

COVID-19 and Digital Transformation

Subjects: Business

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COVID-19 is a driver of digital transformation. Technology, automation, and collaboration (TAC) is the most positive significant factor which enables work from anywhere (WFA) (or work from home) arrangements and also leads to the third positive factor of a work-life balance (WLB). The top three negative factors are no work-life balance (NWL), social employment issues (SEI), and data security and technology issues (DST). While the pandemic situation is leading to a positive situation for economies and organizations at a micro level, the negative impacts, which will affect overall economic growth as well as social, health, and wealth wellbeing, need to be kept in mind.

Keywords: pandemic ; COVID-19 ; digital transformation ; work-life balance ; work from anywhere

1. Introduction

The year 2020 was a pandemic year for the whole world, since COVID-19 affected everyone's lives during that year. COVID-19 is a disease involving a coronavirus ("CO" stands for corona, "VI" for a virus and "D" for disease) ^[1]. COVID-19 has had adverse impacts for almost three quarters since the World Health Organization's (WHO, Geneva, Switzerland) announcement regarding the disease on 30 January 2020. The COVID-19 virus is a severe acute respiratory syndrome related virus ^{[1][2]}. Entire economies are trying to overcome the pandemic it has caused because it is a life-threatening issue for every nation. As mentioned by the WHO, COVID-19 is one of the most serious global pandemics, akin to the Spanish flu ^[3]. Under the prevailing circumstances, there is no solution available to end or control this pandemic and the only solution is to follow the WHO guidelines as much as possible ^[3]. Notably, there are vaccines such as the Pfizer and Moderna vaccines which show efficient and promising results, as was mentioned by the WHO. Moreover, Canada and many other countries have started vaccinating their senior citizens, and they are expanding their vaccine roll outs to cover their entire populations, based on the latest news on the topic (15 December 2020). As per the prevailing circumstances, there are 50 vaccines that are currently in trials and the WHO is working with scientists and health organizations worldwide ^[3].

Digital transformation (DT) has been defined in many ways, but generally it is the use of information and communication technologies (ICT) along with their benefits ^[4] to change business operating models, products, services, and organizational structures to obtain a competitive advantage. According to Vial ^[5], "DT is a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies". There are other definitions of DT ^[6] such as an "opportunity to create a new business model". The expectations and benefits involving DT are somewhat broader ^[7], since it is expected to trigger changes in customer experiences, customer serendipity, business growth, increases in customer touchpoints, changes to operating models, and so on.

DT is quite disruptive, as it changes the way that businesses operate and deliver goods and services to the customer. DT has played a major role in daily business operations during the last three-quarters when the COVID-19 pandemic was in effect. Hence, it is crucial to study the correlation between COVID-19 and DT. Given the negative impacts of COVID-19 on DT, whether we like it or not, survival is essential and even if businesses cannot operate normally, we have to return the business sector back to normalcy where possible ^[8]. Businesses are not operating as expected, as they are constantly being affected by the state of this pandemic. The ways that businesses are constantly being affected is pushing us towards a broader global recession, and hence there is a great need ^[9] to take some effective steps now for the economic well-being of mankind. Tax reform and collection processes are being delayed ^[7], as the "digital link" deadline for making tax digital (MTD) is no longer a high priority. COVID-19 is initiating indirect tax and digitalization on tax functions temporarily ^[7]. Due to COVID-19, tax reformation, collection processes, underlying IT systems, and tax policies are being changed temporarily ^{[9][10]} at the macro level, which is a burden to citizens and at the same time is difficult to use to maintain the sustainability of the economy. In addition to tax reform for individuals, there are concerns involving tax reform ^[11] for the top billionaires or large players such as Google, Amazon, Facebook, and Apple (GAFA). Even though the world

risks being affected by a broad economic and democratic recession due to the pandemic, tax obligations on GAFA have not been affected and their contribution is currently just 0.2 percent of their wealth ^[11].

The economic and social wellbeing of mankind is greatly affected by the COVID-19 pandemic in part because the insurance market is also being affected by COVID-19 ^[12], which is a serious concern for social security at the macro level. Because customers are constantly being locked down and, therefore, are strongly affected by the pandemic, a change in digital business models and related technology components is needed to do business while the pandemic persists. In other words, contactless payments can be very much expected to increase under current digital business models ^[13]. Another emerging situation in the field of education is to figure out the best way to resume schools, at least online, which requires online learning platforms, changes in the learning process, and the provision of e-contents ^[14]. Furthermore, the current role of teachers and students are also to be changed. Because schooling is one of the basic needs for the next generation, COVID is beginning a change in the school operating model. Keeping these technological changes in the teaching methods, the related political issues should be resolved as soon as possible. Unlike a local disease, as this epidemic is widespread, the expectation at the macro level is a world of intercultural relationship and unity ^[15]. As the economy is fully affected, there is an identified unfair and deceptive trade service ^[16]. The business sector has identified internal risks and changes in external market conditions ^[17] to be mitigated as well. In addition to the economic ^[8] issue, social threats and changing communication practices (telecommunication) are retarded ^[18] by the COVID-19 situation. Since the proliferation of technology, information usage and security risks are high. The business and data are subject to phishing and loss of information ^[19]. Data centralization is very much expected ^[20] as the information is needed everywhere and anywhere to be accessible to employers and employees. Another economic issue of reduction in trade interconnection ^[1] is also identified as the impact of COVID-19.

As COVID-19 is something serious and affects every citizen in the entire world, DT is somewhat of a buzzword that most of the business and community sectors are talking about. As reviewed in the literatures cited in the above section, COVID-19 is leading to both negative and positive impacts in the DT journey. However, it is unclear whether the positive impact is on social and economic wellbeing, and at the same time the extent of negative impact is unclear. As COVID-19 is impacting everyone and everyday life, including businesses, DT is one of the key players which drive virtual business and social community. COVID-19 has many effects in both positive and negative senses.

2. Positive and Negative Impacts of COVID-19 in Digital Transformation

2.1. The Negative and Positive Impact on DT Due to COVID-19

The following are the consolidated negative impacts on DT which are due to the COVID-19 pandemic (**Table 1**).

Table 1. Negative impacts on digital transformation (DT) due to COVID-19.

Item #	Negative Impact on DT	References
1	Reformation of the tax system and other IT components in tax specific services Digitalization in the tax function	[7][11]
2	Delay in digital link deadline for making tax digital (MTD)	[21]
3	The expectation of the digital learning platform and digital ecosystem Expected innovation in the way business is conducted through information and communication technologies (ICT) usage Lack of digital literacy	[8][22]
4	Tweaking IT systems of additional catastrophic requirement Better communication channels Expected new IT skill and platform for crisis management	[10]
5	Expected contactless payment system Expected digital business model Contract tracing as a digital nurse	[13][22]
6	Expected online learning platform and online e-contents	[14]
7	The emergence of data and insight Virtual technologies Telecom practice	[17][18]
8	Mitigating risk such as phishing attacks	[19]

Item #	Negative Impact on DT	References
9	Expected telecare/telemedical service	[10][23][24][25]

Looking at the positive impacts of COVID-19 in driving DT, there is a pressure to enable a digital ecosystem, digital learning, and agile business models [8] for business survival and sustainability. As identified by Sathya Nadella of Microsoft [26], keeping the future in mind, the skill of DT is growing extremely fast. This is indicated by the emergence of new opportunities in businesses [27][28][29] such as 5G, proliferated use of AI and ML, filling gaps in B2B2C and B2B, and retarding cultural change by collaboration and strong expectation or potential for quality management. There are a lot of other IT-related business opportunities [30][31] in the space of IoT such as predictive analytics, cloud computing, healthcare, mobility, social media and collaboration, use of automation platform, robotics, medical imaging [32][33][34], wearables, and so on. Furthermore, trade interconnection, telepresence, telecare, and telecommunication have other positive effects on growth [1].

The management of disaster, pandemic, and emergencies are leading to tweaking the IT system [9] which is a positive impact on driving DT. Digital learning and digital ecosystems were part of the competitive factor, whereas they are now the basic requirement for most of the economies since education and schooling are very much impacted [8][35]. The following in **Table 2** are some of the positive impacts to drive DT but are not limited to these.

Table 2. Positive impact to drive DT.

Item #	The Positive Impact to Drive DT	References
1	The emergence of the digital ecosystem Digital learning platform Digital handshake between student and teacher	[8][14]
2	New business opportunity to tweak the IT system New pandemic management system The emergence of telecare service	[7][9][36]
3	Ecommerce and contactless payment system	[13]
4	Digitalization of tax function	[7]
5	Virtual technologies, technology-based development, AI, and ML Proximity deduction using Bluetooth devices	[17][22][27][28][29]
6	System of collaboration management System to manage emergencies, pandemic, safe distancing monitor Hazard detection	[37][38][39]
7	Centralized data management and big data system	[20]
8	Network, cloud, social media, IoT, and wearables	[31][38]

2.2. Frameworks for Technology Adoption

The TOE model [40] was looking at the technological, organizational, and environmental context to identify the influencing factor on innovation and adoption, whereas innovation diffusion theory (IDT) [41] was focusing on economic, social, and communication contexts within the organization. Similarly, the MOA model [12] has been widely applied in the management disciplines, whereas motivation refers to a willingness to act; opportunity refers to the environmental or contextual mechanisms that enable motivation and the ability refers to the individual's skills. RBV theory [42] is one of the classical theories in the information systems based on Edith Penrose's (1959) theory of firm growth. Moreover, RBV focuses on the resources in the form of products, people, and processes. Moreover, the technology-acceptance-model (TAM) [43] focuses on the acceptance and adaptability of technology by an individual in the organization, whereas the unified-theory of acceptance and use-of-technology (UTAUT) focuses on the user intentions towards information systems [44]. Each of these models has unique factors or constructs as it is meant for such specific usage in technology acceptance, diffusion, and usage. Our study is looking at this model differently by allowing respondent to free flow positive or negative attributes and perform meta-analysis to look at the appropriate factor/parameters for further hypothesis. The outcome of this approach will be leading to factor identification and modeling definition for this study. The resultant model and hypothesis will help to test the research questions with the respective hypothesis.

2.3. Discussion

COVID-19 disruption is leading to technology adoption and disruption in the form of automation and collaboration [8][14][31]. In addition to TAC, COVID-19 is leading to working from anywhere [45] which removes the geographic barriers and office dependency. The geographic barrier may help to improve employment in developing countries. DT is enabling WFA as it depends on technology but removes brick and mortar kind of work culture. TAC (responses: 151) leads to WFA (responses: 134) which leads to WLB (responses: 21) as per descriptive responses. The vision of anywhere and anytime is not new [17] as it was visioned in the early 2000s. WFH leads to connecting employees 24 × 7 through mobility [46] or even sometimes connected through collaboration platforms 24 × 7. WFA has a direct negative effect on work-life balance as responses for NWL is 196. This is more than each of every other factor. Of the respondents, 21 reported that work-life balance was good, but 196 responses indicated a lack of work-life balance, which is quite alarming as NWL is leading to social issues.

It is important to mitigate social issues arising from NWL balance [47] by having a work schedule in a controlled manner. Many studies are suggesting having a better work-life balance [48] for health and wealth wellbeing. NWL is [49] rated highly satisfied by the young and old age group of employees but not by the middle age group. This study [49] was done during 2002, but our study shows that the majority of responses says NWL is rated high even though 79 percent of the respondent profiles have more than 10 years of employment. This means that over a period of time work-life balance deteriorates as a result of disruptions like COVID-19 together with the mainstreaming of digital technologies.

3. Conclusions

There is no doubt that the testing of H1 proves that COVID-19 is the driver of digital transformation. Further analysis relating to H2 and H3 proves that the significance of positive impacts is greater than negative impacts. These impacts are directly related to employment and workplaces as the study is among employees. The study shows that technology, automation, and collaboration (TAC) is rated high within positive impacts of DT. This is then followed by working from anywhere (WFA) and new business models (IBM) in positive impacts of DT. This pandemic disruption cannot be avoided as business needs to continue as usual to some extent and it requires employees to work from home or anywhere. WFH or WFA require fundamental technology (TAC) to allow seamless working with the coworkers and customers. Technology, automation through technologies, and collaborative technologies are the important IT platforms as needed for every employee in the organization. Not only for employees, but eLearning acceptance [50] by students proves that COVID-19 is enabling DT directly. Changes in operation or business model [51] is very much driven by DT in the form on industry 4.0 in COVID-19 situation. TAC is one of the positive outcomes of COVID-19. The next significant factor is WFA which is expected to be a new normal in the COVID-19 situation. Overall, COVID-19 brings positive impact in WLB, WFA, and TAC. There will be some form of change in the business model or IBM is expected while the respondents rated work-life balance as a positive change. The contribution from this study is that DT is important to mitigate the pandemic situation as business needs to run as usual. Since the pandemic is widespread and global, employees need to connect globally which requires collaborative technologies. This study informs employers and businesses of opportunities as new business models have emerged to mitigate the pandemic. The study also informs employers that mitigation in the form of technology transformation (DT) is a must for employees or even customer connections.

On the other hand, there is negative disruption as descriptive statistics show the negative impact in the COVID-19 situation since base-lined of NWL (no work life balance) = 1.00 as fixed parameter. This indicates that employee work-life balance is affected and important to be recovered by maintaining due diligence of employee engagement in the pandemic. It is important to engage employees within office hours and give room for balancing their life. NWL leads to social and employment issues (SEI = 0.32). The contribution of this study indicates clearly that employers must maintain due diligence of engagement to maintain work life balance. This will also improve social and health well-being. Societies, organizations, and economies are to be mindful of social and health well-being while using positive disruption as opportunities.

Looking at the result and implications, a qualitative study can be done once the COVID-19 regulations are relaxed. If the disruption of the pandemic in DT impact needs to be studied for specific regions or economies, this study's approach can be extended further for specific regions or economies. As the study is specific to the COVID-19 disruption in DT, it may not be directly related to other types of pandemics as the nature of disruption may vary.

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