounts, the lack of confidence on the part of consumers, and fear of electronic fraud operations, plus some products sometimes do not appear clearly, and its true nature cannot verify (Gupta & Dubey, 2016).

Besides, technical problems, Some countries may suffer from technical problems related to networks, the Internet service, databases, and even electronic software and applications related to e-commerce in addition to the weakness of the Internet service or its high prices (Kabugumila et al., 2016). More importantly, e-commerce has many essential types which they are: B2B (Business-to-Business), C2C(Consumer-to-Consumer), B2C(Business-to-Consumer) and C2B (Consumer-to-Business) (Bhalekar et al., 2014).

Coronavirus (Covid-19)

According to the World Health Organization (2020), the Coronavirus (COVID-19) is a new strain of viruses, which discovered in 2019, in Wuhan, China, and has not detected before. It is a strain of viruses that affect the respiratory system, and its intensity ranges from colds to severe diseases. Its danger is the transmission of infection, which may cause severe pneumonia and kidney failure and sometimes lead to death (WHO, 2020a).

From the above concepts, a clear and robust correlation between them appears. The technology plays an essential role in the linking process between people around the world through globalization, which relied on technology, or on the level of electronic commerce that has emerged through trade exchange of various kinds through the Internet. Thus, technology is the main player in all of this, and the continuous development through industrial revolutions helped the emergence of new types of businesses.

Industrial Revolution and Ecommerce Debate

In this section, the interconnection between modern technology and electronic commerce is discussing and what is the role of globalization in that, moreover how it has contributed to the expansion of electronic commerce. The 4.0 industrial revolution brought about many changes, developments, and helped the emergence of new concepts in dealing with big data and analysing it.

E-commerce, which depends primarily on technology, has emerged. Without it, people would not have been able to practice e-commerce through the Internet. The 4.0 industrial revolution relied heavily on artificial intelligence; electronic commerce relied on technology, and the concept of globalization expanded. Through the Internet, electronic devices around the world have become linked together. Communication has become continuous all the time; therefore, the concept of globalization has become more robust, there are no restrictions and no limits for communication between different countries in a very short time, and through electronic applications deployed based on artificial intelligence numerous products and more opportunities can be found.



Figure 1: Industrial revolution and e-commerce
Source: Shopee, 2020

When searching for a specific product, artificial intelligence will work to find the match between the products by comparing the images with each other, and completing that in a short time, in addition to finding the required product by using the image search feature (Gawali, 2019). The user uses a specific image to search instead of writing in e-commerce applications. For example, in a Shopee application, when searching for a specific product, many options will appear for the same product but from different sources, and each source may have a difference, such as colours, prices, delivery time, etc. Thus, more opportunities for users to find what are suitable for them. The pictures below show the many options that appear when searching (Shopee, 2020).

Besides, the search feature has provided using images, so if the user does not know the name of the product in the application, he can upload an image of the product, then the program finds the products that match the image uploaded by the user, as shown below (Shopee, 2020).

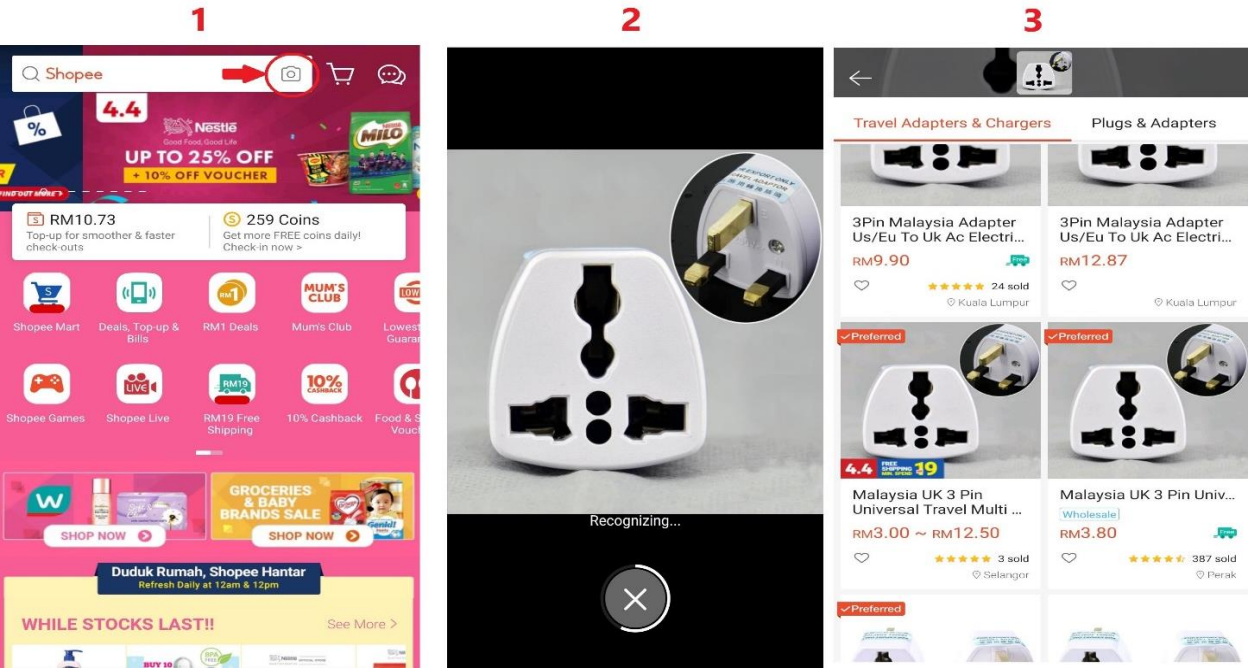


Figure 2: Artificial Intelligence
Source: Turban et al., 2018

These processes are based on artificial intelligence, which searches and matches big data in a short time. One of the applications associated with the artificial intelligence revolution is the chatbot, which is a digital service dedicated to answering users' questions and inquiries, as it is a conversation between a human user and computers. Conversation robots are equipped with high intelligence to handle natural language. Computers rely on frequently asked questions and define short answers for them (Turban et al., 2018).

Chatbot not only answered the questions, but it has had a significant impact on increasing the revenue from financial imports, as shown in the figure 3.

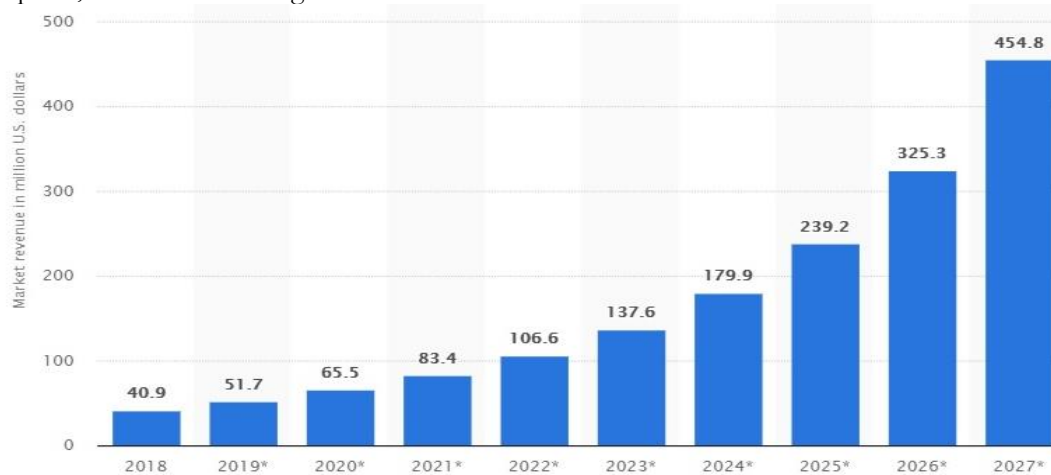


Figure 3: Market revenue

According to the figure 3, revenue has increased over the years, relying on Chatbot, where it was \$ 40.9 million in 2018, and continued to rise, and expected to reach \$ 454.8 million in 2027 (Statista, 2019). Chatbots programs provide user buying suggestions, by analysing customer patterns, and the chatbot suggests related products to the user and thus will increase the chances of purchasing more than one product (Clark, 2019). With the increase in buying, selling via the Internet, the process of paying and financing fees amounts of goods and products, and the fees for delivery have also become electronic. Since digitization is one aspect of the 4.0 industrial revolution, the electronic payment process related to electronic commerce has developed through it.

Electronic payment can define as the payment of amounts, but in a paperless manner, i.e., electronically, and it is done through the use of technology and electronic media, whether in the transfer of paper money to electronic, or the process of linking between customers, individuals and institutions responsible for the payment process and the payment of funds (Fatonah et al., 2018). The electronic payment process has led to a revolution in electronic transactions, represented by reducing transaction costs, reduced paperwork, ease of use, and time savings compared to manual processing. There are many ways to process electronic payments, such as credit cards, electronic money, and others (Tutorialspoint, 2020). According to the Statista website, non-monetary transactions around the world continue to rise around the world; the following graph shows the continuous rise of non-monetary transactions in different regions of the world (Statista, 2020).



Figure 4: Non-cash transactions worldwide

It noted from the graph above that the cashless payments operations increased from 2016 to the expected rise in 2022, and the rise was not limited to a specific region but also included all regions of the world. The scaling of colors indicated a specific region, which are North America, Europe, Asia, the Middle East, Africa, and Latin America. Since globalization is the process of setting up a group of networks between different sides regardless of

distances, through which the national borders of countries crossed, and the integration of various sectors, whether economic, cultural, information, and other, plus exchanging them (Gygli et al., 2019). Relying on technology that has linked different countries strongly through the Internet and smart devices, this has led to a vital strengthening of globalization. Through globalization and technology, electronic commerce has increased dramatically, as electronic websites specialized in electronic buying and selling such as eBay and Amazon and others have spread, hence it is now possible to purchase a product through websites from another country and complete the electronic payment process then receive the product later.

Hence, the strong correlation is between technology and globalization and its role in electronic commerce. Whereas, electronic commerce depended on technology, which in turn increased globalization by increasing interdependence between countries, regardless of the distances between them. In addition to that, the electronic buying and selling process depended on electronic devices, whether in accessing products in various countries from multiple sources, or by completing the electronic payment process required in the electronic payment process. It can be said that these concepts are all related to each other, and it is not possible to achieve anyone at present without the existence of the remaining concepts with it.

Current Challenge to Ecommerce (Covid-19)

In this section of the assignment, the current challenges facing e-commerce will be discussed. Despite the significant prevalence of e-commerce and the great opportunities that it provides, whether for consumers in obtaining multiple opportunities and choosing what suits them or for companies and producers, represented by easy access to new global markets, thus facilitating the trade process and increasing profits. On the other hand, it faces many challenges.

The most prominent challenge now facing e-commerce is the Coronavirus (COVID-19). After the first case of pneumonia was recorded due to an unknown cause, in the Chinese province of Wuhan in December 2019 at the WHO office (WHO, 2020b), and the disease then spread very significantly in China and then around the world, it had a very significant impact on trade and electronic sales. As sales fell sharply and saw sales levels decline. After the spread of the disease in China, people became concerned about the transmission of the coronavirus (COVID-19) infection to them, especially as there are reports that indicated that the virus remains for long periods on various surfaces.

According to World Health Organization (2020a), a study released showed that coronavirus (COVID-19) could remain on copper for four hours, on cardboard for 24 hours, on plastic and steel for between two or three days, and in the air for 3 hours before it falls to the ground or surfaces (Coronavirus Resource Center, 2020). This matter forms a threat and fear for many people, which leads them to stop buying goods online. The reason for this is the fear of consumers from the process of packaging and packing the goods sent may be unsafe, plus the process of shipping goods may pass in several regions; moreover, sometimes transferred in more than one means of transportation, which prompted consumers to fear that the coronavirus (COVID-19) will be transmitted during the transfer process as well.

Shipping operations from China have decreased significantly, as indicated by the Shanghai containerized freight index (SCFI). It has witnessed a decrease since the first week in the year 2020, and the decline in the shipping process continued over the 11 weeks of the year 2020, this confirms the lack of demand and shipping of goods from China, and this is in one region which is Shanghai; indeed, the rest of the outlets were affected and decreased shipping operations. However, after the reassuring news of controlling the spread of coronavirus (COVID-19) in China, the Shanghai containerized freight index (SCFI) started to rise again, showing the impact of the virus on the shipment of goods. Figure 5 shows the continuous decline over the past weeks of 2020 and the rise in the last week (News, 2020).



Figure 5: International trade

In China, coronavirus (COVID-19) did not only affect the shipment of goods but also significantly affected manufacturing and export orders. According to the report issued by United Nations Conference on Trade and Development (UNCTAD) on 4/March/2020 it showed a significant decrease in that, as the manufacturing purchasing managers index (PMI) and new export orders decreased, the figure below shows the decrease after the spread of Coronavirus (COVID-19)(UNCTAD, 2020).

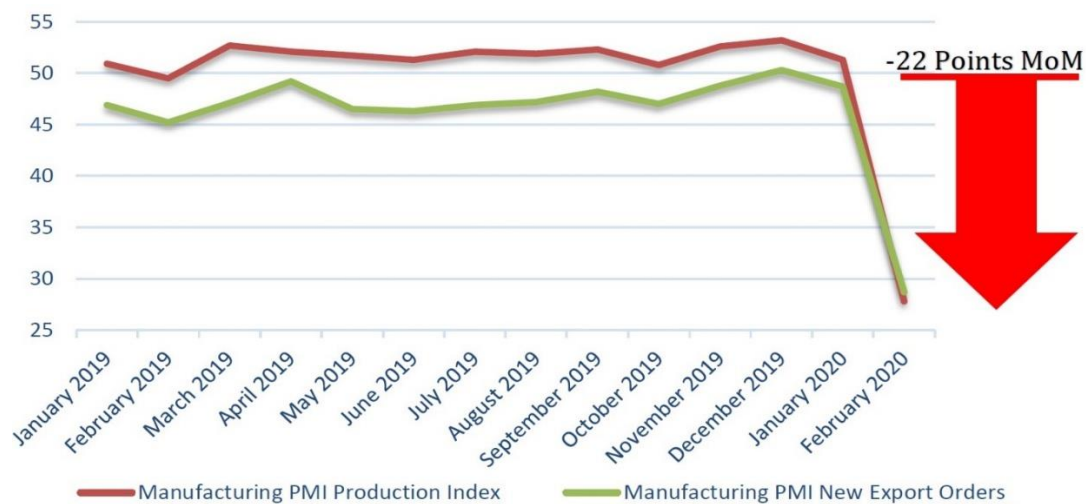


Figure 6: Manufacturing Index

The high negative impact of coronavirus (COVID-19) on the economy and trade sector in China is apparent, as it affected the production and manufacturing sector in addition to export and container shipping; furthermore, this is the challenge at present for trade in general and electronic trade in particular, not only in China but also at the level of the world as a whole.

Solution to the Coronavirus (Covid-19) Challenge in Ecommerce

In this section of the assignment, some solutions proposed to combat coronavirus and reduce its impact on electronic commerce. According to report from centers for disease control and prevention (CDC) in United States (2020), the use of some disinfectants and sterilizers, such as alcohol sterilizers by more than 70% of alcohol, can be used to sterilize, clean surfaces, and reduce the spread of coronavirus (COVID-19)(CDC, 2020).

This paper emanates from this point of view; sprinklers can use to sterilize shipments sent with sterilizers containing alcohol by more than 70%, whether from their shipping areas or in vehicles that transports the cargoes up to their delivery to consumers. Furthermore, the promotion carried out through the video clips that are issued to clarify the sterilization process and publish it on electronic commerce sites and social media sites for spreading confidence among consumers, and the goods shipped are safe and sterile. Besides, technology can use to deliver goods to consumers, especially those who avoid contact with other people; this can achieve by using robots or drones. For example, in residential compound with a vertical construction, robots or drones can be allocated to deliver products from freight cars when they arrive at residential compounds to the places of consumer residence, after sterilization of products in freight vehicles.

Moreover, advantages can take from protective medical equipment such as alcohol sterilizers, wet wipes and masks can also be used to increase sales. It is noticeable that the supplies are scarce in the market plus the demand for them is enormous and continuous by consumers, so companies can make offers on their goods, for example distributing gifts from these types of equipment with each product that the consumer buys from their websites, in this case, the proportion of sales may increase with companies.

After the reports showed that coronavirus (COVID-19) could stay on surfaces and leaves for a long time, people began to fear using cash, and this helped increase the electronic payment transaction. Some e-commerce sites require completing the paper payment process or depositing funds through cheques in certain places or banks, as is the case in the Lazada e-shopping site. Some sellers at the Lazada e-shopping site sometimes require the payment process to be completed and payments made to 7 eleven stores and a payment receipt sent to them later. Here, can take advantage of electronic payment and make payments online electronically by credit cards or electronic bank accounts to consumers and eliminate the fear of people from dealing in paper currency.

Also, using social media to promote offers and the proposals mentioned above, spread to as many people as possible, and the purpose is to communicate to consumers the developing sterile plans ideas of companies and

ensuring the safety of their products plus reducing the risks of coronavirus, furthermore, establishing Confidence between them and thus increase their sale.

Finally, 4.0 industrial revolutions in overcoming the challenges is strong, whether using robots or drones, in the process of electronic payment or promoting protection plans on social media sites; all of these depend on artificial intelligence. Besides, it is relying on globalization represented by linking different regions in the world strongly via the Internet and technology, also publishing advertisements and recommendations through social networking sites around the world.

CONCLUSION

All the industrial revolutions brought about significant changes in our daily life and helped to get things done faster, with less effort and cost. As industrial revolutions continued, and the developments that resulted from them, life became more comfortable. With the invention of steam engines and machines and access to technology, ease has become widespread in all fields, whether in production, movement, scientific and health innovations, technology, equipment, and its massive revolution, through which the world has become more interconnected, and communication is easier and continuously.

The 4.0 industrial revolution came, accompanied by accomplishments and developments that the world had not seen before, plus the world took a trend towards digitizing things at all levels and benefiting from the smart technology that emerged from the 4.0 industrial revolution.

The results of the 4.0 industrial revolution have become apparent and widespread in several areas. In industry, factories have become dependent on robots in manufacturing processes, or through artificial intelligence that enters robotic systems that perform manufacturing processes, or in the process of digitization and converting things into digital things that traded over the Internet.

The economy has been affected and closely related to the results of the 4.0 industrial revolution, whether in a trade directly such as electronic commerce or by monitoring trade-related operations, analysing big data, and finding appropriate solutions. Finally, what the 4.0 industrial revolution reached is an extension of the previous revolutions plus because of them; moreover, the accomplishments achieved through them contributed significantly to increasing the benefit to people as the previous revolutions contributed at the time.

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