Challenges and Opportunities of Public Sector Innovation in Fighting the Covid-19 Pandemic

Lewis Edwin Chigova and Costa Hofisi[*]

School of Government Studies, North-West University, South Africa

Abstract: The article investigates the challenges and opportunities of public sector innovation in the fight against the COVID-19 pandemic. The pandemic caused disruptions in service delivery, and public sector organisations had to find innovative ways of responding to the crisis. Through a scoping review methodology, this article unravels extant literature on some of the general innovation strategies adopted in different countries to fight the COVID-19 pandemic. The study exposes the significant challenges faced in embracing public sector innovations by reviewing many country experiences. The article then argues that public sector innovations bring about opportunities such as getting rid of obsolete systems, streamlining selected successful innovations, and galvanising reforms. The regular proactive review of public sector procedures and frameworks to permit creation is recommended.

Keywords: Public administration, COVID-19, public sector, innovation.

INTRODUCTION

The primary focus of this article is to examine the challenges and opportunities of public sector innovation in fighting the COVID-19 pandemic. This article acknowledges that minimal issues in literature have been conceptualised with consensus amongst scholars as the role of innovation is the public sector (Piening, 2010). Seminal literature on public sector innovation which generally shapes most reviews is linked to the Organisation for Economic Cooperation and Development (OECD); Voorberg, Bekkers and Tummers (2015); De Vries, Bekkers and Tummers (2016); Cinar, Trott and Simms (2019); and Lopes and Farias (2020). These analyses are broad but are limited in scope such that they cannot prepare public sector organisations for calamities such as the one brought about by the COVID-19 pandemic. As underscored by the United Nations Department of Economic and Social Affairs (UNESA) (2020:2), the COVID-19 crisis has ignited a fresh impetus for an inquiry into the role of innovations such as digital government services. Al-Jayyousi, Durugbo, Almahamid, Budalamah and BendiMerad (2020) state that innovations models are likely to emerge in disruptions, like pandemics. These scholars argue that new models of innovations usually appear in a context they describe as the state of "unknown known" and "uncomfortable knowledge" (Al-Jayyousi *et al.* 2020). This state represents a problematic situation that must be scholarly investigated as an analogy.

Public sector scholars and practitioners also agree on the crucial role played by innovation in specifically fighting the COVID-19 pandemic. As a result, several studies are increasingly being published on public sector innovation in fighting the pandemic. Of note are various publications produced by international organisations and bodies such as United Nations family institutions and OECD. Several scholars have also written extensively on the subject. This study seeks to add to the existing literature by explicitly focusing on the challenges and opportunities of embracing public sector innovation to fight the COVID-19 pandemic.

In general terms, public sector innovation is important because, as Bourgon (2017:82) argues, it transforms the public sector and society's ability to generate new solutions. This view is essential in the COVID-19 pandemic environment because public sector institutions and organisations have to respond to new, wicked, global problems, rather than simple, linear, and national in focus and sometimes beyond their reach or capacity (Bourgon, 2010:15; Robinson, 2015:4;). Public sector innovation is critical because the COVID-19 pandemic has successfully transformed public sector work and workplaces overnight (OECD, 2020). Hence, there is a need for systematic studies to investigate the challenges and opportunities available to public sector organisations to bounce back more robust and resilient from the tentacles of the COVID-19 pandemic if they embrace innovation.

The Economist cited in Hughes (2003:182) predicted that public sector innovation would change how public services are delivered and, most critically, the essential relationship between government and citizens. Bourgon (2010:15) further argues that for this to happen, there is a necessity for a change of mindset as much as a change in behaviours and approaches. For this to be successful, Bourgon (2010:15)

*Address correspondence to this author at the School of Government Studies, North-West University, South Africa; E-mail: costa.hofisi@nwu.ac.za

underscores the importance of a budding set of characteristics necessary to deal with complex challenges in public organisations. One characteristic that helps deal with a tough challenge such as fighting the COVID-19 pandemic is an innovative mindset amongst public administrators. This xcreative mindset can help reflect difficult questions scholars and practitioners are asking in the wake of COVID-19. According to UNDP-Rwanda (2020:i), these questions include: "how to build back better; how to build a more resilient global economy, institutions, systems and communities, and how to limit the impact of future crises?" The main challenge faced in answering these questions is that, as encapsulated by Bourgon (2010:15), "there is no simple checklist of actions that public sector institutions" can refer to deal with complex challenges such as the COVID-19 pandemic. However, what is imperative and pertinent, is that a response to a complex challenge such as fighting the COVID-19 pandemic requires critical, innovative pursuits in public sector organisations.

This article argues that public sector innovation is more compelling now than ever due to the pandemic. This is important because the provision of public goods and services traditionally has been undertaken in utmost ignorance of possibilities of forced circumstances despite all the years of proposed and documented reforms. These involuntary circumstances have seen public sector institutions embracing different innovations in areas such as remote working, new communication and information technologies, and platforms for an agile workforce in a bid to respond to the pandemic induced crisis (OECD, 2020:6). Against this background, this article seeks to answer the following questions:

What role does public sector innovation play in the fight against the COVID-19 pandemic?

Where in the public administration discourse can the application of innovation in fighting the COVID-19 pandemic be encapsulated?

What are the significant challenges of embracing public sector innovation in fighting the COVID-19 pandemic, and are they any benefits?

How can public sector innovation be sustained after the COVID-19 pandemic?

Given the questions posed above, the objective of this article is to examine the challenges and opportunities of public sector innovation in fighting the COVID-19 pandemic. The article will utilise a scoping review methodology to achieve the outlined objective. Paré and Kitsiou (2016:163) describe the scoping review methodology as a method that seeks to give an "initial indication of the potential size and nature of the extant literature on an emergent topic." The scoping review method can also be "conducted to examine the extent, range and nature of research activities in a particular area, determine the value of undertaking a full systematic review, or identify research gaps in the extant literature" (Paré and Kitsiou, 2016:163).

In scoping the literature in this article, the initial section will seek to conceptualise and contextualise public sector innovation. The second section will explain the influence of public sector paradigms on public sector innovation. The third section looks at the innovative strategies adopted by public sector organisations in fighting the pandemic. The fourth section focuses on interrogating the challenges and opportunities of public sector innovation. Once this is done, the article will conclude by first providing strategies for sustaining public sector innovation beyond the COVID-19 period and finally pulling some overarching arguments and findings to the fore.

PUBLIC SECTOR INNOVATION: A CONCEPTUAL AND CONTEXTUAL EXPOSITION

Innovation has been conceptualised differently by different scholars from different fields (Salaman, 2005). In the public sector, conceptualisations of innovation have been broad, non-exhaustive, open, inconclusive and varied. For instance, Osborne and Brown (2011) and Matei and Bujac (2016) stress that definitions of innovation have often been "circular or ad hoc" and hardly pass Osborne's (1998) rudimentary characterisation of "something new". Van Acker (2014) describes innovation as a "vague but popular concept", Pollit and Hupe (2011) view it as the "magic concept" in public administration and to Greenhalgh *et al*. (2004) cited in Taylor (2018), innovation is a "socially constructed phenomenon". In the public sector context, innovation has been conceptualised by Brown and Osborne (2013) as "discontinuous change". In this article, public sector innovation is defined using De Vries, Bekkers and Tummers' (2014:5) definition as: "the introduction of new elements into a public service - in the form of new knowledge, a new organisation, and/or new management or processual skills, which represents a discontinuity with the past".

Public sector organisations always look for new ways to accomplish their public mandate (Daglio,

Gerson and Kitchen, 2015). Otenyo (2006:11) believes that reform movements seeking transformations in administrative practices and thinking indicate the persistent search for working systems. Calls for public sector innovation have been part of an exploration of ways to conceptualise efforts to reform public bureaus (Otenyo, 2006:11). Shava and Hofisi (2018) associate public sector innovation with the fourth industrial revolution's advent. Bourgon (2012:13) observes the quest for public sector innovation in adopting various e-government approaches that seek to leverage the power of information communication technologies. The motivation for adopting public sector innovation has been magnified because of the COVID-19 pandemic, but the aim is to deliver public goods. The United Nations Economic Commission for Europe (UNECE) (2017:7) divides public sector innovation into three categories:

Revenue enhancements – finding new sources of revenue,

Public sector production innovations – providing the same goods and services at lower cost, and

Public sector output innovations – improving the quality or range of goods and services.

Osborne and Brown (2013) categorise public sector innovation into the following taxonomies: evolutionary innovation, expansionary innovation, and real innovation. De Vries, Bekkers and Tummers (2014) also developed their classifications of public sector innovation as follows: process innovation (administrative process innovation and technological process innovation), product or service innovation, governance innovation and conceptual innovation. Notwithstanding anything from these classifications by the scholars above, this article believes that public sector innovation in this COVID-19 pandemic environment is sui generis. However, there is a need for further research on public sector innovation in crisis circumstances.

The changes in public sector organisations include production innovations. According to UNECE (2017:7), public sector production innovations can take various forms, such as changes in management structures, changes in physical production processes, and changes in delivery systems. The appreciation must fortify these innovations that the permutations and possibilities brought about by ICTs make it feasible, for example, for civil servants to work with their computers

from home without going to the offices (Hughes, 2003:185).

THE INFLUENCE OF PUBLIC ADMINISTRATION PARADIGMS ON PUBLIC SECTOR INNOVATION

This article argues that public sector innovation cannot be fully conceptualised without connecting it to some of the thought frameworks in Public Administration. Hence, it reflects public sector innovation against some of the paradigms of Public Administration. To this end, the study notes that analyses of public sector innovation in literature have been broad and often based on the shifts in the underlying Public Administration philosophies or paradigms. However, the link between paradigms of public administration and public sector innovation is weakly conceptualised. For instance, scholars such as Hofisi (2018) view innovation public administration as an emerging discipline paradigm whilst noting the epistemological, ontological, and methodological issues under which it is undergirded.

Before the advent of the COVID-19 pandemic, public sector innovation has been associated with reforms rooted in New Public Management thinking (Hood, 1991; Politt and Bouckaert, 2011; Matei and Bujac, 2016). Public sector innovation has also been linked to studies such as "reinventing government" (Osborne and Gaebler, 1992), "market-based public administration" (Lan and Rosenbloom, 1992), "New Public Governance", "network governance" (Osborne, 2006; 2010), "new synthesis approaches" (Bourgon, 2012), and "New Public Service" (Denhardt and Denhardt, 2000; Robinson, 2015). In all these studies, innovation was aimed at characterising public administration as competitive or efficient and later as collaborative (Howlett, Kekez and Poocharoen, 2017:3). The theoretical context in which public sector innovation has to respond to the COVID-19 pandemic is yet to be fully conceptualised.

In several countries, the embracement of innovation necessitates reforms and revisiting enabling paradigmatic regimes. Robinson (2015:4) shares the view that the prevailing public administration paradigms through which public sector reforms have been designed and implemented are relatively static and fail to fully address the significance or implications of the associated more sweeping changes. Robinson (2015:4) further opines that there is often a divergence between the thrust of public sector reform efforts (enabling innovation) in developing country contexts

and broader alterations like governance and contemporary approaches to public administration/management, particularly those informed by experiences of OECD countries.

Sceptics of public sector innovation such as Pestoff (2011:17) have argued in favour of inquiring how changes in the outlook of the public sector and different public administration paradigms might affect relationships with various stakeholders. The primary concerns revolve around implications of innovations on "ethical issues of data sensitivity and anonymity, representation of vulnerable groups, and future considerations around civil rights and privacy" (Misra *et al*., 2020:3). In several countries, these concerns are magnified by gaps and deficits in, as Misra *et al*. (2020:3) stress, institutional mechanisms for coordination, data-sharing, regulatory frameworks, and privacy laws that present obstacles to sustainably scaling up these approaches.

Proponents of public sector innovation such as the OECD (2020) argue that evaluating, adjusting, and formalising aspects of the immediate COVID-19 response can prepare public sector organisations and officials with administrations with much-needed suppleness and dynamism to tackle future challenges. This is very critical at a time when the pandemic has exposed glaring shortcomings of "national socio-economic systems" and "debilitated politics and governance" (Misra *et al*., 2020:3). Against this background, the COVID-19 pandemic heightens the requirement to close in on structural and systematic innovation gaps at the centre of policy interventions whilst mainstreaming new paradigms and approaches that build responsive and flexible governance eco-systems and frameworks.

INNOVATIVE STRATEGIES ADOPTED BY PUBLIC SECTOR ORGANISATIONS TO FIGHT AGAINST COVID-19 PANDEMIC

Public sector innovation opens doors for new opportunities and strategies (Shava and Hofisi, 2017). It is clear from the different case studies that embracing innovation is the only way public sector organisations can effectively fight the COVID-19 pandemic and resume normal operations – since they are the lifeline of counties. The article reviews some of the different innovations adopted in other countries to respond to the COVID-19 situation.

In Rwanda, the government invited drone companies from the United States of America to assist

their rural hospitals in delivering medical consumables (Skorup and Haaland, 2020). Rwanda, in partnership with Zipline, a California based drone start-up, has managed to make thousands of medical deliveries across rural Rwandan rural communities. Drones allowed Rwanda to continue providing critical health services during the COVID-19 pandemic induced lockdown by enabling the transportation of medical commodities (UNICEF, 2020). Rwanda's use of drones had commenced before the pandemic, and it made it easy to harness the technology during the crisis. Ghana also made use of drones to deliver medical supplies to rural communities.

The COVID-19 pandemic environment provided a good chance for public sector organisations to implement digital strategies. When other nations around the world were imposing lockdowns and stringent movement of people restrictions, Dubai turned to digital technologies. According to UCLG (2020), Dubai sought to continue functioning and communicating with the population through the Dubai Mobile app, allowing visitors and residents to use 160 services that facilitate access to health and utilities (UCLG, 2020). In addition to that, several digital technologies were available and operationalised, allowing the continued provision of public services and necessitating scores of civil servants to work from home.

When the government announced regulations are closing down schools in Colombia, authorities developed new innovative strategies for delivering education services to children. The primary method was virtual learning through public broadcasting (radio, television and online). Schools and teachers began to rely on the technological tools available (phone, email, WhatsApp) to maintain communication with children, keep the exercises and exams going and check on their wellbeing (UCLG, 2020). Online learning platforms were also embraced in China, Colombia, Jordan, South Korea and Uganda (Jiang and Ryan, 2020).

In Zimbabwe, South Africa, Botswana and Rwanda, state universities closed because of the pandemic and resumed learning through online platforms. As enunciated by Dube (2020:137), one of the measures taken by the South African government to address the spread of COVID-19 was to prohibit public gatherings, enact social distancing and close schools, which required a move to online teaching and learning. The South African Government also encouraged its citizens to download a mobile application to facilitate contact

tracing in the fight against COVID-19. According to Mlanga and Moloi (2020:5), due to the COVID-19 pandemic, the government of South Africa also went into partnership with private network providers to offer zero-rated applications and educational websites. In line with government regulations, university learning and teaching continued to be held online in South Africa, Namibia and Zimbabwe.

In fighting the COVID-19 crisis, UNESA (2020) argues that governments must reflect deeply and put extended attention on improving data protection, crafting digital inclusion policies and capacity building of public institutions. Strategies aimed at this are imperative in an environment where public officials are forced to work in new ways – juggling new tools with old procedures and processes (OECD, 2020:3). More so, there is pressure on public officials to deal with the immediate impact of the pandemic and its consequences (World Economic Forum, 2020). Against this background, UNESA (2020) stresses that in this era of COVID-19, innovations such as open data and e-participation are pivotal in rebuilding public trust in government crisis response processes and supporting vulnerable groups in society.

CHALLENGES AFFECTING PUBLIC SECTOR INNOVATION IN FIGHTING THE COVID-19 PANDEMIC

The significant challenges hindering public sector innovation are prohibitive laws, regulations and procedures; resource constraints; politics and risks; inequalities and the digital divide; techno-solutionism and privacy and data protection concerns. These challenges are discussed in greater detail in the sections below.

Prohibitive Laws, Regulations and Procedures

Daglio, Gerson and Kitchen (2015) posit that public sector organisations are controlled by an intricate web of laws, rules and procedures relating to budgeting, resource management, and communication protocol. The scholars admit that these laws, regulations and policies might be put in place for noble reasons; their design can end up inhibiting organisational capacity to innovate. Goldsmith and Eggers (2004) discovered that innovation usually faces higher hurdles in a hierarchical organisation such as government bureaucracy due to internal horizontal constraints that often inhibit the interaction necessary to develop good ideas, and vertical barriers prevent developed ideas from rising to decision level. Skorup and Haaland (2020) argue that regulations are still obstacles to adopting innovations

such as drone technology in both developed and developing countries. Public sector innovation during the COVID-19 pandemic is challenging to implement because of identifiable procedural constraints. These constraints to public sector innovation are legal, constitutional and even operational. According to UNECE (2017:6), constitutional and legal controls might restrict access to funding, limiting the ability to act by prohibiting certain activities, exposing efforts to public scrutiny, and essentially slowing down the innovation process.

Resource Constraints

Resource allocation and budgetary support play defining roles in innovation in public sector organisations (Daglio, Gerson and Kitchen, 2015). However, studies do not agree on the quantum of resources needed to innovate. Daglio, Gerson and Kitchen (2015) denote that innovation does not always mean attaching a high price tag in the public sector. Nonetheless, there is always a need for some resources. In fighting the COVID-19 pandemic, the success or failure of public sector innovation depends on budgetary support. Innovations such as drones, remote working, and other information communication technology gadgets are expensive and might burden public resources. In South Africa, state universities had to avail laptops and subsidised data to some students.

Privacy and Data Protection

Notwithstanding the disruption of social interactions, the advancement of the latest information technologies may pose a severe threat to the privacy of individuals (Shava and Hofisi, 2017). A study carried out by Weerakkody *et al*. (2015) concluded that the adoption and implementation of innovations such as e-government is affected by security and privacy risks. Citizens can only accept several innovations if they trust and know-how their private information will be protected and who will have access to it (Agbozo, Spaassov and Alhassan, 2019). Another study conducted by Agbozo, Spaassov and Alhassan (2019) indicates that many citizens in Sub-Saharan Africa are unwilling to allow their governments access to their data. Therefore, it is clear that the use of innovative tools and systems must be done in a way that addresses challenging questions regarding data protection and confidentiality (OECD, 2020b).

Inequalities and the Digital Divide

In some critical sectors such as education, public sector innovation without empowerment and welfare

perpetuates inequalities. As discovered in South Africa's higher education, universities had to provide laptops and data to poor students from marginalised communities. Even though some students were provided with or offered data, some still lived in communities with limited internet connectivity. According to Dube (2020:137), many learners in rural contexts found themselves excluded from schooling and unable to access online resources due to lack of infrastructure, the unavailability of electricity and electricity gadgets. Schleicher (2020:4) also weighs in, exposing that the COVID-19 crisis has revealed the many inadequacies and inequities of education systems – from access to the broadband and computers needed for online education and the supportive environments necessary to focus on learning, up to the misalignment between resources and needs. This challenge affects developing countries the most, where most of the populations reside in rural communities. Hence, as public organisations are adopting more innovations, complementary initiatives have to be put in place to close socio-economic disparities.

Politics and Risk

The public sector is a highly politicised arena with unpredictable, risk-averse, and rent-seeking stakeholders. Borins (2001), cited in De Vries, Bekkers and Tummers (2014), considers the risk-averse public administration culture a vital characteristic of stall innovation. Taylor (2018) observes that innovation often presents a political risk in tight public scrutiny which then contributes to the risk-averse attitudes by stakeholders within public sector organisations. According to the UNECE (2017), elected and appointed officials are sceptical of uncertainty and chances of failure associated with innovation activities.

Innovations, particularly those involving the introductions on information communication technologies, have shown in several studies to lead to job losses. What makes the whole situation politically challenging is the fact that the COVID-19 pandemic is forcing governments and societies to innovate as a way of responding to "the crisis in the short-term, resolve socio-economic repercussions in the mid-term and reinvent existing policies and tools in the long-term" (UNESA, 2020). Government action or inaction becomes politically risky, as Muggah (2020) observes because citizens look to governments in times of crisis for help and protection. When politicians fail to respond adequately, they lose credibility and legitimacy. The situation is worse in countries undertaking innovation now due to the COVID-19 crisis. In the circumstances like that, the United Cities and Local Governments (UCLG) (2020:2) observes that the rapid expansion of COVID-19 is forcing responsible authorities to undertake rushed and complex decisions involving digital innovations that, while effective in the short term, may involve negative long-term impacts on digital rights and other spheres of governance.

Techno-Solutionism

Kritikos (2020: warns against advancing "techno-solutionism". According to Kritikos (2020), technological applications alone cannot solve complex societal challenges, such as those associated with the current pandemic. Thus, in other words, innovation must complement other public policy measures and not be a substitute (Kritikos, 2020). Public sector innovation can be socially divisive if not adequately monitored. Remote working has been touted as a progressive innovation for public sector organisations. However, Schleicher's (2020:5) study observes that innovations such as teleworking are generally suitable for the most qualified, there are seldom possible for those employees with lower levels of education, many of whom have been on the front lines in response to the pandemic, providing essential services to society.

OPPORTUNITIES BROUGHT ABOUT BY PUBLIC SECTOR INNOVATION IN THE COVID-19 ENVIRONMENT

While it is clear that the pandemic interrupted normal functioning and delivery of public goods by public sector organisations, innovations adopted opened doors for several opportunities. The constant pressure to fight the pandemic opens significant opportunities for governments to incorporate new tools and approaches. Al-Jayyousi *et al*. (2020) support the view that pandemics such as COVID-19 provide opportunities for new models of crisis-driven innovation emerging from the public sector response and preparedness. The main options of public sector innovation in the fight against the COVID-19 induced crisis include – opportunities for strengthening of reforms, regularisation of successful innovations and doing away with redundant systems.

Strengthening of Reforms

The necessity of public sector innovation in the COVID-19 pandemic crisis provides governments with an incredible opportunity to synchronise the reform

process. It is an opportunity that allows reorientations in public administration discourse (coming up with further enquiries of how public sector innovation as encapsulated in public administration ought to be conceptualised in crises). The pandemic exposes the disadvantages of failing to make concerted efforts to make government innovative in the fast-changing world where the COVID-19 pandemic turns systems upside down. As the vulnerabilities of slow reforming governments were exposed, leading innovators such as Rwanda stood in front of developed countries using technologies like drones in health service delivery. Kritikos (2020) reasons that Covid-19, as the first major global pandemic of the 21st century, presents a brilliant opportunity for politicians, policy-makers and regulators to reflect on the legal plausibility, ethical soundness and effectiveness of deploying emerging technologies under time pressure.

Regularisation of Selected Successful Innovations

Osborne and Brown (2009) opine that having public policies in place gives the appropriate architecture for creating multiple innovations and ensures the sustainability of successful ones. The pandemic has brought opportunities for public sector organisations to normalise successful innovations. According to the OECD (2020:6), innovations such as remote working, new communication and information technologies, platforms for agile workforce redeployment and other tools, and applications that were implemented to respond to the crisis can be maintained to become permanent features of the post-pandemic normal. Thus, it is evident and undeniable that technology can strongly affect citizens' daily lives, guaranteeing them access to public services, access to information and communication with responsible authorities (UCLG, 2020:1).

They are doing away with Redundant Systems

The innovations adopted to manage the crisis provide public sector organisations with an opportunity to get rid of unresponsive, ineffective and inefficient systems. D'Este *et al*. (2012) observed that public sector innovation is a way for organisations to move away from being locked in established routines. For example, remote working has also allowed civil servants to deliver public goods away from the restrictions of office environments. In countries such as Rwanda, drone technologies have proved to be convenient, faster, and efficient in the transportation of medical commodities. D'Este *et al*. (2012) posit that

public sector innovation affords policymakers with an opportunity to design appropriate measures to tackle systematic failures. Thus, innovation provides a vital tool to get more for less in public sector organisations by removing trade-offs (Eggers, Baker, Gonzalez and Vaughn, 2012). Thus, public sector innovation is the only way governments can serve in the 21st century and beyond the pandemic. Past studies have shown that organisational inertia and structured routines often reduce the capacity of organisations to scout new opportunities and adapt to environmental changes (Nelson and Winter, 1982; Hannan and Freeman, 1984; Dougherty, 1992, D'Este *et al*., 2012). Using experiences of fighting the COVID-19 pandemic public sector innovation, public organisations were presented with a perfect opportunity to do away with unnecessary orthodoxies and routines as a way to fight the pandemic.

SUSTAINING PUBLIC SECTOR INNOVATION IN THE POST-PANDEMIC PERIOD

Since public sector organisations, unlike private enterprises, have to adhere to prescribed laws, rules and procedures, we observe that there is a need for authorities to conduct both regular and timely updates to allow for flexibility and keep abreast with technological developments advancements. As noted by the UCLG (2020:1), technological innovations have proved to be valuable and necessary tools that assist governments to be on the frontline and under emergency scenarios and continue to provide essential public services during the COVID-19 crisis.

Public sector innovations must be complemented by the empowerment of marginalised communities so that they do not perpetuate inequalities and infringe on human rights (for example, the right to education). Strategies such as e-learning must be supported by capacitation of those in rural communities who do not have electricity, let alone modern information communication technology gadgets. Thus, the inclusive, timely and necessary adoption of innovation is crucial in boosting the citizens' trust in evidence-based public sector interventions (Kritikos, 2020).

In circumstances where innovation is embraced across different sectors to deliver public goods, governments or public sector institutions must also implement systems that abide by ethical issues such as respect to privacy. According to the UCLG (2020), innovations such as digital technologies will undoubtedly be central in ensuring that citizens and

communities are back to their daily lives in a safe and organised routine. The delivery of services goes well once again. All innovations adopted must be democratic, transparent and foster accountability. Governments working with public sector organisations must not hide behind innovating to respond to COVID-19 to institute reforms that build police states by trading off people's privacy and self-determination.

Finally, since several governments have been undertaking public sector innovations in different forms, magnitude and persuasions, increasingly because of the pressure and uncertainty brought about by the COVID-19 pandemic, governments are now pressing to reflect on the reform processes. What is clear or has been exposed by the pandemic is that old systems are ineffective, reforms are lagging, and for public sector organisations to serve in both turbulent times and the 21st century, the reform process has to be accelerated. It must be underscored that governments should make a concerted effort to create and maintain an environment that allows public sector innovation to flourish (Leitner and Stifmueller, 2019).

CONCLUSION

The article's primary aim was to investigate the challenges and opportunities of public sector innovation in the fight against the COVID-19 pandemic. The article managed to show that several innovations have been implemented in responding to the COVID-19 situation. These include drones in Rwanda to deliver medical supplies in rural communities, remote working and use of applications in Dubai, online learning in South Africa Universities and use of technological tools and virtual platforms in Colombia. Various other countries reviewed in this examination embraced different public sector innovations. While the cases interrogated, indicate the prevalence of innovations in fighting the COVID-19 pandemic, public sector innovation continues to encounter many challenges. The main challenges facing innovation in the public sector include a cocktail of prohibitive laws, rules and procedures; politics and fear of risk by elected and appointed officials; inequalities, the digital divide, and resource limitations.

The article acknowledges that whilst public sector innovations have been undertaken in a crisis environment as desperate measures to respond to the COVID-19, some opportunities are worth tapping into. Governments and public sector organisations have the perfect opportunity to incorporate successful

innovations as countries are moving with speed towards the fourth industrial revolution. In doing so, public sector organisations find an ignited impetus to strengthen the reform process and eliminate obsolete systems once and for all. The changes brought about by the pandemic are inevitably here to stay, and hence the article recommends that governments should find sustainable ways of keeping the adopted innovations.

REFERENCES

Agbozo, E., Spassov, K. B. and Alhassan, D. A. 2019. Personal Data and Privacy Barriers to E-Government Adoption, Implementation and Development in Sub–Saharan Africa. https://doi.org/10.1007/978-3-030-13283-5_7

Al-Jayyousi, O., Durugbo, C. M., Almahamid, S. M., Budalamah, L. H. and BendiMerad, B. 2020. Crisis-driven innovation: Public sector response during the covid-19 outbreak. Doi: CDI-PolicyBrief-AGU-BIPA-released11july2020-Eng%20(1).pdf. accessed 29 June 2021.

Bourgon, J. 2011. A public service renewal agenda for the 21st century: The new synthesis project. United Kingdom Roundtable Report London, November 16 to 18, 2010.

Bourgon, J. 2015. Distinctively public sector: The case for a new Synthesis of public administration. Leadership for change, innovation for results: A new synthesis. Queensland: Public Governance International.

Daglio, M, Gerson, D. and Kitchen, H. 2015. Building organisational capacity for public sector innovation. Background paper prepared for the OECD Conference "Innovating the public sector: From ideas to impact" Paris, 12-13 November 2014.

De Vries, H.A., Bekkers, V.J.J.M., Tummers, L.G. (2014). Innovation in the Public Sector: A Systematic Review and Future Research Agenda. Speyer: EGPA conference. https://doi.org/10.2139/ssrn.2638618

Denzin, N. K. and Lincoln, Y. S. 2011. The Sage handbook of qualitative research. London: Sage.

D'Este, P., Lammarina, S., Savona, M. and Von Tunzelmann, N. 2012. What hampers innovation? Revealed barriers versus deterring barriers. Research Policy 41 (2012) 482– 488. https://doi.org/10.1016/j.respol.2011.09.008

Dube, B. 2020. Rural online learning in the context of COVID-19 in South Africa: Evoking an inclusive education approach. Multidisciplinary Journal of Educational Research. 10(2): 135-157. https://doi.org/10.17583/remie.2020.5607

Egger, W., Baker, L., Gonzalez, R. and Vaughn, A. 2012. Public sector, disrupted How disruptive innovation can help government achieve more for less. Delloite https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Public-Sector/dttl-ps-publicsectordisrupted-08082013.pdf

Erk P. Piening (2011) Insights into the Process Dynamics of Innovation Implementation, Public Management Review, 13:1, 127-157. https://doi.org/10.1080/14719037.2010.501615

Goldsmith, S. and Eggers, W. D. 2004. Governing by network: The new shape of the public sector. Washington, DC: Brookings Institution Press.

Greenhalgh T, Robert G, Bate P, Kyriakidou O, Macfarlane J and Peacock R, (2004), How to spread good ideas, Report for the National Coodinating Centre for NHS Service Delivery and Organization, London: NHS SDO.

Jiang, N and Ryan, J. 2020. How does digital technology help in the fight against COVID-19? Washington, DC: World Bank.

Krotikos, M. 2020. Ten technologies to fight coronavirus. Brussels: European Parliamentary Research Service.

Leitner, C. and Stiefmueller, C. M. 2019. Disruptive Technologies and the Public Sector: The Changing Dynamics of Governance (in Baimenov, A. and Liverakos, P. (Eds) Public Service Excellence in the 21st century pp 237-274). https://doi.org/10.1007/978-981-13-3215-9_8

Misra, A., Schmidt, J. and Harrison, L. 2020. Combating Covid-19 with data: What role for national statistical systems? Policy brief. Paris: OECD.

Muggah, R. 2020. Urban governance: Cities in a time of Covid-19 (in World Economic Forum. 2020. Challenges and opportunities in the Post-Covid19 world.) Geneva: World Economic Forum.

OECD (2020a). Public management and the Coronavirus (Covid-19) pandemic: emerging responses and initial recommendations. Paris: OECD.

OECD. 2020b. The territorial impact of COVID-19: Managing the crisis across levels of government. Paris: OECD.

Osborne, S. P. and Brown, L. 2009. Handbook of innovation in public services. London: Edward Elgar Publishing

Osborne, S. P., Radnor, Z. and Nasi, G. 2012. A new theory for public service management? Toward a (public) service-dominant approach. American Review of Public Administration. 43(2): 135–158. https://doi.org/10.1177/0275074012466935

Pestoff, V. 2011. Co-production, new public governance and third sector social services in Europe. Ciências Sociais Unisinos. 47 (1): 15-24. https://doi.org/10.4013/csu.2011.47.1.02

Robinson, M. 2015. From old public administration to the new public service: Implications for public sector reform in developing countries. Singapore: UNDP Global Centre for Public Service Excellence.

Schleicher, A. 2020. The impact of COVID-19 on education: Insights from education at a glance 2020. Paris: OECD.

Skorup, B. and Haaland, C. 2020. How drones can help fight the Coronavirus. Policy brief. George Mason University. https://doi.org/10.2139/ssrn.3564671

Taylor, S. P. 2018. Innovation in the public sector: dimensions, processes, barriers and developing a fostering framework. International Journal of Research Science and Management. 5 (1): 28-37.

Teddlie, C. 2007. Mixed methods sampling: A typology with examples. Journal of mixed methods research, 1(1):77-100. https://doi.org/10.1177/1558689806292430

UNDP Rwanda. 2020. The Socio-Economic Impact of Covid-19 in Rwanda June 2020. Kigali: UNDP.

UNESCO/ECLAC. 2020. Education in the time of COVID-19: COVID-19 report. Santiago: UNESCO.

UNICEF. 2020. How drones can be used to combat COVID-19. UNICEF

Weerakkody, V., Irani, Z., Lee, H., Osman, I., Hindi, N.: E–government implementation: A bird's eye view of issues relating to costs, opportunities, benefits and risks. Information systems frontiers, 17(4), 889–915 (2015). https://doi.org/10.1007/s10796-013-9472-3

Wolfe, R. A. 1994. Organisational Innovation: Review, Critique and Suggested Research Directions. Journal of Management Studies, 31(3): 405–31. https://doi.org/10.1111/j.1467-6486.1994.tb00624.x

World Economic Forum. 2020. Challenges and opportunities in the Post-Covid19 world. Geneva: World Economic Forum.

Yin, R. K. 2009. Case research and design methods. 4th ed. London: Sage.