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**AFE BABALOLA UNIVERSITY ADO-EKITI (ABUAD)**

***A TERM PAPER***

***ON***

**ENGINEERING STRATEGIES FOR HANDLING COVID-19 FOR ENVIRONMENTAL HEALTH AND ECONOMIC SUSTAINABILITY**

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**DEDICATION**

This term paper is dedicated to several well-established Engineers and several other medical practitioners whom would require an insight on the various EFFECTIVE Engineering strategies for handling COVID-19 (Corona Virus) for the health of the environment and also for economic sustainability in our country **NIGERIA** and for the World as well.

**ABSTRACT**

Covid-19 is an emerging, rapidly evolving situation which has had a cost in living. This is a disease that has affected a good number of countries and slowly reaching all areas of the world has therefore attained the title of a **Worldwide Pandemic/Crisis**.In this period, the government of several countries in the idea to minimize and control the disease spread has effectively carried out an immediate lockdown on every area of the country leaving schools, churches, Shopping malls,etc and even Hospitals on a compulsory shutdown hence the people losing money, food, education and many more. But thanks to Foreign helpers, there will be light in this darkness. There are seeking out solutions to further eliminate this virus so as to prevent any further Deaths and Calamity. It is noted that in this era of crisis it is much advisable that the coming together of several (if not all) disciplines of study to provide a profitable means to an end of this COVID-19.

So therefore, this paper is aimed at providing Engineering tactics and strategies in tackling this deadly virus, **COVID-19** for environmental health safety (The People) and for the sustainability of the countries economy (The Country).

***Keywords:*** *COVID-19, a Worldwide Pandemic, Engineering Strategies, Environmental Health safety and Economic sustainability*

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**LITERATURE OVERVIEW**

It’s well known that handling and tackling COVID-19 is a huge burden and will require great resources, High-end equipment and a huge amount of time and money, which is fundamental for Environmental safety and preventing Casualties to both Individuals and the Country. This unplanned downtime in our today times not only requires a planned strategy to handle this pandemic but it’s recommend. While Health personnel and other sectors of Worldwide Pandemic issues fighters undergo safety precautionary activities and missions that can go a long way towards eliminating COVID-19 with cures and vaccines, it’s important to keep in mind that these Strategies and Tactics are only as effective as the people preventing it by all means necessary and advised. In other words, qualified, well-trained people are essential to properly provide electrical equipment against the virus and educate people more on precautionary measures to take, especially in today’s environments where several areas of the world rely on fewer people to accomplish increasingly complex work.

Technologies are not usually exclusively products of science, because they have to satisfy requirements such as [utility](https://en.wikipedia.org/wiki/Utility%22%20%5Co%20%22Utility), [usability](https://en.wikipedia.org/wiki/Usability%22%20%5Co%20%22Usability), and [safety](https://en.wikipedia.org/wiki/Safety%22%20%5Co%20%22Safety).

Engineering is the [goal-oriented](https://en.wikipedia.org/wiki/Goal-oriented%22%20%5Co%20%22Goal-oriented) process of designing and making tools and systems to exploit natural phenomena for practical human means, often (but not always) using results and techniques from science. The development of technology may draw upon many fields of knowledge, including scientific, engineering, [mathematical](https://en.wikipedia.org/wiki/Mathematics%22%20%5Co%20%22Mathematics), [linguistic](https://en.wikipedia.org/wiki/Language%22%20%5Co%20%22Language), and [historical](https://en.wikipedia.org/wiki/History%22%20%5Co%20%22History) knowledge, to achieve some practical result. Now this technology is used to tackle the crisis at hand which is COVID-19.

**INTRODUCTION**

**In this period of Corona virus several news has emerged from the media and many more, and most of these news are completely false and not factual. These news include drinking of warm water basically every five (5) minutes because the virus cannot survive in high temperature environment,and so on.this news and others are wrong the really news is found at** [www.who.com](http://www.who.com) **where every detail of the disease and it’s preventive measures are found and are legitimate.**

The corona virus COVID-19 pandemic is the defining global health crisis of our time and the greatest challenge we have faced since World War Two. Since its emergence in Asia late last year, the virus has spread to [every continent](https://www.undp.org/content/undp/en/home/covid-19-pandemic-response.html%22%20%5Cl%20%22covid19dashboard) except Antarctica. Cases are rising daily in Africa, America, and Europe.

Countries are racing to slow the spread of the virus by testing and treating patients, carrying out contact tracing, limiting travel, quarantining citizens, and canceling large gatherings such as sporting events, concerts, and schools.

The pandemic is moving like a wave, one that may yet crash on those least able to cope.

But COVID-19 is much more than a health crisis. By stressing every one of the countries it touches, it has the potential to create devastating social, economic and political crises that will leave deep scars.

We are in uncharted territory, many of our communities are now unrecognizable and dozens of the worlds greatest cities are deserted as people stay indoors, either by choice or by government order. Across the world shops, theaters, restaurants and bars are closing.

Every day people are losing jobs and income, with no way of knowing when normality will return. Small island nations, heavily dependent on tourism, have empty hotels and deserted beaches. The International Labour Organization estimates that [25 million jobs](https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_738742/lang--en/index.htm%22%20%5Ct%20%22_blank) could be lost, really sad.

The United Nations Development Programme (UNDP) administration has had a fair share in helping countries and parts affected economically and health-wise by donating more than two million surgical masks and providing life supporting medical equipment such as X-ray machines, infrared thermometers, infusion pumps, protective suits, gloves and hand-sanitizers. They are supporting health systems in countries including Bosnia and Herzegovina, Djibouti, El Salvador, Eritrea, Iran, Kyrgyzstan, Madagascar, Nigeria, Paraguay, Panama and Ukraine.

  In China, they launched a social media campaign to spread information about COVID-19 amongst vulnerable communities such as the elderly and other disadvantaged people in 40 different minority languages.

Also, the Secretary-General of the United nations, Ant**ó**nio Guterres, has launched a US$2 billion global humanitarian response plan in the most vulnerable. Developing countries could lose at least US$220 billion in income, and the United Nations Conference on Trade and Development has called for [US$2.5 trillion](https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=2315" \t "_blank) to support them.

**AVAILABLE ENGINEERING STRATEGIES FOR HANDLING COVID-19**

**For Environmental Health:**

There are several engineering strategies available to tackle the virus. These tactics are effective and recommended.

1. **The Use of PPEs:**Personal protective equipment (PPE) are designed to protect the wearer’s skin, eyes, mucous membranes, airways and clothing from coming into contact with infectious agents. Mucous membranes and skin with compromised integrity are portals of entry that are highly susceptible to infectious agents such as COVID-19. It is important to note that the use of PPE is not a substitute for proper infection prevention and control practice: for example, the use of gloves is not a substitute for hand hygiene. Healthcare workers who provide care to COVID-19 patients must be proficient in donning and doffing and this requires specific training. Who should wear protective clothing? Select which PPE items to wear based on this assessment: Risk assessment is critical for all activities. This is the assessment of each health care activity to help determine the personal protective equipment (PPE) that is needed for adequate protection in the performance of such activity. As directed by the NCDC interim guidance, all healthcare workers (HCWs), the health facility management and Infection Prevention and Control (IPC) teams at all levels of healthcare in Nigeria is intended to use the planning for Personal Protective Equipment (PPE) needs in care of suspected or confirmed COVID-19 patients.**Note: The choice and combination of PPE ensemble to be worn in dealing with COVID-19 patients should be based on a careful risk assessment that considers risk of exposure and extent of contact anticipated with respiratory droplets, blood, body fluids, and/or open skin.**

2. Application of standard precautions for all patients at all times

3. Implementation of empiric additional precautions – droplet and contact in the care of suspected and confirmed cases of COVID-19 and airborne precautions (in certain situation when aerosol generating procedures are carried out on COVID-19 patients).

4. Implementing administrative controls.

5. Use of environmental and engineering controls such as adequate spatial separation of patients, appropriate ventilation and appropriate cleaning of the environment.

1. Ensuring triage, early recognition, and source control (isolating) of patients with suspected SARS CoV-2 (COVID-19) infections.

**For Economic Sustainability:**

The Nigerian government has introduced a number of measures to provide support to taxpayers and business in the Covid-19 outbreak. As the world grapples with the Covid-19 pandemic, many governments have rolled out palliative measures to stabilize their economies and provide necessary support to their business communities. Nigeria, like many countries, has been adversely affected by the pandemic, from the slump in the crude oil price to disruption of supply chain as a result of the lockdown in China, which is a major trading partner with Nigeria. The Nigerian economy is now heading for the second recession in less than four years.

This examines the various fiscal and economic palliative measures the Nigerian government has announced.

## Measures by Tax Administrators:

The Federal Inland Revenue Service (FIRS) announced a number of palliative measures on March 23, 2020, as highlighted below:

* **Extension of filing deadlines for monthly value-added tax (VAT) and withholding tax (WHT)**: The deadline for filing monthly VAT and WHT returns has been shifted from the 21st day of the month following the month that the report relates to, the last working day of the month;
* **Extension of filing deadline for companies income tax (CIT) returns**: The due date for filing CIT returns has been extended by one month. Companies are statutorily required to file annual CIT returns within six months after the financial year-end date. With this palliative measure, the Executive Chairman has exercised his power to extend the deadline by one month. Thus, a company with a December 31 year-end date now has up to July 31, 2020 to file the returns for 2020 year of assessment.
* **Filing CIT returns with unaudited accounts**: The FIRS is also permitting taxpayers to file their annual CIT returns without an audited financial statement. However, such taxpayers must submit the audited accounts within two months from the revised due date for filing their tax returns. For instance, a company with a December 31 year end that is yet to finalize its statutory audit by the extended deadline of July 31, 2020 may proceed to submit its CIT returns using its unaudited financial statement. However, the taxpayer will have to submit the audited financial statement by September 30, 2020;
* **Increased use of electronic platforms**: In its announcement the FIRS encouraged the use of the [FIRS electronic platform](https://www.firs.gov.ng/e-Services/e-Filing) and emails for submission. For the conduct of tax audits and desk reviews, the FIRS intends to create a web portal where taxpayers can upload documents for both the taxpayer and authority to access.

In addition to the measures proposed by the FIRS, the Lagos State Internal Revenue Service (LIRS) and Federal Capital Territory Internal Revenue Service (FCTIRS) appear to be the only sub-national tax administrations that have so far announced palliative measures for taxpayers. The LIRS extended the deadline for filing annual tax returns for employees and self-employed persons by two months, from March 31 to May 31, 2020, while the FCTIRS extended the deadline by three months (i.e March 31 to June 30, 2020).

It is interesting to note that both tax administrations did not announce any palliative measures in respect of monthly WHT and pay-as-you-earn (PAYE) taxes.

## Measures by the Central Bank of Nigeria (CBN):

The Central Bank of Nigeria (CBN) announced palliative measures on March 16, 2020 aimed at ensuring the financial stability of the economy in light of the ongoing Covid-19 pandemic. The CBN announced policy measures that include the following:

* **Extension of the moratorium period on all principal repayments on CBN facilities by one year**: All intervention loans extended by the CBN to financial institutions which are currently under moratorium are automatically extended by one year with effect from March 1, 2020;
* Reduction in the interest rate on all CBN intervention facilities, from 9% to 5% per annum;
* Establishment of a 50 billion Nigerian Naira ($129.5 million) credit facility through the NIRSAL (Nigeria Incentive-Based Risk Sharing System for Agricultural Lending ) Micro-finance Bank for households and small and medium-sized enterprises (SMEs) that have suffered the adverse effects of Covid-19. The NIRSAL Micro-finance Bank was established to empower small businesses across Nigeria and drive financial inclusion. It is expected that further information/guidance will be provided by the CBN and NIRSAL on the modalities for extending these funds to the beneficiaries;
* Extension of loan facilities to pharmaceutical companies who intend to expand or open drug manufacturing plants in Nigeria and hospital and healthcare practitioners who intend to expand or build first class health facilities. This is expected to boost the health care industry which is an important sector of the Nigerian economy. Similar intervention funds have also been provided in recent times to other key sectors of the economy, such as the agricultural and manufacturing sectors;
* Deposit money banks (DMBs) to consider a temporary and time-limited restructuring of the tenure and loan terms they have with businesses and households most affected by the Covid-19 outbreak. The CBN will work closely with the DMBs in this regard.

## Securities and Exchange Commission and Nigerian Stock Exchange

Similarly, the Securities and Exchange Commission (SEC) and Nigerian Stock Exchange (NSE) have announced the extension of filing deadlines by 60 days. It is believed that this extension will help reduce the compliance pressure on companies regulated by these entities. The SEC and NSE are also encouraging the use of online channels by their stakeholders.

## Emergency Economic Stimulus Bill, 2020

The House of Representatives also proposed a bill for enactment, the Emergency Economic Stimulus Bill, 2020 (the Bill) which seeks to provide the following:

* Tax rebates to companies that do not lay off their employees from March 1 to December 31, 2020

The tax rebate for companies who retain their employees within the stated period is 50% of the actual amount due or paid as PAYE taxes under the Personal Income Tax Act, 2004 (as amended). The tax rebate, which is a refund of the employer’s income tax, does not apply to employers partly or wholly regulated under the Petroleum Profits Tax Act (PPTA), 2004;

* Deferment of residential mortgage payments by individual contributors to the National Housing Scheme for a period of 180 days

The proposed incentive applies to all payments for residential mortgage obligations by individuals for 180 days from March 1, 2020. This is expected to ease the financial obligations of the individual contributors (whose jobs may be uncertain), such that their funds are not sunk into committed fees/payments;

* Waiver of import duties on medical goods

Import duties on medical equipment, medicines, personal protection equipment and other medical necessities required for the treatment and management of Covid-19 are waived from March 1 to December 31, 2020. This should minimize the cost of the items as well as increase their availability. This can also be extended to other essential supplies such as preserved food items and toiletries that are imported.

While the tax rebate proposed by the Bill is expected to prevent a massive lay-off of employees and reduce the cost borne by employers as a result of the downtime created by the pandemic, employers may carry out a cost-benefit analysis in order to take an economically feasible decision.

Although the Bill just passed a second reading and is still in the process of being finalized for presidential assent, it is expected that the proposed relief should provide some succor to businesses and individuals if eventually passed into law.

## Summing Up/ Conclusion

There is much uncertainty and anxiety surrounding the pandemic at the moment, and this calls for countries to unite and collaborate, share knowledge and seek/provide financial support and aid both at the global and national level, in order to curtail the spread of this highly contagious virus.

Despite this, all is not gloom, as some industries appear to be benefiting from the pandemic. For instance, there is an increase in the need for telecommunication and technological tools/support to aid remote working, a spike in demand for health manufacturing equipment and accessories, and a hike in consumer product demand as a result of panic buying and stockpiling, online deliveries, etc.

As the Nigerian government keeps abreast of global best practice in containing the pandemic and minimizing the effects of an economic downturn, the question arises as to what further timely measures (physical, fiscal, economic) the Nigerian government can adopt to ease the adverse impact of the pandemic on individuals, households, business and financial institutions, and markets.

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