



# Impact of COVID-19 Contagion on Digital Transformation and Economy

**James Kunle Olorundare<sup>1</sup>, Christian Ngozi Ahiauzu<sup>2</sup>, Aderonke Favour-Bethy Thompson<sup>3</sup>, Adebimpe Olubunmi Olorundare<sup>4</sup>, Oluwafemi Emmanuel Ekanoye<sup>5</sup>, Adebunmi Akinbo<sup>6</sup>, Abiodun Ayorinde<sup>7</sup>**

<sup>1</sup>Next Generation Technologies and Standardisation Unit, Nigerian Communications Commission, Abuja, Nigeria

<sup>2</sup>Information and Communication Technology Center, University of Port Harcourt, Port Harcourt, Nigeria

<sup>3</sup>Cybersecurity Department, The Federal University of Technology, Akure, Nigeria

<sup>4</sup>Information Technology Department, National Open University of Nigeria, Abuja, Nigeria

<sup>5</sup>Office of Government Contracting and Services, Southern University and A&M College, Louisiana, USA

<sup>6</sup>Internet Society Nigeria Chapter, Abuja, Nigeria

<sup>7</sup>Blockchain Research Department, Blockchain Republic, Lagos, Nigeria

## Email address:

olorundarek@ncc.gov.ng (J. K. Olorundare), christian.ahiauzu@gmail.com (C. N. Ahiauzu), afhompson@futa.edu.ng (A. Favour-Bethy T.), bolorundare@gmail.com (A. O. Olorundare), oluwafemi.ekanoye@sus.edu (O. E. Ekanoye), femiekanoye125@gmail.com (O. E. Ekanoye), adebunmi.akinbo@gmail.com (A. Akinbo), abiodun@blockchainrepublic.xyz (A. Ayorinde)

\*Corresponding author

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**Abstract:** The novel COVID-19 compelled an unannounced and indefinite holiday in the world with a ripple effect of the global economy downturn. As a result, businesses all over the world have been forced to devise business strategies with minimal negative impact from COVID-19. Since there is no timeline as to when the COVID-19 will end, this paper seeks to empirically examine the COVID-19 impact on the traditional economy vis-a-vis digital transformation paradigm shift in the economy ecosystem leveraging on digital channels. Digital transformation can only be implemented based on the availability of digital channels with developed countries having advantage of readily available infrastructures to accelerate the implementation of digital businesses during the COVID-19 pandemic as compared to growing economies. To this end, two surveys were conducted to ascertain COVID-19 effect on the traditional economy as well as the paradigm shift to digital transformation. The first was the qualitative survey which was analyzed based on Key Research Questions which were transcribed and analyzed from focus group discussion. The second survey establishes the fact gotten from the quantitative survey from Survey Monkey platform. The ggplot2 package in RStudio platform was used for the data visualization using R programming Language enabling the data analysis for a technical evaluation.

**Keywords:** Digital Transformation (DX), Telecommuting, E-Commerce Services, Virtual Events, Internet of Things (IoT), COVID-19, International Telecommunications Union (ITU), 4IR (Industry 4.0), Sustainable Development Goal (SDG)

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## 1. Introduction

Digital Transformation (DT or DX) involves the use of new, fast and frequently changing digital technology to solve

problems that may include economic, social, and even governance. This can be said to be underway in some climes but the challenge is that it is not proceeding at the same speed everywhere [1]. Each clime tries to move into digital (era) transformation at a unique pace. However, with the COVID-

19 pandemic, most countries consciously or unconsciously have stepped up their digital transformation game because of the reality that the economy is already moving down the y-axis [2].

The discussion on digitalization is trending based on practical importance for governance, economic business, and human social lives. This is also connected to community development, politics and global international relationships. This paper discusses the COVID-19 impact on the traditional economy and the 'new-normal' COVID-19 has pushed us into digital transformation with the future of economy which is fully digital.

From here the next section discusses the secondary research as literature review in Section II. This is followed by Section III which deals with research methodology which is divided into two viz; primary and secondary research. Primary research consists of qualitative and quantitative analyses. The qualitative analysis is a group of Research Questions administered through an experts' focus group on the subject matter across the continents (Europe, North America, Africa, Asia/Middle East) since the research has a global focus based on COVID-19 pandemic. Also, the quantitative survey was carried out on Survey Monkey and analyzed in the R Studio using R Programming Language to plot ggplot of the data obtained from the survey. The secondary research is the reviews of existing studies.

Data analysis was done in Section IV based on the focus group discussion of primary research for qualitative survey and ggplot was plotted for the quantitative survey. This also help in identify the gap in the knowledge as the pandemic is novel and researches are just coming up to establish how to cope with this type of pandemic using digital channels. This is followed by use case in Section V. The recommendations of our findings based on analyzed data were done in Section VI which precludes the concluding Section VII.

The aim of the paper is to examine the impact of COVID-19 on the traditional economy and to also assess the impact of COVID-19 on the adoption of digital transformation for economic activities. And the reason for the research is the fact that COVID-19 has shut down the economic mainstay of many countries and it is logical to start looking at the changes that COVID-19 has brought into our lives. The scope of this research is quite global since COVID-19 is pandemic. Consequently, we have adopted a mixed methodology to be able to get experts' opinions in different regions of the world in both Quantitative and Qualitative Surveys conducted. As we move into the next stage of the economy due to the paradigm shift through the digital transformation, E-Commerce, virtual events, telecommuting, cloud services became major pillars through which we run both major and minor businesses and the final print of Industry 4.0. It is key that the issue of cybersecurity is seen as a major factor that will affect digital transformation as security is critical.

## 2. Literature Review

### 2.1. *The COVID-19 Advent*

The Covid-19 pandemic outbreak that has affected the entire World since December 2019 made WHO to declare COVID-19 a pandemic on March 11, 2020; this was projected to spread across the world, with the observation that governments, businesses, and individuals have substantial ability to change the disease's trajectory [3].

It is evident that the impact of the pandemic will be enormous on small and mid-size companies' global shutdown. Kraus et al, 2020 empirical study COVID-19 crisis effects on family firms aiming at firm crisis management reported findings of the very short pandemic period, that the pandemic has not only claimed numerous lives worldwide but also caused severe limitations to daily private as well as business life with high impact on Small and Medium Enterprises (SMEs). The study with exploratory qualitative approach using semi-structured interviews with key informants of family firms of all sizes Western European countries that are in different stages of the crisis. The pandemic signifies a new type of challenge for companies. These companies applied measures that can be assigned to three different strategies to adapt to the crisis in the short term and emerge from it stronger in the long run. Study findings depicts how companies in all industries and of all sizes adapt their business models to changing environmental conditions within a short period of time with a major discovery of massive shift towards tentative digitalization for survival and sustenance while making effort to enhance the requisite operational and resilient realistic strategy for the new normal routine. [4]

Saracco, (2020), projection on the shared and gig economy revealed gradual growth of the human cloud business with respect to the world Gross Domestic Product (GDP). These figures are relatively small with respect to the world GDP, estimated in 86 trillion \$ with 140 trillion \$ – different purchase value in different countries. However, the expectation is to witness an increasing weight of the platform economy on the world GDP. The 2023 projection according to a recent International Data Corporation (IDC) report; digital economy supremacy is evident and this is based on the threshold produced by companies that have undergone the digital transformation producing 50% of world GDP. Tactlessly, Covid-19 has changed this scenario, with a high and hard impact on the platform and shared economy that have been disrupted by the pandemic.

### 2.2. *A Call for Digital Transformation*

The 4IR hinges on digital infrastructure that occupies a strategic position now more than ever. Various studies have established the upturn of human behaviour and changes in the modus operandi of various economic sectors such as public health, economic, social, and technological trends the advent of the pandemic across countries in the world with respect to the global supply chain. Staszkiwicz et al.; 2020 elucidated on various countries' impact of COVID-19 in an empirical study on factors affecting contagion, and mortality. The study

presented social media and financial markets analyses with countries data set across the globe from December 31, 2019 until March 31, 2020. The observation from the classification tree regression and cross-sectional regression models revealed that severity and contagion speed; financial markets and social media response; differ within and across continents. However, the major common factor to all is deployed tools to execute the supply chain as the pandemic contagion increases with measures to curb the spread and still sustain citizens and the economy. Therefore, SMEs have to be proactive to ensure that business and financial flow are not totally cut-off. Thus, the decision of these operators in these sectors to leverage on digital technologies which in turn drives the digital transformation. The study outcome supports policymakers with robust information suitable for resource allocation, this is only applicable to developed nations. However, the study failed to integrate the experience from the developing nations where her major economy drivers are left with the options of how to optimally manage available, if any, scarce resources.

Although the long-term significance of the infection will depend on the degree of qualified support staff shortage as pointed out by the global supply chain distortion in terms of generic drugs [5]. Drug is not the only required item for citizens upkeep, thus, Wang *et al.*, position is supported by strategic supply management of other items relying on alternative costs of the globalization of the supply chain distortion. [6]. All these lead to rapid digitization of services, while reshaping digital transformation with respect to individual country which is opined to counter the submission of wave of bankruptcy and insolvency outbreaks [7-9]. While, macroeconomy might struggle with the efficiency of the monetary and fiscal measures in a low-interest rate and high budget deficit environment, it is opined that the gradual or full deployment of digital technologies, leading to the digital transformation will reduce these impacts and converge on the likelihood of COVID-19 fast-tracking virtualized economy on digital infrastructure.

Robust telecommunications network is important for economic growth and constitutes a significant portion of the world's economy as well as improves productivity and efficiency in other sectors. In some ways, the present technological shift is traced to a huge digital transformation that is already well underway. In a period of days, almost any process that could be rapidly digitized has been virtualized: video conferencing enabling a case discussion and telemedicine enabling remote diagnosis and treatment, even law delivering judgement; the New York Stock Exchange just closed its trading floor and has moved to electronic trading [10].

A modernization of social, economic and democratic institutions, as well as greater public-private collaboration are required [11]. Although, it is opined that these might have inherent risks which must be tactically and collectively mitigated by governments and businesses via regulatory models and policies that yield economic developments and innovation. It is also noted that fair competitions among investors as well as users' rights

guarantee the agility of intervening authorities to realizing a sustainable digital economy that is capable of transforming various revenues sector of the country; hence the necessity of maintaining adequate standard frameworks, it will in other hand, foster sustainable digitalization in spite of its inherent environmental complexities.

Thus, digital transformation brings a fundamental change in all spheres of human society, prompted by the use of information technologies which can be applied in the economy, but also in different segments of society, such as public rights, entrepreneurship, education, medicine, mass communication and agriculture [12]. It is clearly evident that digital transformation must be a continuous and comprehensive process that encompasses different spheres of society. Thus, any nation that seeks to toll its route, in attaining the ITU's 2030 Agenda for Sustainable Development Goals, can beckon on ITU's effort and reliable commitment of achieving a better-connected world. These SDGs could be realizable on the short and long run of the digital economy; SDG 3: Good Health and Well-being, SDG 4: Quality Education; SDG 8: Decent Work and Economic Growth; SDG 9: Industry, Innovation and Infrastructure; SDG 11: Sustainable Cities and Communities; and SDG 17: Partnerships for the Goals

Caping it all, COVID-19 pandemic has swept across the world at breakneck speed, impacting not just global financial markets and businesses but disrupting every aspect of human daily lives with long-lasting implications global economy [13]. As COVID-19 continues to spread around the world, more and more enterprises will miss their financial targets because of supply chain disruptions and dampened customer demand [14]. Reflecting this obscurity, this section outlines the overall problems and solutions.

### 3. Research Methodology

The research methodology is based on two matrices of Primary Research and Secondary Research.

A. The Primary Research was based on both Qualitative and Quantitative Surveys. The Qualitative Survey was conducted using experts in the field who were selected from North America, Europe, Africa, Middle East, and Asia and were interviewed to get their views and opinions on the Research Questions (RQs). This survey was discussed in Section IV and the data was transcribed. The research was conducted through online interview of 5 interview respondents and their responses were analyzed and grouped into categories. As such, it was established that a point of theoretical saturation had been attained. The 5 interview respondents used different words in explaining the same thing. So, the data collection at this point of the research was ended. The research team could not access NVivo and improvisation was made by "play and listen repeatedly". And to compliment this limitation, a quantitative survey was conducted using Survey Monkey [15]. The data from this quantitative survey was analysed in the RStudio using R Programming to plot ggplot. The data obtained from the quantitative survey are tabulated below:

**Table 1.** Summary of Quantitative Survey.

	Yes	No	Partially	Respondents
COVID-19 Awareness	97.98%	0%	2.02%	99
Digital Transformation Awareness	68.69%	6.06%	25.25%	99
Impact of COVID-19 Pandemic on (National Economy, Businesses, Organisation, Education etc)	81%	2%	17%	100
Effect of Lockdown order on (National Economy, Businesses, Organisation, Education etc)	89.59%	5.41%	15%	100

From the above table, total number of respondents for question on COVID-19 Awareness was 99 while 100 respondents answered the question on Impact of COVID-19 pandemic on National economy, business, education etc. The quantitative analysis was done using R Programming Language for plotting ggplot for better data visualization of quantitative analysis in Section IV. B.

B. Secondary Research was also conducted through the review of existing literature and journals in order to get up to date information and to identify the gap within the body of knowledge that this research addressed. From the review, the review showed that the COVID-19 is novel and there is need to establish how to manage the economy vis-à-vis COVID-19 pandemic.

#### 4. Data Analysis

The purpose of this qualitative aspect of this study is to explore the various impact of digital transformation during and after the COVID-19 era. A qualitative aspect of this study was proposed based on the need to seek the opinion of experts on the topic and other factors within the digital transformation ecosystem as described in Section II above. The main aim sought response to the following Research Questions (RQs).

RQ1. In your opinion, how has COVID-19 impacted education e.g. more schools have moved online to complete academic semester and session?

RQ2. How has COVID-19 impacted the way we work? E.g. because of stay at home and lockdown due to COVID - 19 many offices have started working online?

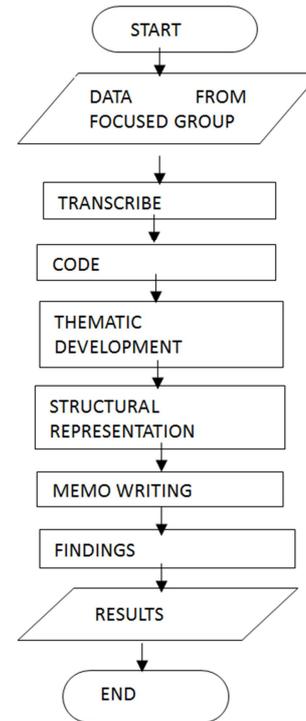
RQ3. How can digital economy and transformation help to suppress economic depression due to COVID -19 impact e.g. Online Banking activities, Electronic Commerce-buying food, essentials and other articles online to keep the economy going?

RQ4. What will be the impact of COVID-19 in pushing us to have a quantum thought, actions, and plans towards digital transformation/economy?

RQ5. What way can digital economy/transformation assist in reducing the effect of COVID-19 on the traditional economy?

The process used for the analysis of the qualitative data is shown in the Figure 1 below, which include transcribing the recorded focus group discussion followed by Coding. The codes transcribed from the interview was grouped into five categories; Adaptation, Adoption, Impact, Development and Shift. The unedited codes as transcribed from the interview and also grouped into sub-category. Downsizing and reframing of the initial codes for the purpose of easing analysis and avoiding repetition. All codes that represent same expression are been reframed to a single code (sub-category) and refined to core categories. based on which Thematic development is done. This lead structural representation. This is followed by

memo writing which leads to findings and the results which were included in the conclusion and recommendations.

**Figure 1.** Flowchart of Qualitative Analysis.

##### A. Memo writing based on Model

Based on the above flowchart Figure 1 above, the final codes are explained in the memo writing below:

1. Adaptation comprises all codes that represent respondent's opinion that COVID-19 has created constraints to physical learning and as result academic activities have been moved online. The experts' opinion suggested that the pandemic has led to the adaptation of online education due to restriction of in-person or face to face learning.
2. Adoption here contains all codes that depict that digital transformation cannot be overemphasized as an obvious choice that has come to stay, which all activities, events and transaction must align to the fresh realities as a result of their coronavirus pandemic. Thus, the respondents highlighted the positives and negative. The positives far outweighed the negatives.
3. Impact category explains all codes representing experts' opinion on the impact of COVID-19, such as factors that ensure various outcomes in the digital economy. This category covers codes which explain respondents' opinion on organizations' attitudinal response to their future performance.
4. Development suggests the main responsibilities of

businesses in harnessing new ideas within the bounds of digital transformation in the era of COVID-19 and beyond. Coming up with structures that would be favourable to both employers and employees without diminishing in output. This category depicts codes that are concerned with communicating operational changes for sustenance.

- Shift explains the codes that are concerned with a new level of thinking which the COVID-19 has forced upon all countries' leadership. This category covers the codes that depict the need for fresh thinking that have resulted in creating a global level plain.

From the memo, the findings showed that the main point of discussion during the COVID-19 pandemic is the adoption of online activities, events and transaction which is a barometer for the digital transformation. Educational institutions, businesses and people's way life have been forced to adopt digital transformation as result of the limited interaction that the COVID-19 has brought. Organizations are beginning to realize the gains of adopting digital transformation in improving their bottom and increasing productivity with less overhead burden.

**B. Data Analysis based on the Quantitative Survey:**

The quantitative analysis below was based on the quantitative survey conducted using survey monkey [15]. Data visualization of the data collected from this survey was done using ggplot2 package in R Programming Language. Results of the plots generated were used to conduct the analysis of the questions as tabulated in Table 1, Table 2 and Table 3.

*COVID-19 Awareness*

The ggplot generated from RStudio for Table 1 is shown below in Figure 2

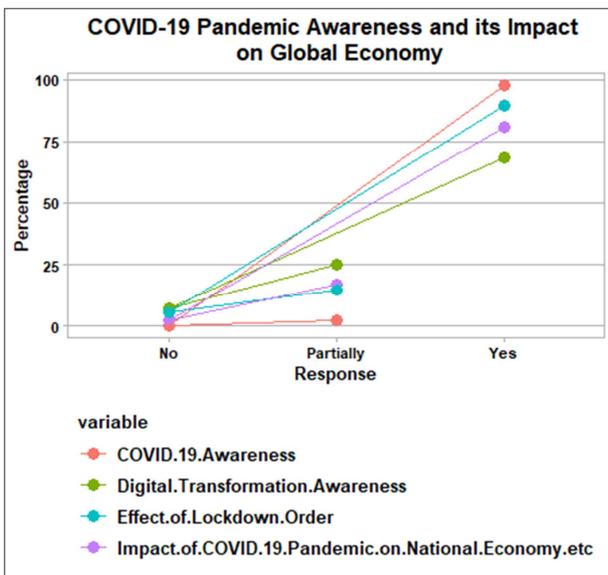


Figure 2. COVID-19 Pandemic Awareness and its Impact on Global Economy.

The above ggplot shows the visualization of data from the survey results and it established and validated the following facts which is similar to the findings of qualitative analysis.

**C. Colour Interpretation of ggplot**

Colour red from the ggplot legends shows that the

awareness of on COVID-19 is very high as shown in the ggplot. The value 97.98% showed a sharp and rapid paradigm shift to online activities.

Colour green from the legend also established the fact that there is high level awareness with value 68.69% on digital transformation based on the impact of COVID-19.

Colour purple showed that 81% of businesses that were not ready to transform digitally before COVID -19 have moved very fast to embrace digital transformation.

Colour blue from the ggplot showed 89.59% negative effect of lockdown on businesses. And hence the need to digitally transformed. Colour purple shows that COVID -19 has greatly impacted on national economy and this also brings the need to digitally transform businesses based on the impact on national economy.

The sharp rise and change of direction can be interpreted that the paradigm shift became rapidly visible. This confirms the memo and the findings from the qualitative analysis.

*Acceptance of Telecommuting*

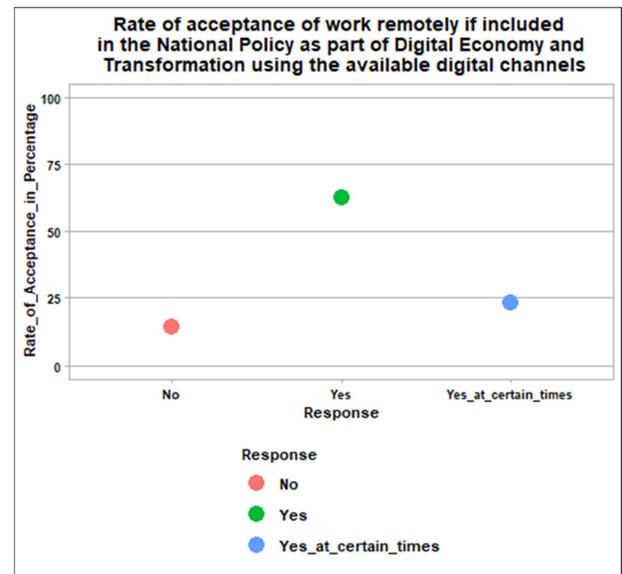


Figure 3. Ggplot for Rate of Acceptance of work remotely policy adoption.

Table 2 below shows that the society is ready to accept a policy on working from home if it is included in the national policy as part of Digital economy and transformation using the available digital channels like the internet viz:

Table 2. Showing Rate of Acceptance of Telecommuting if the government brings such policy.

Rate of acceptance of the work-from-home/work remotely, if included in the National Policy as part of Digital Economy and Transformation using the available digital channels.	
Response	Percentage
Yes	62.63%
No	14.14%
Yes, I will at certain times like COVID-19 pandemic	23.23%
Total Respondents	99

Table 2 is a tabulated data based on conditional question of telecommuting. The large percentage of “Yes” shows that telecommuting will be acceptable if such policy is put in

place. And the ggplot below shows the data visualization on the above question.

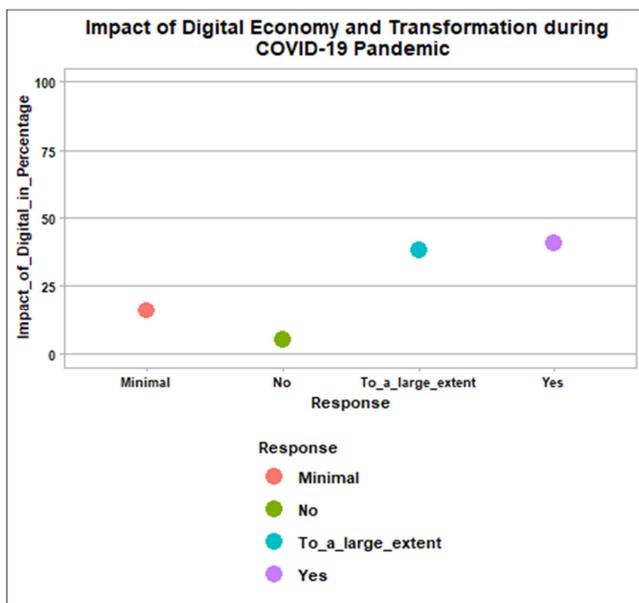
The ggplot above showed that telecommuting will be accepted if there is a national policy on it. 62.63% (Colour green) wants to telecommute if the government brings a policy on that. And the citizens are ready to embrace it to keep safe especially in times of pandemic like COVID-19 pandemic. The legend showed that colour red (14.14%), is a very low percentage of people not ready to accept telecommuting. This also confirm the qualitative part of the qualitative survey transcribed in section 4a memo. Based on the strong evidence gathered from both the qualitative and quantitative survey, Section V below analysis a proposed use case of how digital platform can be deployed.

Impact of digital economy and transformation during COVID-19 pandemic

**Table 3.** showing impact of digital economy and transformation during COVID-19.

Impact of Digital Economy and Transformation during COVID-19 Pandemic e.g. [Online Banking, Electronic Commerce (Business transaction, goods and services delivery), Telemedicine, E-Pharmacy, etc.]	
Response	Percentage
Yes	41%
To a large extent	38%
Minimal	16%
No	5%
Total Respondents	100

Table 3 above showed the impact of digital transformation and transformation during COVID-19. And the ggplot in Figure 4 below showed the data visualization.



**Figure 4.** Impact of Digital Economy and Transformation during COVID-19 Pandemic.

The ggplot showed that an aggregated total of (41+38%=Colours Purple and Blue) summing up to 79% rapidly adopted digital channels to transact businesses at the advent of COVID-19 so as to limit person to person contact

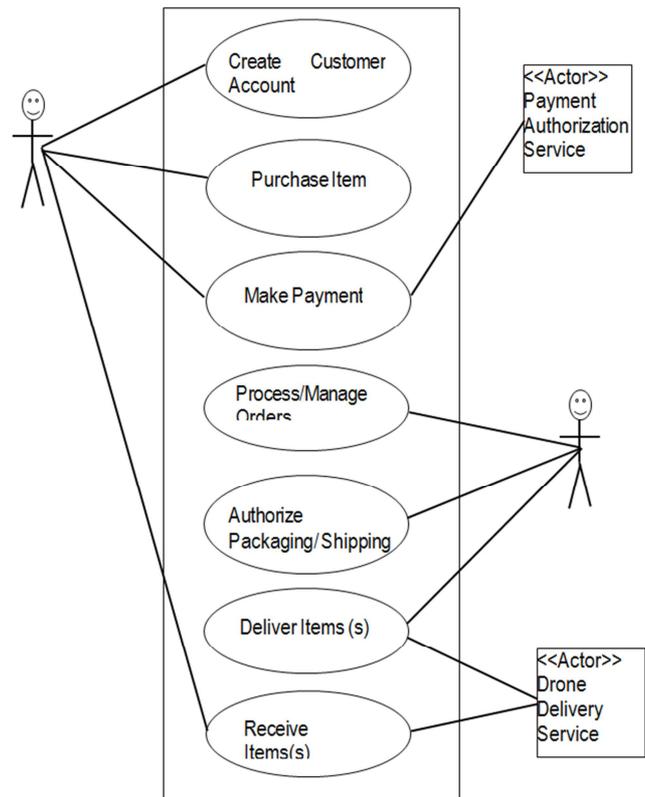
as lockdown was implemented in many climes all over the world together with social distancing. Hence, digital economy and transformation which allow businesses to be done on digital channels with less human contact became the most favorite business strategy.

### 5. Use Cases and Solutions

There are a number of technology-based solutions which can be used as digital transformation agents during this period of Covid19. Most of these solutions are aimed at reducing human to human contact. They cannot all be discussed in this section thus we focus on a modified ecommerce system which uses drones for item delivery.

Figure 5 shows the high level use case diagram of an electronic purchase / delivery system while Figure 6 shows the flowchart. The traditional human to human interaction during delivery is totally eliminated.

The diagram shows four actors, one of which is the primary (customer-LHS), while the others are secondary. Two of the secondary actors are system actors (Payment Authorization Service and Drone Delivery Service). The other secondary actor is a human actor (Sales Personnel). Section 5.1 shows the detailed Use Case for the "Deliver Item" goal.



**Figure 5.** High level use case diagram for a modified electronic purchase/drone delivery system/.

#### 5.1. Use Case

[Deliver Item]

**5.1.1. Description**

One amongst a fleet of delivery drones carries out the delivery of the purchased package (one or more items) as assigned by the sales personnel.

**5.1.2. Level**

Summary

**5.1.3. Trigger**

A Sales Personnel clicks the “deliver item (s)” button on the administrative interface.

**5.1.4. Primary Actor**

The Primary Actor is the Customer who bought the item (s) using the mobile app.

**5.1.5. Additional/Supporting Actors**

Sales Personnel and Drone Delivery Service (Secondary Actors)

**5.1.6. Stakeholders**

Packaging Department, Onloading crew, Quality Control Department

**5.1.7. Preconditions**

A customer placed an order which has been confirmed and authorized by a sales personnel.

**5.1.8. Main Success Scenario**

1. Drone Delivery System confirms an available/functional drone in the fleet.
2. Drone Delivery System Assigns specific delivery to a drone in the fleet.
3. Drone Delivery System documents the assignment.
4. Assigned drone in fleet reconfirms functional status.
5. Assigned drone leaves the fleet bay area and flies to the loading area.
6. On-loading crew loads package (s) on the assigned drone.
7. Assigned drone reconfirms battery status, GPS status, etc
8. Assigned drone loads customer location information in memory.
9. Assigned drone delivers packages to customer destinations using GPS data.

**5.1.9. Extensions**

a. Exception: No available drone in fleet: System displays a drone unavailable warning message, calculates estimated time of arrival of a drone to fleet and places delivery on queue.

b. Exception: Assigned drone functionality faulty: System returns to main command path item 1.

c. Exception: Battery Status or GPS Status etc faulty: Assigned drone displays an error message and notifies the Drone Delivery System. Drone Delivery System restarts from command item 1 on the main command path. Loading Crew unloads package from drone.

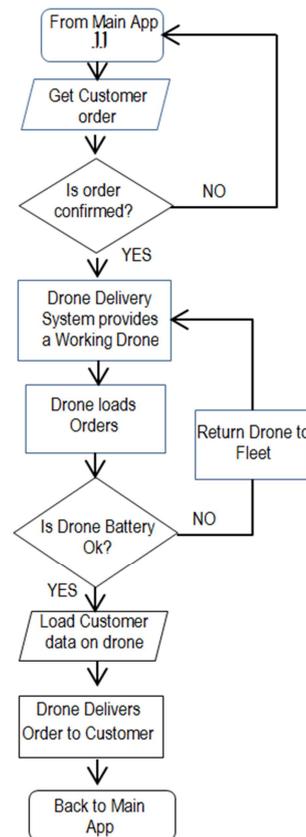
**5.1.10. Post Conditions**

a. Success End Condition: The customer receives package delivery notification for confirmation.

b. Minimal Guarantees: The Drone Delivery System logs all activities and takes snapshot of customer.

c. Failure End Condition: The customer does not receive the desired item, and the Company’s inventory remains the same.

i. Frequency: As Often as a Purchase Is Made from a Particular Neighborhood



**Figure 6.** The Flow Chart for a modified Electronic Purchase/Drone Delivery System.

**ii. Special Requirements**

Performance, Security and Usability/Accessibility: The drone battery life must be good enough to execute the package delivery. Technologies such as voice recognition, facial recognition and encryption will be used. Drone operations must be as approved by the regulatory agencies and it should support major languages

**5.2. Stem Use, Influence on Digital Economy and Encouragement During the Pandemic**

Amazon Prime Air is a drone delivery service currently in development by Amazon. It is one of the first major efforts on drone delivery service by a major ecommerce company. This was reported on BBC news [16]. There is currently no evidence that this effort has been used in large commercial settings yet, aside from the tests and promises.

According to Corrigan (2019), delivery drones can be used

in medical supplies, food and other package deliveries [17]. Big players like Alphabet Inc. (Google's Parent Company), Walmart and UPS are becoming major players.

One of the major reasons for decrease in commercial activities in both developed and developing countries during this covid19 pandemic is the imposition of lockdowns and the reduction of human to human contact through social distancing. Commercial activities all over the world have reduced to its barest minimum. This has led to low demand for goods and services which can also be interpreted as low access to them. As may have been noticed from above, drone delivery systems have been suggested a long time ago before the covid19 era. Its suggested introduction was to reduce delivery cost and time. Now, using it during this pandemic era would also have these advantages of delivery cost and time reduction, and then human to human interaction reduction. Thus, businesses will begin to get demands once again and orders fulfilled without largely affecting the lockdowns.

This system reduces human to human contact to the barest minimum as customers only interact with the mobile and web apps, and the drone which delivers the package. Thus, the customer has no business having any physical interaction with humans which can be carriers of the dreaded covid19 virus.

## 6. Recommendations

A. From the Qualitative survey memo and the findings, it is established that COVID-19 has catalyzed the speed of transiting from traditional economy to online businesses which is an integral part of digital transformation. This is also evidenced in the result of quantitative survey conducted in which Table 3 and Figure 4 established the high rate of impact of digital economy and transformation during COVID-19 pandemic in which the aggregated impact is (41+38) % implies total aggregate of 79%. This is both established in both developed and developing countries because the scope of the research had been established to be global. Consequently, it is recommended that it is important for both major and minor businesses to reengineer their business strategies towards the use of digital channels as this is the future of economy.

B. Figure 3 and Table 2 showed the results of quantitative survey on policy on telecommuting. The ggplot put the acceptance rate at an aggregate of (62.63 +.23.23) % implies a total aggregate of 85.86%. The implication of this is that if the government put this policy in place majority are ready to embrace it. For telecommuting to be implemented, it has been shown from the literature review that the ICT infrastructure is key to a successful implementation of digital transformation in which telecommuting is a subset. This is also verified from the findings of the qualitative focus group investigation RQ2 in Section 4. Consequently, it is recommended that government at all level should commence work on National Policy on Telecommuting.

## 7. Conclusion

From the investigation conducted, it has been successfully established that Digital transformation can only be implemented based on the availability of digital channels with developed countries having advantage of readily available infrastructures to accelerate the implementation of digital businesses during the COVID-19 pandemic. Figure 4 and Table 3 showed fast adoption of digital economy and transformation as very high percentage of businesses moved onto the digital platform at the advent of COVID-19; 79% of respondents agreed that digital economy and transformation greatly impacted on busines activities at the advent of COVID-19. This is also valid for the developing countries. The need for appropriate policies has also been successfully validated.

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