

The Corona Decade: The Transition to the Age of Hyper-Connectivity and the Fourth Industrial Revolution

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Abstract

1. Background

The COVID-19 pandemic is profoundly affecting the world socially and economically. The quarantine and isolation strategies adopted globally have advanced online trade to a new level, as people are finding new ways to provide products and services from home. Several digital tools are gaining popularity and delivery services are ramping up production to meet the increased demand. This paper analyses the current situation considering the impact of COVID-19 in technology and society.

2. Methods

The first part of the analysis consists of historical connections between epidemics and technological progress. The paper charts the impacts these have had on society and where they have come to define each industrial revolution. Finally, the paper demonstrates the impact of the strategies in social lives and the economic shift from physical to online.

3. Findings

Considering COVID-19's high impact on society, drastically altering the way the market operates, we suggest this moment as the true beginning of the Fourth Industrial Revolution, bringing with it a new historical narrative. The paper also explores the creative adoption of platforms and technologies that are driving the new revolution.

4. Interpretation

This paper takes the view of technologists members of the Transformation North West cohort working with the industry in the UK'S North West.

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Introduction

As a result of the COVID-19 crisis, several technological innovations of the previous decade have gained immense market power, and leading digital companies are now further expanding. Digital and online platforms have benefited from the lockdown, as a swarm of users and consumers have appeared online. Society, economy and culture are being abruptly reshaped and online trade has finally become mainstream. Here, we announce the Fourth Industrial Revolution and a new decade marked by the ‘corona’ disruption, brought on by a pandemic that has completely changed the system.

Epidemics and Industrial Revolutions

For design and technology, the consequences of this pandemic could not be more extreme. It has forced humanity to stop climbing the ladder of prototype technology, and to go directly to the world of stable digital design. History tells us that unprecedented events motivated the first, second and third Industrial Revolutions. The First Industrial Revolution began around the 1760s and was mainly characterised by steam and waterpower, along with advances in mechanised factory systems (1). Although the causes for this revolution are various (2), this was preceded by a series of epidemics caused by diseases such as the plague (3), which may have driven societies to invent new ways to operate. For instance, the Black Death (1348–1350) killed between a third and half of the European population, and for Britain and Italy, this resulted in a rise of wages (4). Workers earned three or four times subsistence (5) and marriage ages increased, since there were more female employment opportunities, particularly in animal husbandry (6).

The Second Industrial Revolution generally corresponds to the period of 1870-1914 (7), marked by the development of public utilities such as gas, water and sewage systems, along with railroad and telegraph networks, further leading to electrical power and the invention of the telephone. The large amount of epidemics happening throughout this revolution, such as the third plague pandemic (1899-1940) in Europe (8), several cholera pandemics and the flu pandemic (1889–1890) (9), are seen as contributors of this revolution and have motivated technological developments. Dirty and contaminated water were discovered to contribute to the spread of diseases, and this made improvements in public utilities and sanitation vital for survival. Furthermore, horses in urban communities contributed to transmission of diseases, which is argued to have sped up their replacement by automobiles in the early 1900s (10).

The Third Industrial Revolution began in the 1950s (11), highly accentuated by the invention of semiconductors, leading to the invention of computers and culminating with digital tools and the internet. These developments came after more series of pandemics, such as the Asian Flu (1957-1958 (12)) which caused millions of deaths worldwide, closing factories and causing global recession. Epidemics, as such, may have supported the need for automating factories and inventing ways to make machines operate more independently of humans.

Certainly, pandemics as well as wars and other conflicts, provoke socioeconomic consequences. The direct connection between disease and the First and Third Revolutions can be argued to be tenuous, as there is a much stronger link to the other conflicts that preceded them. However, it is clear that the Second Industrial Revolution was propelled by the need for improvements in public health due to diseases. In a similar way, the isolation strategy of COVID-19 throughout the world has had a great impact on the way countries operate. With the virus rapidly spreading worldwide, several countries have enforced quarantine and closed their borders, establishing rules of social distancing and self-isolation. This has forced people to find ways to work, consume, study and socialise through the internet, creating an economic chaos to the outdoor market and hastily transforming our ways of thinking, acting and being.

The arrival of a Fourth Industrial Revolution has been announced before by many historians and technologists (13-15). Yet, there was no event like the pandemic that could accelerate technological advances and immediately turn the market over. The cause of such a revolution is not the coronavirus *per se*; all this was expected to develop to this stage. However, the pandemic has caused an abrupt market change from physical to online, where society has had to completely reconfigure itself. The educational sector, for example, has had to rethink how to educate children and adults through dedicated technology platforms that are easily accessed from homes. The demand from businesses, now operating from homes, for easy communication has been pushing further technological development favouring conferencing software relatively unheard of prior to the pandemic and massive 5G adoption, something that had been under question due to the use of hardware developed by the Chinese State Telecoms company and scare stories around spying (16). This certainly marks a revolutionary change. For this reason, now we believe we can officially declare: The Fourth Industrial Revolution has begun, and its starting point is 2020, the ‘Corona Decade’.

Philosophy of a Transformative Chaos

Our society has suddenly become isolated and many have seen their jobs in danger. The solutions for those who are not key skill workers (e.g. medical or social services) seem limited to two main options: work at home online or work for the warehouse and delivery industry.

Who are the people losing their jobs? All workers who require physical structure and dealing directly with customers, which includes great part of the arts and entertainment sector (artists, galleries, performers, etc.), the education sector, salespersons, hospitality, the whole tourism sector including airlines and hotels, the sex industry, personal service workers such as decorators, plumbers, hairdressers... the list continues extensively, addressing all industry sectors (17). If there is dependence on mobility, the job is at risk. A report from the UN estimates that up to 24.7 million jobs could be lost (18). However, society must not stop, consumers must still consume so delivery must continue, and therefore, there will always be those who will keep old patterns alive. We are living through a dramatic reshaping of society consisting of online work and study. If drones were more ready to be utilised for delivery, human activity could be even more suppressed.

For those people forced to go the route of an online business, skills for acquiring specific tools and managing online marketing is indispensable. This has provoked new technological demands; faster connection services (leading to rapid 5G adoption), faster computers and webcams. Those items, among others, increased their market value following the crisis. As an example, the shortage of protective masks was soon followed by a shortage of webcams (19). The education sector suddenly relies on this technology, and thus thousands of teachers around the globe must consider investing in new digital equipment. Yet, to compete in a saturated online market, high quality media and internet speed is crucial, which means consuming equipment and services that are not always affordable.

The chaos opens the curtains on the 20s decade; announcing a drastic shift in our common way of living. The steep increase in internet traffic is further proof. It is evident that this data has increased exponentially since the first quarantines. Digital streaming platforms such as Netflix and Disney Plus are limiting high definition content in Europe so that bandwidths can cope with increased demand (20-21).

We are now noticeably more financially dependent on the internet and its digital tools. Cash is history. It holds the risk of virus contamination and, now, more complicated, physical,

distribution. The total shift online has been predicted many times over but until now had been slow to come about. It has been a key strategy of capitalism: multinational online companies such as Amazon taking over physical shops, supermarket chains improving their delivery services, online banking, and the arrival of 5G. Despite the predictions, the change had not quite happened, until now. The transition has taken place with no warning and all digital resilience has been suddenly lost.

One example concerns the elderly population, those who did not have connection to the online world, who still paid bills by visiting the bank and post office. By unfortunate coincidence, the elderly population seems to be the most affected by this virus. These are thousands of senior citizens who are getting excluded from the digital turn of society as they no longer comprehend how it works. In isolation, people who have ignored digital platforms such as WhatsApp and social media see little choice but to reconsider adopting new ways of communication.

All of the extra expenses that can be attributed to the digital shift of home supply, compared to all jobs at risk, point to a global recession (22). However, it goes beyond that, we are seeing a societal shift to a single economic model of online work, especially for the tertiary industry. The virus situation will be temporary as solutions and vaccinations are brought forward, but the changes are bound to remain. Who will invest in an offline business after such an event? It is true that this disease can be contained or eradicated soon, however, the risk of other similar threats in future remains and the world must be more prepared for such events. Whereas the digital dependence can be reversed after recovery, it is unlikely it will return to the same state it was before the pandemic.

Global Cocoons and the Worldwide Transition

As many countries adopt quarantine strategies and the global society adapts to online solutions, we see a stage of change and transition. The worldwide strategy dilemma has divided the priorities between economy and health. This decision can drastically change the current economic position of all affected countries. Governments that better respond with economic tools to protect employment, income and demand, who are providing effective methods, may guarantee a better economic future after the outbreak. However, prioritising the economy is not a straightforward option, especially for countries with public health systems that cannot cope

with large or concentrated influxes of cases, as a weak public health system during a time of chaos can also profoundly impact the economy.

What must also be considered in mitigation strategies is digital infrastructure. Quarantining the population means an increase in the use of digital tools, from production to consumption. Although countries have been adopting different measures, most countries in the world have encouraged remote working and the closing of schools. Financial support for online working has been provided in Italy and Japan (18). In other cases, like Greece, a proposal for developing digital skills – customer service, technical support, etc. – was considered at the onset of the pandemic but eventually not applied (23). Nevertheless, this makes the need for training and transition more evident, moving individuals from not using or using some digital tools to becoming efficient in operating daily chores and vocational responsibilities remotely and online.

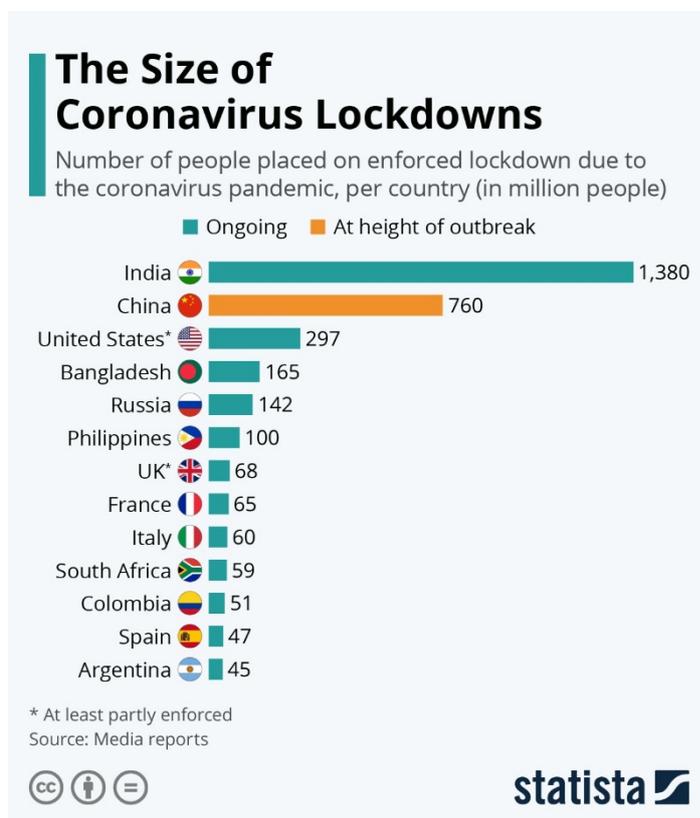


Figure 1. The Size of Coronavirus Lockdowns (26).

Media reports data (24) that shows a great part of the world’s population has entered a lockdown state, where the tendencies are to socialise and work online. As the event prolongs for longer than a month, the likelihood of a restructuring of socio-economic patterns on global scale is high. However, it is important to consider that a restructure might not be true to

all parts of the world. Countries or regions that lack digital infrastructure and technology might have more difficulties confronting COVID-19, and as such, many countries may not participate in such a transition as described here. Yet, this event reinforces investments and developments in digital technology, which in a few years might lead to the same paradigm shift in harder to reach regions. It is important to remember that the previous industrial revolutions did not exist in all parts of the globe concurrently (25). However, in the current scenario changes are happening in all industrialised regions through several means of communication and international relations.

We, here, take into consideration the concept of ‘revolution’ as the hasty and precipitous restructure of a society, which happens for almost urgent reasons. Countries that responded with immediate measures for encouraging online working and that already had a high-end digital structure in place are likely to be transiting towards revolution. According to the Harvard Business Review, countries on the frontline of digital business are the US, the UK and the Netherlands (26). The list ranks countries for their digital capabilities such as banking, retailing, media and skilled freelancers. These are countries that can function through a wide range of online services and have efficient delivery services. At the bottom of the list we see Indonesia and Russia, countries that might struggle more to find digital solutions and thus will not operate similarly in this historical shift.

Hyperconnectivity and Possible Futures

During this period of rapid transition, workers will become more accustomed to flexible working. Through the realisation that workers no longer need to waste time on the daily commute, and perhaps a greater appreciation of their homes, we could see a move to more creative pursuits and a return to the old adage from the Second Industrial Revolution: 8 hours for sleep, 8 hours for work and 8 hours for play. We may also see a change to the week/weekend dichotomy. Even prior to the house-isolation measures, services such as groceries or product deliveries were already in place throughout both the weekdays and weekends with normal working hours. However, these services have now received a significant higher demand, consequently changing the habits of many shoppers and attracting new customers. This has substantially increased the number of people connected to the online market.

As the world is counting the weeks in the ‘work from home’ setup, there are certain changes in human behaviour regarding work and leisure to be considered. These changes relate

to aspects of flexibility, overtime, management and motivation. We are seeing that people tend to keep a more flexible and loose working schedule. This is to cope with responsibilities at home as they occur (home-schooling children, carer responsibilities, household emergencies). While they may compensate with the time gained from not commuting, this in turn requires certain skills of self-management. It would also require a new approach to arranging meetings, making deadlines and tracking excess of working times in the hierarchical levels of different professions.

Online services are now becoming more frequent and accepted. As a result of the imposed quarantine measures and the new rules for supermarkets, which include long queues for grocery shopping, more consumers are registering online (27). It is likely that after the pandemic crisis people will continue to online supermarkets for groceries.

Video conferencing tools have become crucial since the beginning of quarantine and there has been a boom in previously underused platforms such as Zoom (28). Without cinemas, restaurants, cafes and clubs for socialising, online platforms such as cloud clubbing and film/music sharing have been in higher demand (29).

Digital tools and skills are becoming critical for career development in all sectors. In the entertainment business, for instance, many artists have experimented with online performances, and funding is being offered to create computer-based experiences. Online platforms have expanded their capabilities for audience interaction and have improved features to assist digital concerts.

The current latency issue musicians have for playing remotely in synchrony will be replaced by ultra-low-latency connections with the rise of 5G and WiFi 6. This will allow a new range of creative interactive collaborations and engender more digital music platforms. Furthermore, it is possible the new decade will have an increased number of YouTubers as the profession becomes more valued and competitive. The digital culture of microcelebrities will rise further and will be levelled with other media channels. The online shift has also increased interest in joining VR platforms to experience virtual tourism through online galleries and museums (30). There has been a surge in connectivity as more people have joined the connected world since the start of the pandemic; we can say now we are 'hyperconnected'.

There is another consideration to be made. The limitation of personal services during quarantine and the longer stays at home could have an impact on domestic affairs. As people settle into life at home, we could see a return to old skills; craft and repair projects that have

been growing dusty on shelves will suddenly look appealing once all the streaming content has been consumed. The internet is replete with sites to help us to repair and create, and older relatives might delight in the chance to demonstrate cooking, sewing or woodworking skills, for example (while possibly learning about video making themselves). In Europe, as this crisis is developing during the start of spring, many people will make attempts to grow their own food in light of the supermarket shortages and inevitable supply chain disruption. This has also coincided with parents being forced to educate their children. Parents who could now be looking for easy, home based activities, which could result in a generation of people with traditional skills that were almost lost to the generations before them.

Further research

There are a number of areas of research that this paper could lead to. The steps that governments might take to tackle this pandemic may endanger public privacy and new concerns will continue to emerge as governments seek to prevent future pandemics. There will also be the potential for research into skills acquisition and moves towards self-sufficiency during this time, which could be complemented by research into a phase in experiments in governance and social welfare models.

Conclusion

Through this paper we have proposed the COVID-19 event as a historical mark. One that is reshaping society by motivating a number of industrial sectors to move to fully online operations and changing the face of work for millions. We have compared this to previous industrial revolutions, elevating the current crisis to a catalyst for a Fourth revolutionary phenomenon; an event that has the potential to characterise the whole next decade. The current state of quarantine of several countries has been seen as a transitional phase which can have profound socio-economical consequences and a large impact in global society. Estimated changes in society have been expressed in possible futures, as the digital market and technology continues to be impacted by the pandemic. The decade of 2020s will greatly differ in many aspects from the previous two, spawning a whole new cultural generation that functions through live virtual interaction.

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