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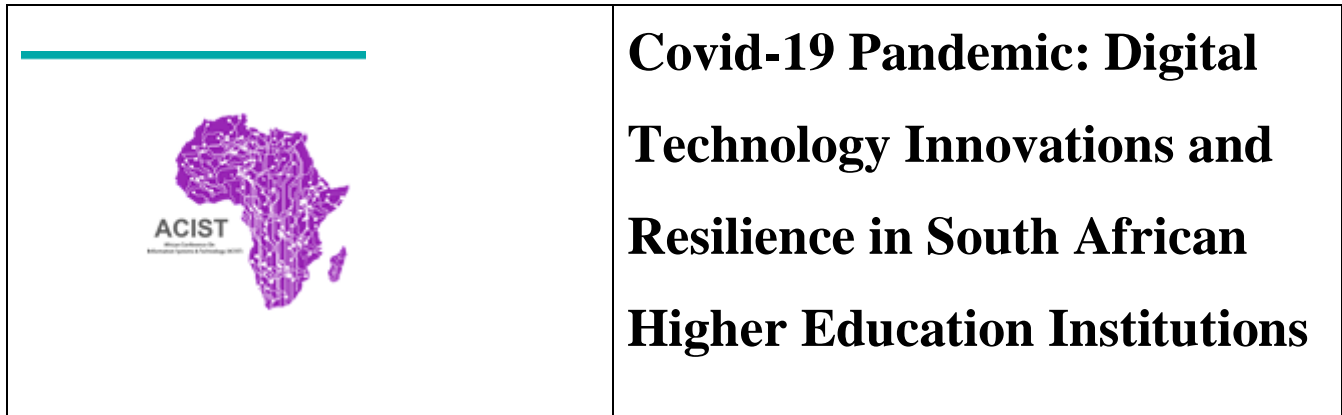Vusumzi Funda

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ABSTRACT

The centrality of education in socio-economic development has since been recognized and considerable efforts have been made towards safeguarding the objectives of inclusive education. The covid-19 pandemic has disrupted learning and teaching in tertiary institutes which resulted in sudden adoption of online innovations meant to ensure continuity in Higher Education Institutions (HEIs) in the face of restrictions and social distancing. The sudden adoption of digital technologies as a desperate stop-gap measure to ensure continuity and revenue inflows against a background of high overheads has been met with challenges. This study explores literature on inroads made towards harnessing digital technologies for teaching and learning in South African HEIs. Specific focus is on the potential role of digital technologies during and in the aftermath of the covid-19 crisis. It is argued herein that resilient HEIs will require an ambidextrous digital technology strategy that optimizes exploitation of existing innovations to improve the efficiency and effectiveness of onsite and digital education services.

Keywords

 Digital innovations, online education, organizational resilience, e-learning

INTRODUCTION

The adverse socio-economic disruption associated with the covid-19 pandemic has far reaching implications on the education sector, as with other service sectors (Dube, 2020). The disruption caused by the covid-19 pandemic has given renewed impetus to the discourse on the dynamic relationship between organizations and their environment. Organizations operate within the context of the environment capable of either fostering or constraining operations.

Changes in the organizational environment necessitates the institution of appropriate strategic and organizational adjustments with respect to processes, models, products and services in alignment with the changes.

Patil (2020) state that covid-19 pandemic presented a substantial disruption in the socio-economic environment marked by social distancing and digitalization of services. In Higher Education Institutions (HEIs), disruptions came in the form of restrictions on the use of traditional onsite schooling in favour of distance and electronic learning (Mhlanga and Moloi, 2020). However, a host of digital innovations have been embraced albeit immaturely as a desperate stop-gap measure to ensure resumption and sustenance of learning under the covid-19 adverse conditions. In the case of South Africa, this fast-trekked adoption of electronic learning (e-learning) in HEIs showed mixed results. The core thesis of this article is that e-learning is an essential strategic response to disruptions in the environment caused by the covid-19 but in itself, it is inadequate for sustained organization resilience and more so when it is immaturely adopted. Digital technologies provide HEIs with substantial potential to absorb and adapt to the disruptive effects of the covid-19 crisis along with harnessing related opportunities. It is argued that digital technology is a dynamic organizational asset continuously improved in order to gain a sustained digital capability. To this extent therefore an ambidextrous digital technology strategy is necessary for innovation and resilience in HEIs.

This article is largely descriptive, based on a deep analysis of the literature comprising peer reviewed journal articles, newspaper articles, reports from government and multilateral institutions, policy documents and relevant books. This article begins by discussing a case for technology investment and strategy in the education sector and proceeds with reviews digital technology interventions within a conceptual framework anchored on three pillars: the antecedents, technology ambidexterity and organizational resilience, provide a snapshot on the post-covid-19 scenarios and concludes with the insight on the role of digital technology in the development of innovative and resilient higher education system.

CONCEPTUAL BACKGROUND

The covid-19 pandemic induced socio-economic disruption has brought to the fore the operational imperative for developing resilient capabilities. The covid-19 pandemic draws considerable attention to the dynamic relationship between organizations and the environment within which they operate. Monzoni and Carvalho (2020) contend that organizations find themselves trapped in an ever-changing environment driven by massive technological innovations and changing customer behavior. The focus of the discourse is on how organizations can develop innovative and resilient capabilities necessary to navigate the sub-optimal conditions under the covid-19 pandemic.

Resilience is defined here as an organizational state in which the organization is able to rebound and adapt to shocks by transforming itself in terms of its business models, processes and products in alignment with the new

environment (Nicolletti et al., 2021). This is a dynamic state of resilience, evolutionary in state and perpetually transforming the organization (Belinky, 2017). The covid-19 pandemic has introducing a new normal characterized by expanded online operations and a reduction in demand for contact-based services. There is a serious possibility that organizational environment will continue along this trajectory in the post covid-19 pandemic. This presents a case for organizational resilience in HEIs. Digital technology adoption in the HEIs has provided a strategy for continuation under the covid-19 restrictions. This article interrogates the efficacy of the hastily adopted digital innovations, provides insights for continuous improvements and leveraging digital technologies for resilience in the South African HEIs.

ANTECEDENTS FOR TECHNOLOGY INNOVATIONS

Digital technological capability places organizations in a better position to respond to the changes in the environment, absorb the shocks and disruptions and also to harness opportunities which come with disruptions. Investment in digital technologies in HEIs has potential to strengthen their resilience in view of the uncertainties surrounding cure and emerging variants of covid-19. An ambidextrous digital technology strategy (combining technology exploitation and exploration) better places HEIs in a position to respond to environmental challenges. Technological ambidexterity is a necessary pre-requisite for organizational resilience during and post covid-19 pandemic.

The table below gives shows the antecedents for technology innovations under covid-19 pandemic implications on organizational resilience:

Resilience framework	Main elements	Description
Antecedents for technology adoption under covid-19 outbreak	Health risk	Health risk associated with in-person onsite education services triggered technological innovations for digital education services
	Declining revenues	Low demand for on-site education due to health risks and space limitations reducing student enrolment
	High overheads	High fixed costs including rentals and utilities against sub-optimal business performance

	Environmental uncertainty	The prospect for continuing under lockdown/ restrictive regulatory regime due to uncertainty around covid-19 cure, immunizations and new variants
	Changing consumer behavior	The rising demand for digital and convenient education services on payments and consumption
Ambidextrous digital technology strategy (optimizing concurrently exploitation and exploration)	Exploitation strategy	Focuses on leveraging and optimizing existing knowledge and digital innovations to ensure continuity, efficiency, effectiveness and quality in digital and onsite education
	Exploration strategy	Focuses on the continuous search for new knowledge, ideas and technology innovations to help improve further existing digital education service to meet educational expectations in terms of quality, curriculum suitability and convenience
Organizational resiliency under uncertain environments (dynamic resilience)	Anticipation capability	It is the ability to scan the environment for disruptive threats or new trends on education technology, teaching and learning contexts, quality and accountability management, and new opportunities
	Absorption and Adaptation capability	It is the capability prepare for potential innovative or socio-economic disruptions, adjust the education institutions, teaching and education services, products and delivery models in alignment with the new circumstances

Table 1: Digital innovations and organizational resilience

SOUTH AFRICAN HIGHER EDUCATION SECTOR

Krönke and Olan'g (2020) posit that the impact of the covid-19 pandemic has been extremely harsh and far reaching on the services sector in general and the higher education sector in particular. According to UNESCO (2020) about 1.2 billion students and youth were affected worldwide by the sudden closure of institutions of learning. In the context of developing countries including South Africa, the covid-19 health and socio-economic impact aggravated deteriorations education quality owing to a host of other inimical factors already prevalent before the covid-19 pandemic such as high drop-out rates seeing 258 million children out of school before the lockdown (Save the Children, 2020), infrastructural and human resources bottlenecks. Chronic problems compounded by the adverse effects of covid-19 on HEIs made the situation particularly dire and urgent in the developing countries.

The severity of the disruption associated with the covid-19 lies in the suddenness, magnitude and systemic nature of the health and socio-economic impact to which governments, HEIs and society have been ill prepared to absorb. Dube (2020) assert that in South Africa, the higher education sector, as with other sectors of the government, has been equally unprepared to respond to the crisis as they struggled with fixed costs, low revenue inflows under sub-optimal operational conditions. The health risk associated with the pandemic triggered a high demand for digital services but also lowering demand for onsite schooling.

In response to the radically altered socio-economic landscape characterized by social distancing and stringent public health regulatory regime HEIs adopted digital technologies (Mhlanga and Moloi, 2020). Initially HEIs have been digitalizing, albeit at a slower pace, the covid-19 disruption has triggered the accelerated adoption of a wide spectrum of digital technologies under the most extreme time constrains (Carroll and Conboy, 2020). Digital technologies have been especially designed to bridge the gap between the institutions and instructors on one hand and the learners on the other hand. These digital innovations have been considered expedient not only to ensure continuity in education but to ensure inclusive learning (Riasanow et al., 2018). Inclusivity of digital education lies in its ability to provide convenient learning to all ages along with the ability to facilitate learning and work endeavors at the same time.

Digital education in HEIs

Digital education exploits the communicative capabilities offered by the social media platforms and mobile penetrations along with television and radio broadcasts and mobile applications in South Africa (Mhlanga and Moloi, 2020). Generally, e-learning refers to teaching and learning that is driven by a combination of computer technologies and the internet (Aboagye et al., 2020). E-learning consists of learning which is wholly digital involving less or no personal interaction and the blended form in which e-learning and teaching platforms are blended with the traditional face to face model (Horn and Staker, 2010). These e-learning innovations have been met with mixed results with the limitations largely aggravated by the suddenness of adoption but the key achievement being in the ability to provide learning continuity and saving the academic calendar.

The ongoing digital transformation is opening whole new opportunities in the HEIs including efficiency gains. The prime advantage of digital education is its distinct capability in facilitating sharing of information, learning materials between lecturers and students and amongst student and lecturers allowing education institutions to contain service costs (Fomunyam, 2019). There is a growing body of literature focusing on the improvements of e-learning and its implications on the quality of education (Shen and Ho, 2020).

Digital technologies in HEIs

Lizcano et al., (2020) discovered that despite the nobility of intent behind the fast-trekked adoption of digital technologies for e-learning and the supreme convenience drawn from bridging social distancing and limiting health risks as literature demonstrates, a host of challenges still stand in the way. One of the most important limitations is the digital divide which is the disparity in skills and access to technologies (Dijk, 2020). In the case of South Africa, digital education has the potential to aggravate the digital divide which seems to find its roots in the apartheid era (Nyahodza and Higgs, 2017). Challenges pertaining to access disparities include the high cost of data and internet which effectively precludes the poor and disadvantaged from enjoying the same access with their counterparts (Mhlanga and Moloi, 2020). In the context of South Africa, literature suggests that there is digital divide between schools in affluent urban suburbs and the poorly resourced schools scattered in the remote areas (Department of Education, 2004).

The most notable challenge around the hastily adoption of e-learning lies in literacy skill gap. E-learning is fairly a new concept in most HEIs and amongst academics, students, parents and communities at large (Naik et al., 2020). As such, these new digital innovations necessarily require adjustment to different learning contexts and levels of exposure for a straitjacket adoption would result in a substantial negative impact on education (Ssekakubo et al., 2014). Education as a service is co-provided with parents who may be required to play an active role in the education of their children, helping with homework and revisions. The introduction of e-learning has seen many parents most of whom victims of the marginalization associated with the apartheid era digitally ill prepared to continue with their part using digital platforms with quality implications.

TECHNOLOGY ACQUISITION IN SOUTH AFRICAN HEIS

Manasia et al., (2020) posit that the discourse pertaining to the potential role of digital technology in HEIs has gained considerable traction focusing on the efficacy of digital technologies, limitations and the need for empirical studies. There is a body of literature concerning itself with the implications of digital technologies on ethical integrity, pedagogy and epistemology (Manasia et al., 2020). This body of literature seems to take the debate beyond issues of efficiency gains and convenience to suitability and effectiveness. These concerns partly stems from a deep understanding that immature adoption of digital technology has serious unintended effects including 'digital sclerosis', a condition where digital innovations stifle services, processes and models limiting operational flexibility, effectively defeating the very purpose for their adoption (Andersen et al., 2020).

In the education system there is a risk that the immature rolling out of e-learning might aggravate existing inequalities and thus result in unintended social exclusion of poor and marginalized groups of the society from consuming education services. To this extent, Kayembe and Nel (2019) argue that ad-hoc digital adoption

approaches characteristic of the covid-19 digitalization wave in HEIs need urgent rationalization guided by a clear and coherent digital acquisition and implementation strategy. A clear and coherent technology strategy will ensure consistent financial investment in technology and provide strategic direction in technology adoption and implementation in HEIs. A technology strategy will ensure that technology adoption is not viewed as a once-off investment but cumulative and continuous process of build-up and improvement. It is especially urgent to provide minimum competency skills for educators along with provision of development training in order to ensure that lecturers possess the requisite digital skills for the information economy in order to ensure their active participation in the new learning and teaching ecosystems. The use of advanced tools including video streaming and virtual learning is essentially a novel concept in developing countries including South Africa (Lizcano et al., 2020). The novelty of advanced digital education systems presents formidable challenges to lecturers, parents and students, especially when it come against other problems around digital education to do with reliability and misuse of technology (Mukhtar et al., 2020). It is noteworthy that critics of e-learning still lament the lack of the most needed human and personal touch in the teaching and learning exchange (Somayeh et al., 2016). It is for this reason that an ambidextrous technology strategy is recommended in view of its twin capabilities of concurrently leveraging exploitation and exploration. E-learning, as with the traditional face to face education requires serious financial investments which in most cases is limited, especially currently when HEIs are on a shoe string budget.

THE POST COVID-19 SOCIO-ECONOMIC PROJECTIONS

Contemporary literature on the post covid-19 scenarios seem to converge on a number of environmental conditions and digital trends. For instance, there is consensus on digital trends already imminent during the covid-19 pandemic largely informed by the need to reduce contact-based services including: online shopping and robot deliveries, contactless payments, remote work, distance learning and supply chain 4.0 (Xiao and Fan, 2020). In the same vein, other studies posit that the covid-19 environment is characterized by substantial online meetings, collaborations and remote work. There is a body of literature, albeit small, projecting that the current digital transformation momentum will continue foreseeably into the post-pandemic fueled by people's fear for contact and high preference for contactless services. These trends suggest the need to seriously consider business resiliency under the foreseeable restrictive environment marred with considerable uncertainties around the issue of covid-19 cure, immunizations and the new variants. This brings to the fore the need to focus the discourse on the disruptive impact of covid-19 on education to the more pertinent issue, leveraging technological muscle as a distinct resilient capability.

Projections on economic performance by experts point to a new normal in which technology and digitalization will become the hallmark and resilience efforts must necessarily focus on the technology strategy and its future prospects (GEM, 2020). This does not however mean to say technology strategy is in and of itself a solution to the many

disruptions facing HEIs today but nevertheless a fundamental lever with which to build on organizational resilience. Another perspective is that HEIs in the post covid-19 pandemic will be characterized by hybrid models blending the traditional face to face with online teaching and learning. Some studies points to the sudden proliferation of the private players in the education sector and suggest the need for policy regulation and data control (Human Rights Council, 2020).

Chen (2015) state that the knowledge economy demands significant levels of digital literacy for socio-economic and political linkages. For instance, social media platforms have transformed people's interactions, reshaping social and business interactions (Oke and Fernandes, 2020). It is therefore advisable for HEIs to develop sustainable ecosystems of learners, academics, parents and communities digitally capacitated to play an active part in the modern economy (Paledi and Alexander, 2018). Notwithstanding a myriad of problems associated with the use of digital technologies in HEIs, its many benefits cannot be discounted neither can their future role in the post covid-19 pandemic. The crucial question therefore is how best digital technologies can be harnessed sustainably toward e-learning without engendering inequity and exclusion (Aung and Khaing, 2015). This article argues for an ambidextrous technology strategy as a pre-condition for digital innovation and resilience in HEIs.

AN AMBIDEXTROUS TECHNOLOGY STRATEGY

The main argument of this article is that the ad-hoc and immature technology acquisition shaping digital transformations in HEIs can be rationalized within the supervening circumstances presented by the covid-19 pandemic. As such, the impact of digital technology innovations in HEIs is largely dented owing to the ad-hoc and immature nature of technology adoption. It is important to note that innovations in technology provide a capability to sustainably in order to navigate the ever-changing and harsh environmental disruptions. To this extent therefore, it is befitting to put in place a proper technology strategy.

A technology strategy will guide the identification and adoption of relevant technologies necessary to meet the pre-determined organizational goals (Alsudiri et al., 2013). It is imperative to reduce fragmentation and whimsical technology adoptions which may not only waste organization's resources but cause the unintended consequences of inequality and social exclusion (Martinez et al., 2015). While having a technology strategy is an important starting point, the same strategy must be kept in alignment with the changing environment in order to sustainably create value (Rai et al., 2015). This is necessary in order to stay competitive in the current socio-economic environment characterized by uncertainty and instability. However, keeping the organizational technologies attuned to the environment is not an easy task but an important one to harness opportunities coming with disruptions and crisis events. As such, it is suggested that an ambidextrous technological strategic conceptual framework (Figure 1 below) has the greatest potential to keep HEIs resilient to environmental disruptions. It is pertinent to reiterate that the

organizational and social environment is characterized by both uncertainty and rapid changes in technology and customer expectations and in this regard traditional strategic models promises very little.
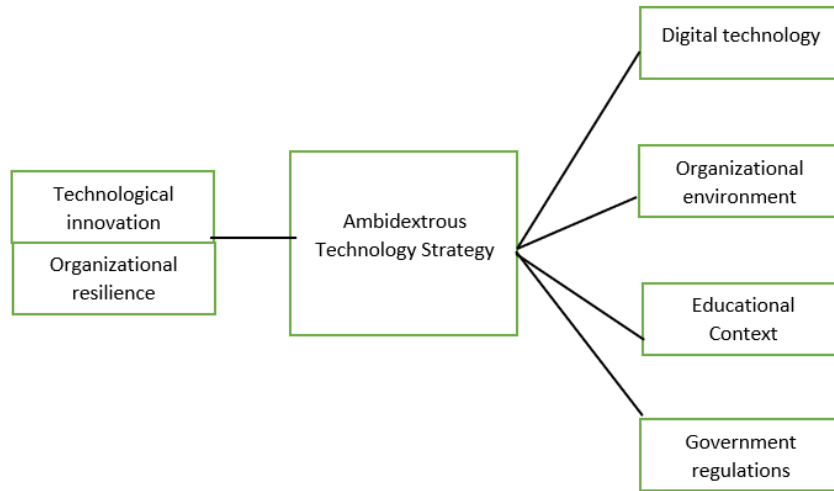

Figure 1: Ambidextrous Technological Strategy Conceptual Framework

Ambidexterity in the technology strategy will allow the HEIs to benefit most from the current breath of technology innovations, improved efficiencies, providing real time virtuous streaming, and improved learning through exploitation. An ambidextrous technology strategy will help the HEIs to keep abreast and in alignment with technological advances and environmental changes (Wu, Straub and Liang, 2015). Technology is in itself subject to rapid change, it is for this reason that a technology strategy for the HEIs is imperative for sustained operational performance and continuation in the face of disruptions. However, it is not logical or proper that digital technology should replace wholly onsite schooling, ruling out the substantial benefits of social networking based on real human interactions (Human Rights Council, 2020). It remains critical that technology bridges the distance between academics and students in the event of disruption and also serve as a strategic springboard for innovations.

CONCLUSION

The disruptive impact of covid-19 on the education institutions has been substantial and far reaching. The covid-19 pandemic transformed the socio-economic landscape into one characterized by social distancing and a reduction in in-person services. This sudden but radical transformation in the socio-economic landscape has forced HEIs to embrace albeit immaturely a wide range of technology innovations designed to bridge the distance between education institutions and instructors on one hand and learners and parents on the other hand. Despite the nobility of intent behind these digital innovations and registered successes, challenges such as widening social inequality and digital divide in the consumption of online teaching and learning has become apparent. These challenges can

be largely located in the manner with which digital technologies have been adopted under the supervening circumstances presented by the covid-19 crisis. Notwithstanding the limitations confronting e-learning, it remains one of the most effective, assured and safe way to continue with education in the face of disruption. Online teaching and learning does not however in itself substitute the quality of learning and replacing wholly onsite schooling is most unwelcome as it precludes the most needed human interactions. It is the core argument of this article that technology acquisition, notwithstanding its demerits, provides a much needed resilient capability to the education system. This however should be followed by necessary adjustments in the financial, manpower and resource commitments.

Technology acquisition is not a simple process characterized by once-off investment as most decision makers would want, but a continuous process of building on technological muscle of HEIs from strength to strength. Technology adoptions demands new sets of teaching and digital skills which may not be obtaining at the time of technology acquisition. In HEIs, it affects front-end and back-end processes, teaching and learning contexts. It should therefore be followed by necessary re-skilling or up-skilling in order to fully optimize the benefits of digital technologies and reduce system rigidity.

This is impossible to do without a clear strategy designed with an eye to strengthen resilient capabilities. In order to remain resilient in light of disruptions, uncertainties and fluctuating demand a digital technology exploits the communicative capabilities offered by the social media platforms and mobile penetrations along with television and radio broadcasts and mobile applications in South Africa (Mhlanga and Moloi, 2020). Ambidexterity strategy optimizing exploitation and exploration in digital technology sourcing will position organizations in a better place to absorb the shocks, adapt to them and flourish in them. HEIs must therefore sufficiently and sustainably invest in digital technology acquisition with the objective of harnessing the full breath of opportunities which come with it while at the same focus on eliminating bottlenecks.

There is need to develop the resilient capabilities in HEIs in order to position them in a firm position for the post covid-19 environment. Organizational resilience which is an evolutionary capability enabling HEIs to anticipate, absorb and adapt to changes in the environment is critical. As such, the proposed Ambidextrous Technological Strategy Conceptual Framework may be essential in order to meet the short- and long-term aspirations of the organization. HEIs must fully harness opportunities presented by the covid-19 disruption through efficient exploitative strategies while at the same time keep on learning on new technology innovations and ways of making the existing array of digital innovations work better. However, technology is not in itself a panacea to performance issues in HEIs, other key issues must be attended to including resourcing, manpower, competence and motivational issues bedeviling the education system. Technology has however become an imperative in light of the social distancing and developing trends towards distance learning and online transactions. The role of technology is

therefore twofold: it provides a capacity to cope with disruptions and a capacity to innovate new models, products and services.

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