Academic Journal of Current Research
Vol.7, No.10; October-2020;
ISSN (2343 – 403X);
p –ISSN 3244 - 5621
Impact factor: 6.37

COVID-19 AND DIGITAL FINANCIAL INCLUSION OF GENERATION Z WITHIN COMPLEX ADAPTIVE SYSTEMS

[1]Ms. Diana Kangwa, [2]Mr. Joseph Thokozani Mwale and [3]Dr. Junaid M. Shaikh,
[1]DBA Candidate, Binary University of Management and Entrepreneurship, Malaysia,
Lusaka Zambia
[2]Lecturer, Mulungushi University, P.O. Box 80415,Kabwe, Zambia. Email:
[3]Ass. Professor, UTB School of Business, University of Technology,
Corresponding and presenting author: Diana Kangwa

Abstract: The global pandemic of COVID-19 has induced unprecedented socio-economic transformations throughout the world thereby revealing deep-seated social inequalities and vulnerabilities in society. The pandemic has disrupted the functionality of many socio-economic systems including the financial ecosystems leading many of these systems into a survival challenge. The resilience or restoration of these systems to normal functionality is dependent upon the adaptive capacity shaped by the inherent potential and connectedness of a given system within its social-cultural setting. This present paper discusses the dynamics of digital financial inclusion of Generation Z under the COVID-19 pandemic as observed through the lens of Complex Adaptive Systems, which is increasingly seen as a scientific frontier that enhances the understanding of complex systems. The paper dwells upon the results of a study on the social production of digital financial inclusion of Generation Z in digital ecosystems that revealed the intrinsic propensity and competency of Generation Z for digital consumerism that could be harnessed to enhance digital financial inclusion of the marginalized segments of society. Using the Complex Adaptive Systems theory, the paper demonstrates that the COVID-19 scenario presents scope for enhancing the digital financial inclusion of the marginalized segments of society through increased access to electronic banking services and financial technologies. The pathway to digital financial inclusion is, therefore, contingent upon the ability of the banking ecosystems to overcome the rigidity trap of non-flexible regulatory frameworks, which occurs at the opposite end of the poverty trap in a maladaptive system typifying the socio-economic setting of sub-Saharan Africa.

***Key words**: COVID-19, Digital Financial Inclusion, Complex Adaptive Systems, Generation Z*
**Dr.Junaid M.Shaikh previously worked as . Professorial level at previous University*

Introduction

Development prospects for the 2020 decadal year have been overshadowed by the unprecedented emergence of an acute respiratory disease that has been designated by the World Health Organization, WHO as the Coronavirus Disease 2019, (COVID-19). The current scientific understanding of COVID-19 is that it is caused by a beta-coronavirus in the same sub-genus as the severe acute respiratory syndrome, and the International Committee on Taxonomy of Viruses identified the novel coronavirus as the Severe Acute Respiratory Syndrome Coronavirus 2, SARS-CoV-2 (McIntosh, 2020). Epidemiological monitoring of COVID-19 reports that more than 25 million people have been infected by the disease globally with just under a million deaths. Within the evolving scientific and epidemiological understanding of COVID-19, it is currently postulated that the disease is primarily transmitted via direct person-

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to-person contact within two metres of social distance. Scientists currently hold that the pathogenic SARS-CoV-2 is released in the respiratory droplets of an infected person through coughing, sneezing, or talking. The environment including the people, air and surfaces is then contaminated with the virus that can be transmitted to uninfected people found within the environment depending on age and other underlying factors that increase the susceptibility to the virus.

COVID-19 was declared a pandemic by the WHO in March, 2020 on account of the worldwide spread of the disease. This prompted Governments to institute socio-economic lockdowns as part of the pragmatic effort to contain the pandemic. Runachalam and Crentsil (2020) describe the COVID-19 pandemic as a very distinctive crisis that has a highly unsystematic and uncharacteristic fusion of a deadly disease with an economic catastrophe characterised by an unparalleled global macro-economic shock of uncertain magnitude and duration. As a result of the pandemic, the global economy is projected by the International Monetary Fund, IMF (2020) to contract sharply by three percent (3%) in 2020, signifying a historic economic depression that has been referred to as the "Great Lockdown". The IMF further asserts that "the COVID-19 pandemic is inflicting high and rising human costs worldwide, and the necessary protection measures are severely impacting economic activity. Many countries presently face multiple crises including the health crisis, financial crisis, and collapse in commodity prices, which interact in complex ways". Lockdowns have had far-reaching implications for the sustainability of individuals, businesses and whole communities globally. Regarding the socio-economic impacts of COVID-19 in the context of sub-Saharan Africa, Teachout and Zipfel (2020) estimate that containment measures in sub-Saharan Africa may have pushed an additional 9.1% of the population into extreme poverty and the prolonged income shock could maintain about 18 million people at risk of severe food deprivation. Given the poor performance of pre-COVID-19 social protection programmes in sub-Saharan Africa, Teachout and Zipfel (2020) reasonably expect that "blanket lockdowns imposed in low income countries to contain the spread of the virus, if unmet by a massive national and international economic response, may put even more people at risk of dying than the unmitigated spread of the virus itself."

The pre-existing conditions of social inequality in society render the most vulnerable people highly exposed to the devastating effects of COVID-19. Przeworski (2020) intonates that COVID-19 is a magnifier of social inequality having amplified health and wealth inequality and raising important questions about ethics and the priorities of public policy interventions. In the context of the United Kingdom, Janke *et al*. (2020) observed that the economic and policy response to COVID-19 has created specific gradients in both exposures to the disease itself and the economic impact of the lockdown. Although everyone is susceptible to the virus, Burstrom and Tao (2020) hypothesise that disparities in social determinants of health have contributed to the early observations of differential exposure to the virus, vulnerability to the infection and consequences of the disease. Such differential social vulnerabilities have been reported in many countries including the United States of America where inequalities persist along the income, age, race and urban/rural divides. Differential susceptibility to the COVID-19 based on historical cultural dynamics is starkly demonstrated by Morrison (2020) that people of African descent in Latin America who are often essential front-line workers providing necessary cleaning, transportation, delivery, stocking and care-giving services are highly susceptible to the coronavirus. The collateral damage of the COVID-19 pandemic could thus be aggravated by the social inequalities and vulnerabilities. To this end, Braveman (2020) believes that the pandemic will persist as long as more vulnerable nations and populations within nations are marginalized and excluded from state-of-the-art approaches to containment.

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In the wider context of social vulnerability to COVID-19, the demographic cohort of young people is of great concern to the international community. The International Labour Organization (2020) reports that the youth aged between 15 and 24 were already three times more likely to be unemployed compared to adults, while 126 million young workers were in extreme and moderate poverty worldwide as a result of the COVID-19 pandemic. As unemployment is widely projected to increase globally as a result of the COVID-19 pandemic, the United Nations (2020) expects a disproportionate effect of the linked global economic recession on employment prospects for young people if there is no targeted policy intervention. To this effect, the COVID-19 crisis poses considerable risks for young people of whom 35 % are employed in low-paid and insecure jobs (Organisation for Economic Co-operation and Development, 2020). Youth employment is a contemporary development challenge, especially in the developing world as most of the livelihood for the youth is drawn from the informal urban sector. It is estimated that more than 60 % of the world's employed population are in the informal economy with Africa accounting for 85.8 % (International Labour Organization, 2020). Under the COVID-19 scenario, an increasing unemployment and loss of disposable income calls for policy responses that ensure financial inclusion of the vulnerable youths. Notwithstanding the pre-COVID-19 digital divide in terms of access to technology and the Internet in the developing world, the evolving financial technologies, FinTechs have facilitated digital payments and financial inclusion of millions of people worldwide. As policy measures to encourage the use of digital finance have been undertaken all over the world in the wake of the COVID-19 pandemic, the Sub-Saharan African (SSA) economies, in which financial inclusion levels are among the lowest in the world, have undertaken the most policy reform work in response to the pandemic (Boakye-Adjei, 2020). Thus, it can be reasonably hypothesised in this paper that the COVID-19 pandemic appears to have catalysed the co-evolution of digital consumerism and financial inclusion within financial business ecosystems.

Driven by the need for solutions to the contemporary socio-economic problems intensified by such disruptive phenomena as the COVID-19 pandemic, society continues to structure and create new knowledge to increase the understanding of complex systems. Complexity is associated with the intricate inter-twining or inter-connectivity of elements within a system and between a system and its environment (Mitleton-Kelly, 1997). The theoretical construct for understanding the interconnectedness of things is the Systems theory. Katz and Kahn (1978) define the Systems theory as a knowledge framework that focuses on structures, relationships and interdependence between elements. The systems theory is built on the mathematical concepts of linearity and additivity with an assumption that the behaviour of a system can be predicted completely from the behaviour of its constituent parts. This construct shapes the reductionist philosophy employed in classical science wherefore variability, randomness and uncertainty represent noise, disorder or system error in scientific analysis. Consequently, system theorists believe that order and regularity lead to the state of homogeneity or equilibrium. However, this paradigm has been contested in modern science. Thomas *et.al*. (2016) argues that for as long as traditional science inquired about the laws of nature, it has suffered ignorance about the sudden changes and the disorder in the atmosphere, the turbulence of the wind and the sea, the fluctuations in wildlife and human populations, and the variations of signals from the brain and heart. Thus, the systems theory does not fully capture the uncertainties and complexities inherent in natural and social phenomena. This limitation has given rise to the complexity theory. As such Ferreira (2014) considers a system to be complex (See Figure 1) when it is made of groups of elements with different functions and behaviours that are in constant evolution and are influenced by events that cannot be foreseen with certainty.

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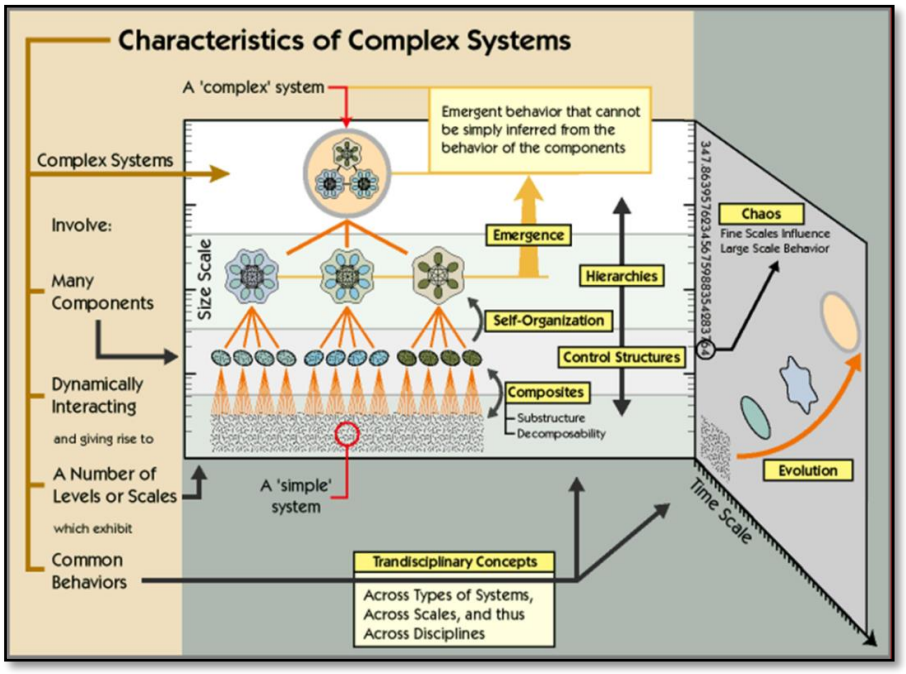

Source: Ferreira (2014)
Figure 1: A complex system

Amagoh (2016) synthesises the general characteristics of a complex system: "firstly, Complex systems are characterized by nonlinearity and feedback, which usually result in feedback mechanisms. Secondly, Complex systems are dissipative structures that do not correspond to external pressures in a linear manner. Thirdly, complex systems have the ability for self-organization and adaptation reflected in the ability of the system to modify itself to environmental disturbances that threaten the system's efficiency. Fourth, Complex systems have high connectivity and interdependence of constituent parts. Finally, Complex systems exhibit emergent properties whereby patterns emerge which are due to the collective behaviour of the system's components". The defining feature of Complex systems is entropy, which is the ability of a system to move toward a chaotic or random state where there is no further potential for energy transformation (Byeon, 2005; Farazmand, 2003; Guevara and Posch, 2015). Complexity theorists postulate that Complex systems evolve through phases of instability and tend to exhibit creativity and produce new and innovative behaviours, and that disorder triggers changes within a system beyond a threshold at which there is either a system breakdown to total collapse or system breakthrough to emergent new conditions as part of self-organisation that subsequently influences future behaviours (Sullivan, 2004; Guevara and Posch, 2015; Price, 2004). Holland (2006) further describes such dynamic systems involving many components that adapt in or learn from and evolve with a changing environment as Complex Adaptive Systems (CAS).

Within the complexity paradigm, this research work reasonably considers a financial business ecosystem as a Complex adaptive system, being an interconnected network of banks, clients, retailers, technology, telecommunication firms, internet service providers, regulatory authorities and several other players. The

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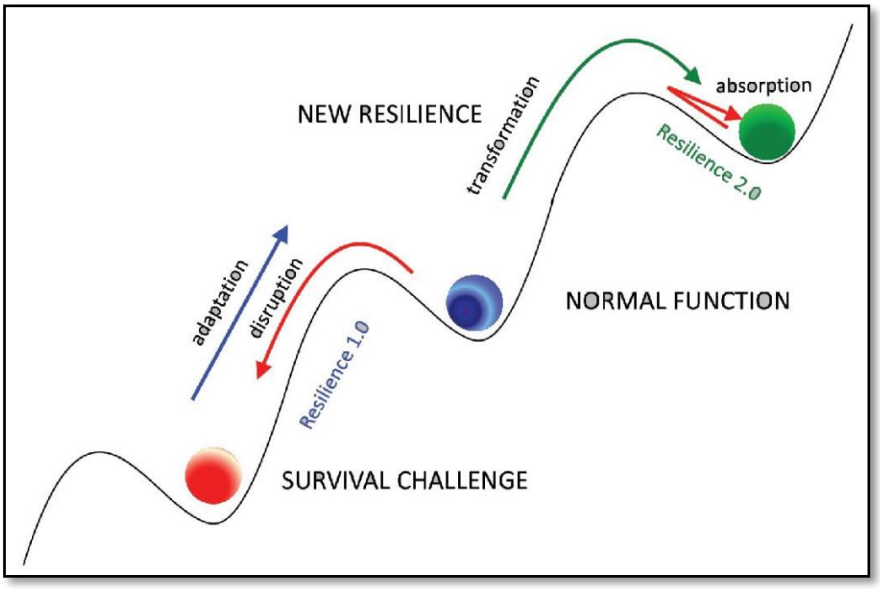
financial business ecosystem components are dynamically interacting and co-evolving at various scales within the changing context of global business and society at large. Axelrod and Cohen (2000) affirm that business ecosystems can be described as "complex adaptive systems" because they are dynamic systems of agents and organisations that experiment, explore, self-organise, learn and adapt to changes in their environment. Thus, the conceptual framework for this paper is transformational resilience (See Figure 2) to assist in understanding the transformation and sustainability of a financial business ecosystem within the complexity paradigm under the COVID-19 pandemic scenario.



Source: decisionintegrity.co.uk
Figure 2: Transformational resilience

Figure 2 illustrates transformational resilience, whereby the normal functioning of a system is disrupted by an external or internal disturbance leading the system into a survival challenge. The system then adapts to restore its functionality and build first level resilience whereupon it learns from its experience and transforms itself by building capacity to absorb future shocks thereby attaining second level resilience. Redman and Kinzig (2003) note that Resilience is considered a fundamental concept in the understanding of complex systems from simple cells to ecosystems, focused on transformational change; and Gunderson and Holling (2002) exposit that complex adaptive systems are shaped by three distinct properties of potential, connectedness and resilience. The potential of a system includes knowledge base, skill sets, capital and such available resources as indicate the capacity of a system to innovate. Connectedness reflects the degree to which a system can control its relation with the environment, while resilience reflects the capacity of a system to retain its basic function and structure in the face of a disturbance or shock.

From the foregoing discourse, it is conceivable that the global pandemic of COVID-19 has induced unprecedented socio-economic transformations throughout the world thereby revealing deep-seated social inequalities and vulnerabilities in society. The pandemic has disrupted the functionality of many socio-economic systems including the financial ecosystems leading many of these systems into a survival challenge.

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The resilience or restoration of these systems to normal functionality is dependent upon the adaptive capacity shaped by the inherent potential and connectedness of a given system within its social-cultural setting. This paper explores the co-evolutionary dynamics of digital consumerism and financial inclusion of Generation Z within the complex adaptive system of a financial business ecosystem under the scenario of the "Great Lockdown" induced by the COVI-19 pandemic. The co-evolutionary dynamics are observed through the theoretical lens of Complex Adaptive Systems, which is increasingly seen as a scientific frontier that enhances the understanding of complex systems. The paper is structured in such a way as to espouse transformational resilience as a conceptual framework for understanding the socio-economic transformations induced by the COVID-19 pandemic, particularly its impacts on the sustainability of a financial business ecosystem. The subsequent sections of the paper include the methodology, results, discussion and conclusion.

1. METHODOLOGY

The methodological framework of this paper is based on an exploratory research design that is justified for use in finding the most likely explanations for some observed phenomenon; and Stebbins (2001) considers it as a broad-ranging, purposive, systematic, prearranged scientific undertaking. This particular undertaking employs a case study within a qualitative research paradigm. Luck *et. al.* (2006) describe a case study as a detailed, intensive study of particular contextual and bounded phenomena that is undertaken in real life situations. For this present work, a schema was developed for exploring the co-evolutionary dynamics of digital consumerism and financial inclusion within the digital banking ecosystem of the Zambia National Commercial Bank (ZANACO) in sub-Saharan Africa. The schema incorporated the building blocks of a complex adaptive system including potential, connectedness and resilience. Strategic policy documents were analysed to examine the policy context of IT promptness to financial business adaptation and digital financial inclusion under the COVID-19 scenario. Interviews were then conducted with banking personnel in decision-making positions to explore their perspectives and experiences of transformational resilience under COVID-19. Finally, Causal loop analysis was performed on the Vensim PLE software platform, Version 8.1.0 to identify and visualise the interconnectedness, feedback mechanisms and emergent behaviour of the dynamically evolving digital banking ecosystem.

2. RESULTS AND DISCUSSION

The co-evolutionary dynamics of digital consumerism and financial inclusion within the digital banking ecosystem of ZANACO were explored from the perspective of Complex Adaptive Systems. The exploratory study found that in the pre-COVID-19 era circa 2018, the ZANACO digital banking ecosystem comprised refurbished digital branches with 24/7 self-service; more than 1200 agents that were ready to assist customers; a 24/7 internet banking service at the customer's finger tips; more than 700,000 mobile banking subscribers on a customized product called XAPIT; micro-merchants ranging from vegetable sellers to taxi drivers that transacted cash-free using the QR Code technology; and a mobile banking application which with more than 60,000 downloads. As can be seen from Causal Loop Diagram (CLD) in Figure 3 below, the emergence of COVID-19 (+1) then posed a challenge on delivering the mainstream banking products as some business lines slowed down during the economic lockdown induced by the pandemic (+2). At the edge of chaos (+3), the banking ecosystem went through a phase of instability from which it adapted to deal with the uncertainties (+4) and co-evolved with the environment (+5) by exploiting its potential and maximising its internal controls. Thus, COVID-19 presented an incredible opportunity for ZANACO to consolidate its digital financial services.

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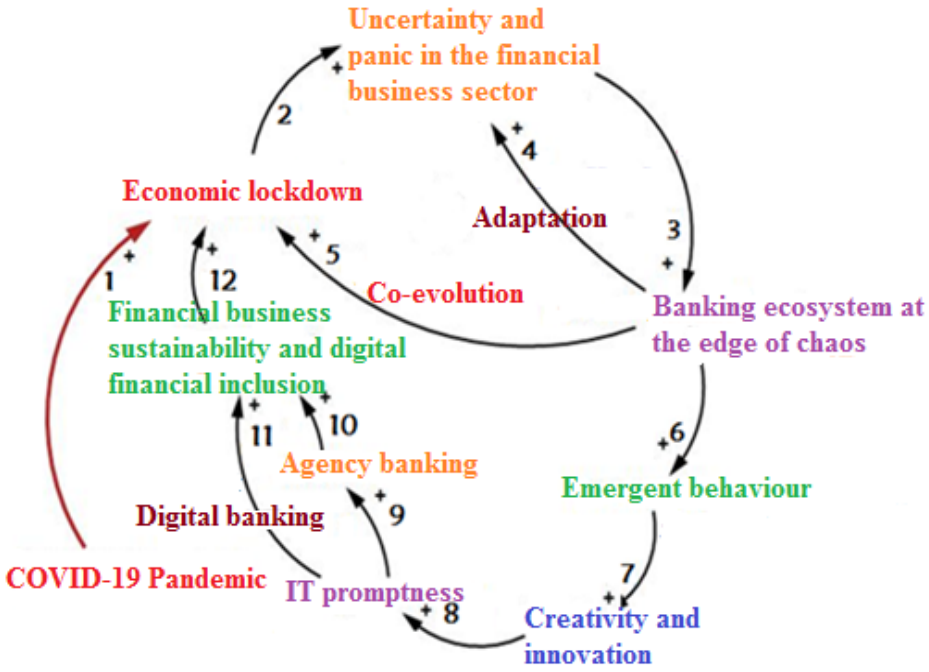

Figure 3: Co-evolutionary dynamics of digital consumerism and financial inclusion within the ZANACO digital banking ecosystem during the COVID-19 pandemic

The emergent behaviour of ZANACO within the complex adaptive system (+5) was then the need to aggressively transform its business processes that included reviewing marketing strategies and fine-tuning the technology offering. At the same time, consideration was given to customer centricity and cost optimization. This meant focusing less on brick and mortar, less on cash needs, but more on cashless and efficient distribution models. Another consideration was given to the growth in financial technologies (FinTechs) that leveraged off agility and more lifestyle-based new digital products and services. This was a critical element for driving financial inclusion of the unbanked segments of the society that mostly includes Generation Z. Thus, Mobile network operators (MNOs) and banks have come together to build an ecosystem to accommodate lifestyle-based financial services. With creativity and innovation (+7), ZANACO was able to reposition itself for information technology (IT) use (+8) to intensify Agency banking (+9) by increasing the number of agents to 9,800 on its ZANACO-branded Xpress service. This reflected an eightfold increase on the 1, 200 agents in the pre-COVID-19 era. In agency banking, all banking services such as receiving deposits, withdrawing cash, transferring funds, bills payments, inquiry about bank balances etc. are offered by the employee of the banking agent instead of the parent bank teller (Lotto, 2016). The ZANACO Xpress agency banking service was seen as a frontier for digital financial inclusion of not only the Generation Z that are mostly employed as agents, but also as a pathway for expanding and strengthening the bank's distribution network beyond the urban areas to rural areas (+10). The COVID-19 pandemic made normal branch visits more challenging for the customer with the social distancing requirements and reduced banking hours to minimize exposure of members of staff and customers. Thus, the digital banking ecosystem offered alternative channels that were well received by the customers looking at the growth in numbers of digital financial clients. The growth in the network outlay

further suggests that ZANACO now has presence in remote areas which were not previously serviced thereby creating new revenue streams for the agents and merchants operating on commission-based agreements. On the digital frontier (+11), ZANACO grew its digital customer base of 700,000 in 2019 to 850,000 in 2020 under the COVID-19 whereupon it achieved the ability to absorb future shocks caused by the economic lockdown as part of financial business sustainability and digital financial inclusion (+12).

3. CONCLUSION

In view of the foregoing co-evolutionary dynamics of digital consumerism and financial inclusion in the study setting of a sub-Saharan African financial business ecosystem, it has been demonstrated that ZANACO faced the economic lockdown induced by the COVID-19 pandemic with enhanced financial business sustainability and digital financial inclusion. This signified the ability of the complex adaptive system to absorb future shocks thereby attaining a second level of transformational resilience. Therefore, the COVID-19 scenario presents scope for enhancing the digital financial inclusion of the marginalized segments of society through increased access to electronic banking services and financial technologies. The pathway to digital financial inclusion is, therefore, contingent upon the ability of the financial business ecosystems to overcome the rigidity trap of non-flexible regulatory frameworks, which occurs at the opposite end of the poverty trap in a maladaptive system typifying the socio-economic setting of sub-Saharan Africa.

ACKNOWLEDGEMENTS

Management of the Zambia National Commercial Bank is gratefully acknowledged for its support-in-kind rendered to this research work; and a tribute of gratitude is further extended to the organisers of the e-Conference on “COVID-19 and Global Business Sustainability: IT promptness” for the opportunity to share knowledge and experience on this contemporary subject matter.

DECLARATION OF INTEREST

There is no conflict of interest in the publication of this paper.

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