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Operational Resilience and Efficiency of Private Universities in Southwest Nigeria: The COVID-19 Pandemic Experience

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Abstract: The study investigated operational efficiency through operational resilience of private universities in Southwest Nigeria during COVID-19. Private universities were established to impact knowledge, enabled unhindered learning and timely turn-out of graduates since their inception in 1999. However, private universities' operational efficiency was challenged and truncated by the outbreak of the COVID-19 pandemic, which motivated the thrust to determine their operational resilience along with their efficiency. Primary data were obtained from academic lecturers in eight selected private universities in Southwest Nigeria. The questionnaire used was adapted, and the validity and reliability were established. Findings showed that operational resilience significantly affected the operational efficiency of the universities. Therefore, institutions should leverage technology to enhance response and fast-track learning to drive their operational efficiency in the face of disruptions and pandemic.
Keywords: operational efficiency; operational resilience; mission critical services

Abstrak: Studi ini meneliti efisiensi operasional melalui ketahanan operasional universitas swasta di Nigeria Barat Daya selama COVID-19. Universitas-universitas swasta ini didirikan untuk menunjang ilmu pengetahuan, pembelajaran tanpa hambatan, dan jumlah lulusan tepat waktu sejak didirikan pada tahun 1999. Efisiensi operasional universitas swasta ditantang dan terhambat oleh merebaknya pandemi COVID-19 yang memotivasi dorongan untuk menentukan ketahanan operasional terkait efisiensi. Studi ini menggunakan data primer yang diperoleh dari dosen akademik di delapan universitas swasta terpilih di Nigeria Barat Daya. Kuesioner yang digunakan disesuaikan dan validitas dan reliabilitas ditetapkan. Temuan menunjukkan bahwa ketahanan operasional secara signifikan mempengaruhi efisiensi operasional universitas. Oleh karena itu, institusi harus memanfaatkan teknologi untuk meningkatkan respon dan pembelajaran jalur cepat guna mendorong efisiensi operasional mereka dalam menghadapi gangguan dan pandemi.
Kata Kunci: efisiensi operasional; ketahanan operasional; layanan misi penting

INTRODUCTION

The educational sector in Nigeria has witnessed a relative revolution and impressive turnaround since the inception of private universities in 1999 and has become germane for economic growth and development. The educational liberalization was intended to solve the endemic problems that were destroying tertiary education in Nigeria; strikes, riots, unrests, lockdowns, and cultism (Egwakhe & Osabuohien, 2009), which characterized the public university education sector. As a result of these

problems, students were not sure of the opening or closing dates of the school system (Umeh & Matthew, 2017). Thus, the university system in Nigeria appeared to have been galvanized with the proclamation of the first three private universities in 1999. These premier universities were Igbinedion University, Okada, Edo State; Babcock University, Ilishan-Remo, Ogun State and Madonna University, Okrija, Anambra State (Iruonagbe et al., 2015; National Universities Commission, 2019). Also, the private university system in Nigeria has grown rapidly from three in 1999 to seventy-nine in 2019 (Bolaji, 2020; National Universities Commission, 2019), with the highest concentration of private universities located in Southwestern Nigeria.

The exponential growth in the number of private universities impinges strategic, operational resilience on universities towards operational continuity and efficiency, which was challenged by the spread of the Coronavirus disease across the globe. The outbreak of the novel Coronavirus disease in 2019 (COVID-19) has spread to more than 120 countries worldwide, and 54 out of 56 African countries (including Nigeria) have become crucial test grounds of the true meaning of operational resilience in the university system. As a result, numerous African higher education institutions (HEIs) and other educational institutions have been ordered to close down to curtail and contain the spread of COVID-19. The United Nations Education Scientific Cultural Organization (UNESCO) estimates that 776.7 million children and young people worldwide will be hindered by the closure of schools resulting from the COVID-19 pandemic, which was corroborated by the Association of African Universities (2020).

In the first three months of the new decade, the novel coronavirus and the corresponding disease tagged COVID-19 spread from Wuhan City in central Hubei Province of China to 201 other countries and territories (La et al., 2020). According to the Global COVID-19 Tracker Map at the Johns Hopkins University Center for Systems Science and Engineering [CSSE] (2020), more than 176,329,887 confirmed cases of people infected and 550,000 deaths as of 15th June 2021. In addition, COVID-19 pandemic has had such a large impact on the global higher education sector (Crawford et al., 2020) for a short period.

A mitigating initiative such as social and physical distance measures was instituted to slow down the spread of the disease, leading to the physical closure of schools worldwide. However, the study on the technological response of the United States of America's Coronavirus Education System (COVID-19) pandemic (Reich et al., 2020) concerning workload, mental health, and psychological support revealed a turning point in the state-level education policy on distance learning. Accordingly, approximately 20% of countries have issued comprehensive remote-learning guidance addressing issues related to digital versus non-digital options, grading policy, graduation requirements, equity issues, provision of services to students with disabilities, time and schedule recommendations, and suggested resources, lesson plans, and more. Thus, between March 27 and March 31, 2020, the guidance from all 50 U.S. state education agencies was reviewed to summarize issues and challenges and identify emerging recommendations and best practices (Reich et al., 2020).

The first case of coronavirus disease (COVID-19) in Nigeria was confirmed by the Federal Ministry of Health on February 27, 2020, in Lagos State, since the beginning of the outbreak in China in January 2020. This first case was an Italian citizen who worked in Nigeria and returned from Milan, Italy, to Lagos, Nigeria, on February 25, 2020. It was confirmed by the Lagos University Teaching Hospital Virology Laboratory, part of the Nigeria Center for Disease Control [NCDC] Laboratory Network. From this first case, the number of cases in Nigeria has increased to 10,819 (as of June 3, 2020), with 314 recorded deaths and 3,239 recoveries (NCDC, 2020). Advisory measures on social distancing have been recommended, along with suggestions to restrict travel, postpone and cancel large-scale gatherings (NCDC, 2020). As the number of cases increased, the government ordered the immediate closure of tertiary institutions, secondary and primary schools in the country as part of measures to contain the spread of the disease (Wahab, 2020). Even then, the number of reported cases in Nigeria has further increased to 167,078 (as of June 15, 2021), with 1,492 deaths and 163,469 recoveries (NCDC, 2021). With the closure of many businesses and academic institutions on March 19, 2020, to prevent coronavirus spread, universities and business operations were disrupted, and several losses have been incurred.

In the light of these commentaries and reports, resilience and coronavirus impact studies had been conducted on small and medium-sized enterprises (Coates et al., 2020), public health (La et al., 2020), transport (Amekudzi-Kennedy, 2020), education (Crawford et al., 2020) among others. These resilience studies focused on product offerings, supply chain, risk management, exchange rate volatility, and

security. However, limited studies focus on the education sector thus, this paper filled the gap and focused on the operational resilience of the education sector, particularly the private tertiary institutions in Southwest Nigeria. Prior to COVID-19, previous studies had shown that resilience measures such as workload, which is linked with mental health and psychological work environment (Bukoye, 2017; Daykin et al., 2017; Devdutt & Mehrotra, 2018; Ekechukwu & Isiguzo, 2016; Ishola, 2017; Weissman et al., 2017), and the technological work environment to efficiency in most school systems (public and private) had remained a concern, especially in most developing countries as the traditional way of operations still reigns with most academics not willing to adopt and adapt technological advancement (Collins & Halverson, 2018; Henriksen et al., 2018; Jaja, 2013; Kanematsu & Barry, 2016; Mishra & Mehta, 2017; Page & Thorsteinsson 2017; Runco, 2014). Hence, the lecturer-focused learning vis-à-vis student-focused learning in content delivery through operational resilience to efficiency was undertaken. The study is instructive and supportive to institutions in order to better understand and initiate revolutionary change to operational resilience towards operational efficiency.

LITERATURE REVIEW

To make an ample understanding of the concepts of operational resilience and operational efficiency, diverse literature was reviewed in the areas of concepts, empirics and theories. The synthesis of literature was to broaden scope and offer insight on the ripple-effect at global, continent and national level of COVID-19 in the area of education operational resilience towards efficiency.

Operational Resilience

Many institutions are beginning to understand the operational and financial risks posed by the increased threat of natural disasters, global pandemics and climate change (Foster & Smith, 2015). The challenges of today's operations vis-à-vis turbulent environment persuade most organizations to implement business continuity management system and enterprise risk management modalities to deal with disruptive incidents such as earthquake, flood, disease, and terrorist attacks (Soufi et al., 2019). Business organizational resilience to disruptions, disturbances and discontinuities is an evolving area of research that has attracted growing attention among academics and practitioners (Coates et al., 2020; Sahebjamnia et al., 2014). Essuman et al. (2020) defined operational resilience as the ability of a firm's operations to absorb and recover from abrupt or anticipated disruption. Resilient organizations are capable of bouncing back when faced with disruptive systemic shocks such as natural disaster (Miller & Engemann, 2019) and man-made-attacks. However, resilience is not just about rebounding, but more about the adaptive capacity and strategic reconfiguration of individuals, organizations and/or communities (Saunders & Becker, 2015). Thus, Mullen (2010) and Daykin et al. (2017) opined that the most important step towards becoming more resilient, therefore, is to identify areas of organization refinement and alignment that should be targeted such as workload, mental health, work environment, psychological and technological environment.

Resilience is a global topic in a number of industries, with many organizations moving towards operational resilience. Pricewaterhouse Coopers (2019) suggested five reasons for this trend; higher customer expectations for twenty-four-seven availability, increased cyber threat sophistication, unending severe natural disasters and extreme weather events, higher risk associated with internal change failures, and increased regulatory scrutiny. In order for operational resilience to be successful, the cross functional areas of the organization need constant strategic adjustment and fitness properties. Thus, operational resilience includes building shock-absorber-blocks or stop-valves that include risk frameworks, wellbeing measures, and firewall processes and methodologies that organizations are institutionalizing to absorb and recover from unanticipated shocks for efficiency (Awasthi, 2020; Egwakhe & Umukoro, 2019; Miller & Engemann, 2019). Scholars have stressed that organizational resilience system is often established to integrate and maintain continuity and recovery plan for essential operations not only before, but also during and after any disruptive event based on prior arrangements of bundles of strategic resources (Miller & Engemann, 2019; Sahebjamnia et al., 2014) to sustain competitive advantage through efficiency in service delivery.

In the last decade, organizations generally have realized that lack of preparedness to face disruptive incidents that affect efficiency have irreparable consequences (Aguirre et al., 2005; Foster & Smith, 2015; Muflihah & Subriadi, 2018). Thus, while Junior Cycle Wellbeing Guidelines [JCWG]

(2017) and Bruton (2018) focused on systems-based understanding of resilience measures with emphasis on both the immediate environment, social values, health and resources such as, workload, mental health, physical, psychological and technological work environment; Soufi et al. (2019) identified Business Continuity Management (BCM) as a robust new approach to achieve this purpose. Soufi et al. (2019) suggested three main steps that should be taken to implement the BCM in an organization; (a) the business key products should be identified using Business Impact Analysis (BIA) process, (b) those risks threatening the delivery of key products should be identified and categorized through the risk assessment process and risk matrix construction and (c) a solution should be design for each risk disruption identified in the Business Continuity Plan (BCP) risk matrix area that threatens the key product. Cumulatively, the resilience indicators identified by JCWG (2017), Bruton (2018), and Soufi et al. (2019) are interrelated as organization's resilience planning relies on the assumption that each section of the organization depends on the continued functioning of the other sections hence supporting systems-based concept for operational resilience.

Awasthi (2020) argued that though resilience measures should be systems-based, some sections of the organization are more critical than others and requires more resources in the event of a disaster. Thus, costs associated with disruption, such as loss of profits, replacement of equipment, incremental salaries, loss of customers is paramount. Though, Steiner (2018) claimed that business impact analysis (BIA) is a systematic process to identify and assess the potential impact of a disruption on critical business operations due to a disaster, and accident or emergency. This is done by distinguishing critical (urgent) from non-critical (non-urgent) functions or activities of and organization and defines the Recovery Point (POR) and the Recovery Time Goal (RTO). In addition, Office of the Superintendent of Financial Institutions (2019) stated that key activity in the operational resilience strategy that enables the organization to ensure the continued availability of priority services in the event of disruption is business continuity planning (BCP). As such Miller and Engemann (2019) stressed that resuming normal processing is the goal of the recovery phase as recovery involves the stabilization and resumption of critical activities. Likewise, Awasthi (2020) added that disaster recovery planning will involve the various teams in the organization coming together to develop a plan that may be rigorous but has a detailed step-by-step process for its implementation.

These commentaries are interrelated with the resilience indicators by JCWG (2017) and Bruton (2018), since no matter the business impact analysis, business continuity planning and disaster recovery initiated, if the amount of workload which could either be positively or negatively connected with mental health and the physical, psychological systems and technological work environment are not fine-turned and refined progressively (Egwakhe & Umukoro, 2019), optimum operational resilience may not be achieved even in the face of disruptions and pandemic. As such, Usoro (2018) viewed the concept of workload, as amount of work an individual has to do no matter the prevailing situation. Linking workload and mental health, Devdutt and Mehrotra (2018), and World Health Organization (2016) stated that mental health involves a state of mind in which an individual can effectively utilize his or her capacities by displaying psychological resilience in making personal and social adjustments to fit the dynamic environment within which the individual coexists with other persons; and pattern of reactions to a situation where job demands are not compatible with workers' competence, abilities or aptitudes, and challenges coping mechanism (Mbazor et al., 2018; Salau, 2017). More so, Oludeyi et al. (2018), and Iqbal et al. (2018) conceptualized physical work environment as the physical or tangibles at the setting where job is performed, and the work setting goes beyond the physical office space. While the technological work environment, relates to a digitalized workplace that has a strategic mechanism that improves cooperation, communication, and exchange of information and knowledge through the presence and proper use of tools or assets that encourage knowledge and information to flow more rapidly and spread more easily (Alabi et al., 2017; García-Sánchez, García-Morales, & Martín-Rojas, 2018).

Operational Efficiency

Operational efficiency is the backbone of any institution. It is associated with the judicious use of the resources and capabilities available to the institution or organization in a cost-effective manner to minimize waste and maximize resources according to laid down policies (Musah et al., 2019). Kunz and Crones (2015) in analyzing the monetary implications in constraining price vectors which maximize the different single objectives, identified (i) profit, (ii) revenue, and (iii) unit sales, as well as (iv)

balanced multiple objective solution as the efficiency measures of a retail revenue management system. Likewise, Ikhwana et al. (2019) suggested that business optimization involves cooperation ranging from the supply of raw materials, processing raw materials, manufacturing, to consumers, in an activity integrated manner. As such, Ikhwana et al. (2019) defined operational efficiency along quality of materials, price of materials and timeliness of delivery of a firm's product or service. Essuman et al. (2020) added that operational efficiency reflects how well a firm minimizes "costs" (such as, actual monetary expenses either direct and or indirect paid incurred and volume of wastes in operations like waste of material and idle capacity) associated with administering its business operations. The view of Musah et al. (2019), summed operational efficiency as techniques and strategies adopted to accomplish the basic goal of delivering quality goods and services, which can be achieved by streamlining the firms' core processes thereby effectively responding to continually changing market forces in a more cost-effective manner which can be achieved either through operational management, improvement, and system management. Consequently, operational efficiency is aimed at curtailing the unwelcomed and maximizing resource capabilities as a key determinant of the long-term solvency of businesses attained when a firm minimizes redundancy and waste while leveraging their resources that contribute mostly to their success; and also utilizing the best of their workforce, technology and business (Hussain et al., 2017; Kasule, 2015; Musah et al., 2019; Olofin & Aniede, 2016).

Operational Resilience and Operational Efficiency

Several scholarly investigations have been carried out on how operational efficiency is affected by the operational resilient in institutions or organizations. Previous studies found that technology advancement as a component of operational resilience affected how humans lived, worked, adapted, think, and communicated to achieve efficiency (Cascio & Montealegre, 2016; Kanematsu & Barry, 2016; Olofin & Aniede, 2016; Umukoro & Egwakhe, 2019). However, Coovert and Thompson (2014) study stressed that the direction of how technology affected efficiency is not in and of itself technology; rather, it is how to utilize, manage the impact, and implementation of emerging global and economic developments. Accordingly, in the education sector, Page and Thorsteinsson (2017) found that the connection between technology for operational resilience and resourcefulness for operational efficiency is a crucial concern for twenty-first century education. As such, Mishra and Mehta (2017) advanced that aside the provision of operational resilience measures, there has been much consideration of what teachers need to know to use technology effectively. This is because, most school systems work environment still function in traditional ways (Collins & Halverson 2018; Runco, 2014); as most teaching staff especially in developing counties are not up to date with a variety of modern learning experiences to encourage academic efficiency (Anderson et al., 2014; Jaja, 2013; Kasule, 2015; Oludeyi, 2015).

In addition, Makhbul and Khairuddin (2013) found that the goal to build the international reputation of universities has had a huge pressure on universities due to higher education globalization's demand and institutions expectation. Hence, work overload obstructs the efficiency of educators in terms of service delivery, sharing information, as well as other administrative duties. Indicating that, there is a significant relationship between workload pressures, and efficiency. Usoro and Etuk (2016), and Osaat and Ekechukwu (2017) corroborated Makhbul and Khairuddin's (2013) findings that workload significantly influenced the job effectiveness and efficiency of lecturers. Abbas (2017) postulated that increased awareness, communication and networking through sharing information for improved research and teaching activities is a critical factor in the survival of educational institutions across the globe. Correspondingly, Agba and Ocheni (2017) found the existence of a significant positive relationship between physical workplace and efficiency in academia. Also that work related factors like internet facilities, conducive work environment, training opportunities, access to affordable medical care were significant determinants of the efficient service delivery from academic staff. Steenkamp and Roberts' (2018), Devdutt and Mehrotra's (2018), and García-Sánchez et al.'s (2018) findings are in line with previous studies that, workload, mental health, and psychological experiences affected academics and academia efficiency. Also, the support for technology and improvement of technological skills and, technological distinctive competencies, promoted improvement in efficiency and performance through the positive influence on the operational processes of potential and realized absorption capacity.

Further, the work of Aguirre et al. (2005) showed that an institutional approach to disasters allowed greater insight into the proposition, as disasters are produced by risks that create demands that

exceed the capacity of social organizations to handle. Hence, institutions should not only engage in a constant process of reinventing themselves as they pursue resilience and a minimization of vulnerabilities in times of crises but should also be embedded in planned networks of dynamic relations with other sectors and institutions. The implication from the foregoing is strengthening the internal capabilities as well as the exchanges of resources and coordinative efforts with others technically for enabled and enhanced operational efficiency. Thus, universities that have invested the most in resilience planning and risk management may financially outperform their peers (Aguirre et al., 2005). In addition, resilient campuses that are operational in times of stress are a critical element of a successful post-disaster community recovery (Foster & Smith, 2015).

Broadening the scope of previous works, the cumulative effects of these disasters to the institution can be summarized with respect to enrollment, financial consequences, and renewal (Foster & Smith 2015; Sarmiento et al., 2019). In assessing disaster and their economic tolls, Sarmiento et al., (2019) found five evidences of impact and interruption in business as physical, financial, market and functional. The loss of customer base and sales, loss of employees, lifeline/utility disruption, length of closure/delay in reopening are listed as other disruptions that impact recovery (Sydnor et al., 2017). As such, Essuman et al. (2020) postulated that a relationship existed between operational resilience and operational efficiency after moderating the role of operational disruption within the purview of resource-based theory and contingency perspective of the firm. In light of these findings, Blomberg et al. (2018), and Umukoro and Egwakhe (2019) resolved that the discourse on efficiency should acknowledge which operational resilience factors may work either for or against it under different circumstances.

Theoretical Review

This work was anchored on the systems theory propounded by Ludwig Von Bertalanffy in 1973 which supports the impact of operational resilience on operational efficiency. Systems theory supports the need to work in an open system as opposed to a closed one. Systems approach was adapted by organizations for their efficiency and effectiveness in the dynamic and changing environments. The theory explained operations, which involves the transformation of inputs (gotten from the environment) to outputs (sent back to the environment) while the organization or institutions is the processor (where transformation takes place). Similarly, resilience is not a state but a dynamic set of conditions, as embodied within a system. Therefore, the concept of organizational resilience is only visible when considered under system theory. Hence, resilience is certainly a good goal for any organizations, however, it will never be achieved if an organization is fragmented or disconnected, as a result of this, organizations require a new way of thinking, with interdependency and synergetic coherence in parts as defined in system theory (Quendler, 2017). A complementary perspective is the resource-based view to resilience by explicating the valuable, rare, inimitable, and non-substitutable (VRIN) resource nature are vital input, processing and output. The disruption absorption and recoverability qualify as VRIN resources will consequently generate sustained competitive advantage and performance. The bundle and mix of capabilities are valuable as they allow firms to neutralize the negative impacts of disruptions (inefficiencies, poor delivery performance, lost sales, and bad reputation) and provide an enhanced competitive advantage in the long run. Thus, supporting the theories, Kotter and Heskett (2011) and Egwakhe and Umukoro (2019) stressed that institutionalized practices and resource-pool to efficiency and ingenuity should continuously respond to dynamic environment.

RESEARCH METHODOLOGY

Cross-sectional survey research design was adopted to critically deepen insight and broaden the academic horizon academic staff population perception on operational resilience and operational efficiency at a categorical timeframe. The adopted research resign aligns with existing works of Essuman et al. (2020) on operational resilience, disruption, and efficiency: conceptual and empirical analyses; and García-Sánchez et al. (2018) on influence of technological assets on organisational performance through absorptive capacity, organisational innovation and internal labour flexibility. The research concentrated on Southwestern Nigeria as geographical location was informed by the region's hub in warehousing most functional private universities in Nigeria (Nation University Commission [NUC], 2018). Eight (8) private universities were determined to have met the selection threshold (i)

year of establishment, (ii) ownership structure and (iii) ranking along academic stability, popularity, and available facilities according Economic Confidential (2017).

The target population consisted of full-time academic staff in the rank of Senior Lecturer, Associate Professor, and Professor, who are saddled with the task of taking strategic decision on operational resilience that can be adopted during times of crisis or disruption. Also, people usually look to the top for guidance on how the organization or institution can overcome a disruption or crisis. Five hundred and thirty-two (532) academic staff respondents constituted the sample size determined by Krejcie and Morgan (1970) formula for sample determination for a finite population. Multiple-stage stratified random sampling technique was used and a structured questionnaire adopted and adapted to obtain data on the constructs. The questionnaire was pilot tested along validity and reliability. Content and construct validity were established with scores on Operational Efficiency = 0.86, Workload = 0.79, Mental Health = 0.78, Physical Work Environment = 0.97, Technological Work Environment = 0.82, Psychological Work Environment = 0.71 (Shimomitsu et al., 2000). The reliability result through Cronbach's alpha coefficients from the internal consistency revealed; Operational Efficiency (α) = 0.84 and Operational Resilience variables ranged from 0.72 to 0.87. The data sourced were analyzed using multiple regression analysis.

Model Specification

An econometric equation was established to test the linearity in the relationship between operational resilience variables and operational efficiency. Hence, the model was formulated:

$Y = f(X)^n$

Where:

Y = Operational Efficiency (OE)

X = Operational Resilience (OR)

$(x_1, x_2, x_3, x_4, x_5) = (OR)$

The proxies for operational resilience are workload (WL), mental health (MH), physical work environment (PE), technological work environment (TE) and psychological work environment (PW). The functional relationship of the model is presented as:

$WC = \beta 0 + \beta_1 WL_i + \beta_2 MH_i + \beta_3 PE_i + \beta_4 TE_i + \beta_5 PW_i + \mu_i$ …… eq. 1

Where:

β_0 = Constant term

$\beta_1 - \beta_5$ = Coefficient of operational resilience

μ = Error term (Stochastic variable).

The preposition was that operational resilience variables have no significant effect on operational efficiency of selected private universities in Southwestern Nigeria in light of COVID-19. The investigation expects a positive and significant effect between the variables. The study complied with ethical issues in research such as confidentiality, anonymity, and secrecy in the data collection and processing.

RESULTS AND DISCUSSION

The proposition was that operational resilience has no significant effect on operational efficiency of private universities in Southwest Nigeria. Primary data from five hundred and thirty-two (532) respondents were collated and analyzed. The results of the multiple regression analysis are presented in Table 1.

The aggregated result of the multiple regression analysis in Table 1 revealed that operational resilience (mental health, physical work environment, technological work environment, workload, psychological work environment) had a positive significant effect on operational efficiency of private universities in Southwest Nigeria (adjusted $R^2 = 0.455$, $F(5, 526) = 89.703$, $p = 0.000$). Also, the results for individual effect revealed that, mental health ($\beta = 0.087$, $t = 2.657$, $p = 0.008$), physical work environment ($\beta = 0.178$, $t = 4.963$, $p = 0.000$), technological work environment ($\beta = 0.301$, $t = 7.003$, $p = 0.000$), workload ($\beta = 0.111$, $t = 2.583$, $p = 0.010$), and psychological work environment ($\beta = 0.210$, $t = 4.719$, and $p = 0.000$) had positive and statistically significant effect on operational efficiency of

private universities in Southwest Nigeria. The result indicated that although all the five indicators of operational resilience adopted in this paper had positive and significant effect on operational efficiency of private universities in Southwest Nigeria, technological work environment was the best predictor.

Table 1. Summary of Multiple Regression Analysis on Operational Resilience and Operational Efficiency of Selected Private Universities in Southwest Nigeria

Model	B	Sig.	T	ANOVA (Sig.)	R	R^2	Adj. R^2	F (df)
(Constant)	0.522	0.015	2.443	0.000	0.678	0.460	0.455	89.703 (5,526)
Mental Health	0.087	0.008	2.657					
Physical Work Environment	0.178	0.000	4.963					
Technological Work Environment	0.301	0.000	7.003					
Workload	0.111	0.010	2.583					
Psychological Work Environment	0.210	0.000	4.719					

Predictors: (Constant), Psychological Work Environment, Mental Health, Workload, Physical Work Environment, Technological Work Environment
Dependent Variable: Operational Efficiency

The results further showed that, the relationship between operational resilience and operational efficiency was moderately strong and positive (R = 0.678). Also, the goodness of fit model recorded an adjusted R^2 = 0.455, indicated that operational resilience explained 45.5% changes in operational efficiency of private universities in Southwest Nigeria, while the remaining 54.5% could be attributed to other factors not included in this model. Also, the F-statistics (df = 5, 526) = 89.703 at p = 0.000 (p<0.05) indicated that the overall model was significant in predicting the effect of operational resilience on operational efficiency. This implies that operational resilience had a positive significant effect on operational efficiency of private universities in Southwest Nigeria. The new model for explaining operational resilience and operational efficiency with context is expressed as thus:

$$OE = 0.522 + 0.087MH + 0.178PE + 0.301TE + 0.111WL + 0.210PW$$

Where:
OE = Operational Efficiency
MH = Mental Health
PE = Physical Work Environment
TE = Technological Work Environment
WL= Workload
PW = Psychological Work Environment

The regression model equation showed that β_0 was 0.522 when X = 0. The value 0.522 inferred that statistically holding operational resilience indicators to a constant zero, operational efficiency would be 0.522 surmising that without operational resilience indicators, operational efficiency of private universities in Southwest Nigeria would be 0.522 which is an indication of minimal sustainability. The analysis also showed that the coefficient (parameter estimate) results when mental health, physical work environment, technological work environment, workload, and psychological work environment, are improved by one unit; operational efficiency would increase by 0.087, 0.178, 0.301, 0.111, and 0.210 units respectively (that is, statistically, operational efficiency rate will increase by 8.7%, 17.8%, 30.1%, 11.1% and 21% respectively with technological work environment resulting in the highest rate of increase on operational efficiency during pandemic and disruptions in private universities). This implies that an increase in the operational resilience indicators would lead to an increase in operational efficiency. The result of the analysis indicates that private universities should invest heavily on technology while not neglecting the mental health, physical work environment, workload, and psychological work environment to sustain operational efficiency in the face of disruptions and COVID-19 pandemic.

Discussions

The aggregated results in Table 1 revealed that operational resilience variables had a positive significant effect on operational efficiency of selected private universities in Southwestern Nigeria in light of COVID-19. The results in this paper aligned and in consonance with the findings of Essuman et al. (2020) that operational resilience significantly affected operational efficiency. Also, resilient campuses that are operational in times of stress are a critical element of a successful post-disaster community recovery (Foster & Smith, 2015); as universities that have invested the most in resilience planning and risk management may financially outperform their peers (Aguirre et al., 2005). Thus, further strengthening previous results and submissions by this paper's findings, studies had found that understanding how operational efficiency can be affected by operational resilience is of strategic importance to both organizations and institutions, in that resilience building is a resource-consuming activity where the organizational capacity needs to be exploited. Such knowledge, however, will be less useful and may mislead decision-makers if the construction of operational resilience remains vague. As such, a thorough understanding of the conceptual scope of operational resilience is an essential step towards the improvement and effective management of this capability and the accurate assessment of its cost-benefit implications (Blomberg et al., 2018; Bruton, 2018; Egwakhe & Umukoro, 2019; Essuman et al., 2020; Kotter & Heskett, 2011; Quendler, 2017; Soufi et al., 2019; Umukoro & Egwakhe, 2019).

In addition, the individual positive significant results of operational resilience variables (mental health, physical work environment, technological work environment, workload, psychological work environment) on efficiency are also in line with the studies of Usoro and Etuk (2016) and Usoro (2018) that workload significantly influenced the effectiveness and efficiency of lecturers. Likewise, Steenkamp and Roberts (2018) and Devdutt and Mehrotra (2018) hypothesized that workload, mental health, and psychological experiences affected academics and academia efficiency. However, other studies found that excess workload is linked with mental health issues and inefficiency (Dahie et al., 2017; Eluka & Nwonu, 2015; Osaat & Ekechukwu, 2017). Abbas (2017) also postulated that increased awareness, communication, and networking through sharing information for improved research and teaching activities is a critical factor in the survival of educational institutions across the globe. In line with Abbas (2017), Agba and Ocheni (2017) found the existence of a significant positive relationship between physical workplace and efficiency in academia. García-Sánchez et al. (2018) findings are in line with previous scholars that, support for technology and improvement of technological skills and, technological distinctive competencies, promoted improvement in efficiency. Also, the importance of operational technological work environment and digitization of tertiary education to operational efficiency in order to be able adapt to global and economic environmental dynamic changes in today's world of works cannot be overstated (Coovert & Thompson, 2014; Kanematsu & Barry, 2016; Mishra & Mehta, 2017; Page & Thorsteinsson, 2017; Kinman & Wray, 2018; Steenkamp & Roberts, 2018; Umukoro & Egwakhe, 2019; Zhao, 2012). Therefore, Foster and Smith (2015) stressed that the effects of disasters and disruptions on universities can be summarized in terms of enrolment, financial consequences and renewal. This according to studies by Kotter and Heskett (2011), and Egwakhe and Umukoro (2019) could be improved on through institutionalized practices and resource-pool that continuously respond to dynamic environment to efficiency and ingenuity.

Consequently, this study result which showed technological work environment as the best operational resilience predictor to operational efficiency is consistent with findings from previous works that the ability to leverage technology and information as an operational resilience strategy as well as a supply network is a strong positive predictor of business continuity and resilience management in the event of disasters or unforeseen events (García-Sánchez et al., 2018; Page & Thorsteinsson, 2017; Păunescu et al., 2018). However, to take advantage of technology by migrating from traditional or blended learning to a fully virtual and online delivery strategy will not happen overnight this is because of the many challenges and questions that need to be addressed such as, lack of infrastructure to work or study from home such as internet bandwidth for lecturers and students to access online and virtual content from remote locations. There is also a lack of the general skills needed to professionally design and offer online/virtual education (Collins & Halverson 2018; Henriksen et al., 2018; Mishra & Mehta, 2017; Olofin & Aniede, 2016). These findings support an earlier submission by Coovert and Thompson (2014) that the direction of how technology affects efficiency is not in and of itself technology; rather,

it is how to utilize, manage the impact, and implementation of emerging global and economic developments.

This position was supported in a study by Crawford et al. (2020) that for higher education institutions to implement digital strategies, which are largely based on the resources available to the institution and the cohort of students attending the institution to efficiency, that this is limited in countries categorized as developing economies in which Nigeria falls. Thus, in any event, the findings of Awasthi (2020) have revealed that training in Business Impact Analysis, Risk Assessment and Control, Incident Management, Developing and Implementation of DRP (Disaster Recovery Plans), Public relations and crisis communications, technological work environment and digitization, and soft skills are key pillars of disaster recovery. This underlines the need for private universities in Nigeria to explore this operational strategy and to be able to survive the COVID-19 pandemic as well as any future disruptions. In light of these findings, Blomberg et al. (2018), and Kanematsu and Barry (2016) and Umukoro and Egwakhe (2019) resolved that the discourse on efficiency should acknowledge which operational resilience factors may work either for or against it under different circumstances.

CONCLUSION

Insights from this study advances that operational resilience has an effect on operational efficiency. Operational resilience as described has a multifaceted concept that is concerned about stretching the capabilities of an organization in the time of a disruption, or disturbance. Nevertheless, operational resilience parameters can be maximized through internal collaborations and deployment of technology by the organizations/university. For enhancement of operational efficiency, institutions should identify and build technological infrastructure for academic delivery, address the psychology and mental health of academic staff during pandemic in order to prevent disruption to institution's activities/services. Tele-working and tele-schooling strategies in different contexts could be considered as innovative means of deploying technology in supporting institutions' continuity and sustaining social connection within the academic families and communities.

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