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EMBRACING DIGITAL GOVERNMENT IN THE TIME OF COVID-19: CHALLENGES & OPPORTUNITIES IN THE PHILIPPINES

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EMBRACING DIGITAL GOVERNMENT IN THE TIME OF COVID-19: OPPORTUNITIES & CHALLENGES IN THE PHILIPPINES

Traditionally, electronic government (or e-government) is viewed as the use of information systems in public administration. With the principal goal of improving the delivery of services, this is often achieved through automation of manual transactions (e.g. face to face/paper-based) and is often based on the idea that computerized systems may result to greater efficiency and lower operational cost. An iteration of this view presents e-government as a vehicle for good governance. It is a tool that promotes openness, fosters accountability and lessens corruption.

However, because of the internet's ubiquity and the widespread use of advanced technologies such as cloud computing, data analytics, and artificial intelligence among others, the traditional view of e-government is being challenged. It seems that the old "electronic" and transactional level automation paradigm has become inadequate to address the new demands emanating from citizens and other stakeholders. For its part, governments saw the need to adapt to these emerging practices to make it more relevant. Hence, the idea of digital government was born.

Digital government (DG) underscores the need to go beyond transaction-level automation. While still anchored on good governance principles, this concept highlights the importance of going beyond stand-alone systems. DG encourages its champions to rethink the current governance models and harness the power of new technologies to eliminate organizational/transactional silos and create a new culture of innovation and citizen-centricity. Furthermore, this emerging view highlights the value of sharing and collaboration among agencies through a data governance regime. As a concept, DG traces its roots to digital transformation, which emphasizes the importance of adopting a strategic perspective and achieving organizational agility, claiming that this new paradigm can significantly change how we view government.

This emerging view of DG is timely given the challenges posed by the COVID-19 pandemic. Due to the widespread disruption caused by the viral outbreak, governments have once again taken the lead in ensuring that public health risks are lowered and that its economies do not stagnate. Moreover, governments recognized the importance of maintaining trust in its ability to mitigate the adverse impact of the pandemic. Simply put, it must continue to deliver public services, protect its citizens, and enable a society-wide response to control the spread of the virus. For these governments, DG provides an alternative on how government services can be delivered, thus avoiding unwanted disruptions.

In the case of the Philippines, the importance of DG especially during a public health emergency is more pronounced. The massive lockdowns have resulted in the economy's negative growth and adversely affected the government's operations and service delivery capabilities. For instance, reports of corruption in the distribution of cash aid and food packs have put the efficacy of social assistance programs into question. Similarly, the inaccuracies in the COVID-19 data have undermined public confidence in the ability of the government to handle the pandemic.

This paper argues that the adoption of DG is an important facet in the strategy to beat COVID-19 in the Philippines. Learning from the experiences of selected Asian countries, the paper will emphasize on the need for a clear DG roadmap to address the data gaps in public health, local governance and social programs. Further, it will also discuss the different views on digital government and how this concept is seen as a tool to mitigate the adverse effects of COVID-19.

Finally, the paper examines the current policy environment of the Philippines and will argue for the need to synergize these policies and adopt an integrated approach. Lastly, the paper will also present best practices related to DG and propose recommendations that can enable the adoption of DG.

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Background Discussion

The pre-COVID-19 view on digital government adopts the neo-liberal philosophy of smaller government: public organizations are supposed to be lean, efficient, interconnected, and technology-driven. While this view casts the private sector as the driver of innovation and growth, it also portrayed governments as evolving institutions that preserved its new public management identity and at the same time embracing digital transformation.

However, the widespread disruption due to the COVID-19 pandemic has resulted in the rethinking of these views. Amid the backdrop of a global recession, governments are now taking the lead in ensuring economic recovery and avoiding the resurgence of the virus. Furthermore, they are expected to ensure the efficacy of social amelioration and public health programs. With limited resources coupled with depressed economies, governments are confronted with this unprecedented task of balancing economic productivity with health and safety issues.

In the Philippines, the government continues to struggle with its COVID-19 response. It has largely securitized the pandemic, particularly elevating the role of its security agencies. With its public health response lagging, the government has largely failed to abate the rise in infections. It has also been characterized as having the longest lockdown in the world, resulting in a double-digit decline in its GDP and a massive unemployment trend. These problems have prompted various sectors to clamor for a change in strategy. Similarly, there are calls from both the public and the private sectors to immediately embrace digital transformation practices and technologies as part of its new normal adjustment.

At this point, one might be curious to ask the following questions: (a) How can digital

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ABOUT THE AUTHOR

Sherwin E. Ona, Ph.D.

is a non-resident fellow at Stratbase ADR Institute, chairperson of the political science department at DLSU, and a fellow of the Philippine Public Safety College and the La Salle Institute of Governance. For his research endeavors, he has worked with the iGov program of the State University of New York, "Open Data in Developing Countries" of IDRC-Canada, and the Newton disaster informatics and innovation spaces project of the British Council and the Commission on Higher Education (CHED). Parts of this paper were drawn from his research endeavors and from his contribution with the UN-Asia Pacific Center for ICT for Development (APCICT) in their research about the government-led interoperability initiatives in the Philippines.

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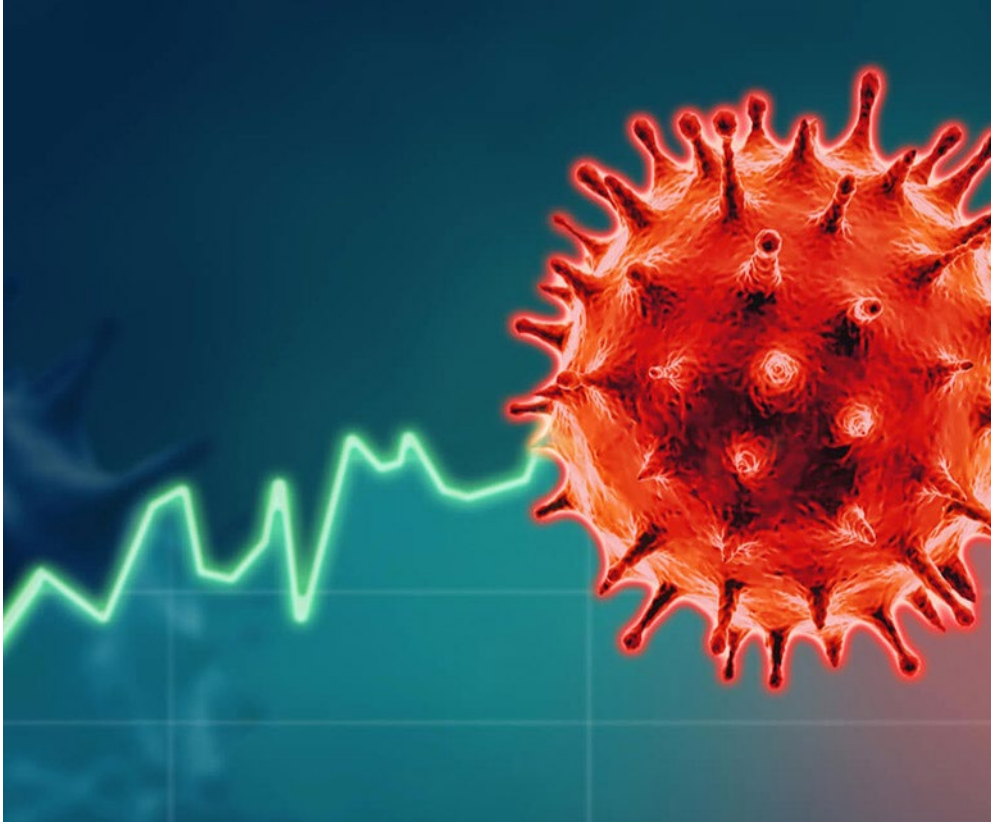
government (DG) address the challenges posed by COVID-19?; and (b) how can the Philippine government harness the power of DG?

For the first question, this paper argues that an adoption of digital government practices is inevitable. Because of uncertainties brought by the pandemic, the Philippine government must now seriously consider pushing for digital transformation and DG. The paper will discuss the transition from e-government to digital government, and present how DG can be used to mitigate the negative effects of COVID-19.

For the second question, the paper will examine the current policies of the Philippines on e-government and how this can serve as a springboard for DG and digital transformation. Overall, the paper will discuss suggestions that can be pursued by policy makers, industry leaders and innovation advocates that can turn this current health malady into opportunities.

From E-Government and Digital Government

Historically, the evolution of the current e-government concept can be traced to the personal computing revolution of the 1980s and the rise in connectivity as well as the widespread access to the Internet during the 1990s and early 2000s. During the 1990s, the Internet precipitated the transformation of offline government services into its online form (Szabo et al, 2017). While the use of technology, especially internet-based applications, was viewed as a way of enhancing the access and delivery of public services to citizens, businesses and other government agencies (Ghayur, 2006). Another popular view of e-government is that of a platform or tool to improve efficiency and cost effectiveness as well as foster good governance (Torres & Miles, 2017). Related to this is the concept of digital governance, which aims to provide a framework for developing structures, processes, and rules for managing an organization's digital presence (Welchmann, 2015). Also, digital governance practices include a set of principles and performance objectives that ensure that the use of ICT adheres to good governance as well as risk management (Shakya and Schapper, 2017). Moreover, the use of digital tools such as websites and social media entails adherence to existing laws and policies. These resources must also create value to its citizens and provide opportunities for greater participation and inclusion.



However, due to the advancements of new technologies, traditional views on e-government are evolving. Cloud computing, artificial intelligence and data analytics among others, are forcing public organizations to rethink their business practices and models. For instance, the e-government practice of providing online services to citizens is being challenged by the smart phone. This device, powered by social media apps, Internet of Things (IoT) and artificial intelligence (AI) technologies, empowers the citizen to demand real-time services with high expectations. It also allows for the mining of public data and the use of big data analytics for numerous public services including but not limited to transportation management and public safety (Hanna, 2020). This can be seen in smart cities around the world where DG systems incorporate the use of data from connecting sensors, smart phones, CCTV cameras and other devices. These real-time data are then processed using AI and data analytics to enhance the quality of life and to develop new proactive services for its citizens (Kelly, 2020). Furthermore, DG provides alternative channels for citizen communication through use of the phone, using chatbots, social media and other technologies thus greatly increasing positive interaction (Ibid).

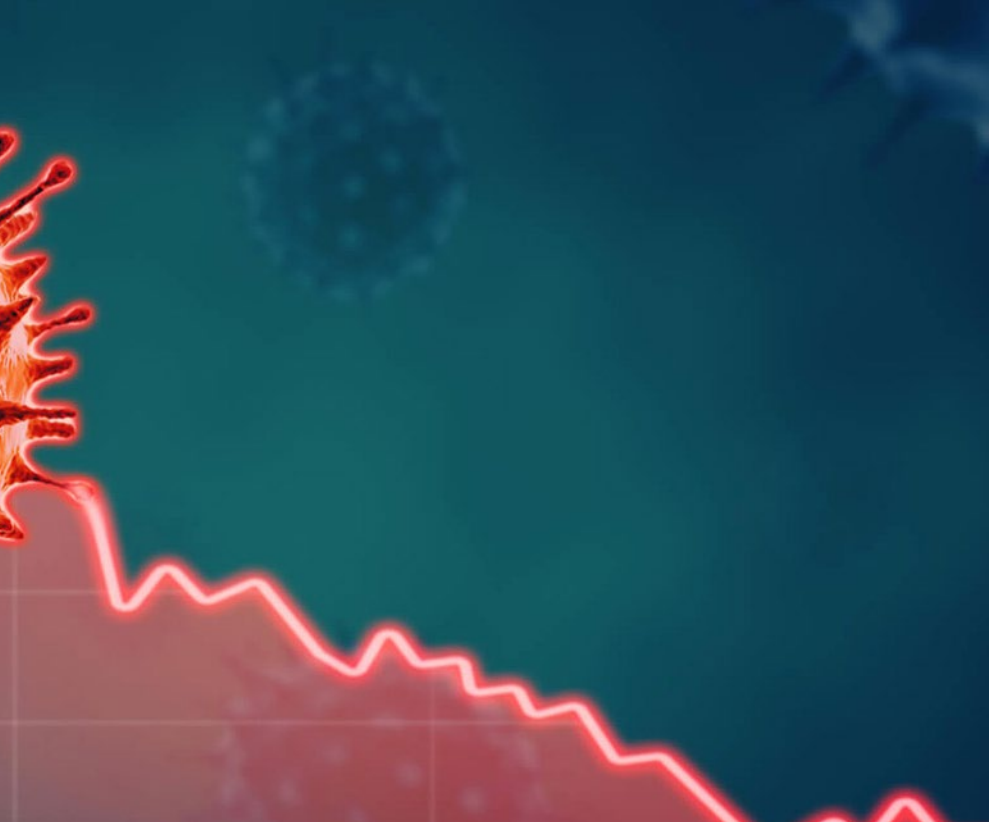
These novel practices enabled by new technologies and high-speed connectivity, provides a clear differentiation between digital government and e-government. Therefore, DG is more data-driven and citizen-centric. It has evolved from the portal-based online services that are provided by specific agencies. It has transformed the traditional e-Government agency-specific approach into a more integrated/combined services, often supported by cloud-based technologies and the use of a citizen digital ID (van der Muelen, 2016) (Kelly, 2020). Moreover, DG is also related to the idea of digital transformation, where its champions are strongly encouraged to adopt a strategic view and embrace organizational agility in its intent to use emerging technologies.

Digital Government and COVID 19: New Opportunities

The current pandemic has upended the rosy predictions of continued global economic growth. In fact, the World Trade Organization (WTO) sees global trade to fall between 13% to 23%. While for its part, the International Labor Organization (ILO) estimates that COVID 19 will result in a loss of 195 million jobs worldwide. Overall, the global economy is expected to contract by 5.2%, amounting to an estimated loss of USD$ 3.8 trillion due to the adverse effects of the pandemic (Morrison, 2020) (WB, 2020).

Although these predictions paint a grim picture of the future, new opportunities are simultaneously presented. The pandemic exposed the need to continuously improve government services and ensure its continuity. With the possibility of less face-to-face transactions, new bot-assisted digital channels, and seamless integration of services will be the default (Mari, 2020). These emerging trends will also see a shift from legacy systems to cloud-based systems.

In addition, existing DG platforms are being used to advocate public health information and services to citizens. For instance, government portals are becoming platforms for the dissemination of vital health information and e-health services. In some cases, these portals also host public health dashboards that keep track of COVID-19 cases and serve as a venue to counter misinformation (Kulkarni et al, 2020). Moreover, DG is being used to encourage the participation of citizens in fighting the pandemic. Government-sponsored hackathons brought



together skilled citizens to uncover solutions using data analytics, AI and simulations. Crowdsourced solutions like contact tracing applications are being encouraged (UN-DESA, 2020).

Another facet of DG is the need to address misinformation. Governments must strive to preserve the trust and confidence of its citizens. For this, an effective communication strategy that leverages the available ICT platforms must be developed. Lastly, the participation of the private sector and civil society must be pursued to enable a whole-of-society response to the pandemic.

Best Practices in Digital Government: South Korea, Singapore, and Taiwan

There are noticeable characteristics of the DG initiatives that this paper cited as best practices. First, it seems that these economies have had a long tradition of e-government which can be traced back to the early 1990s. Second, the DG programs of these economies are future-oriented, and are focused on ways in which emerging technologies can further improve the quality of life of its citizens. Lastly, the long DG tradition and its strategic orientation enabled these economies to effectively respond to the coronavirus threat.

In the case of South Korea, the country's DG practices evolved from its efficiency and transparency focus during the 1990s to its present vision of smart governance where the government is seen as a conduit for openness, sharing and collaboration. The early 2000s saw the integration of multiple e-services through a single access portal (Choong-sik, 2015). This portal reflects the government's citizen centric approach to DG by offering the Minwon 24, a 24-hour online site that provides access to more than 8000 types of government services. In addition, its home tax service enables citizens to file their income taxes online, eliminating long lines and minimizing corruption. While its on-narra systems allow the government to standardize administrative procedures to improve its efficiency (NIA, 2016). Ranked by the UN as number 2 among 193 countries in the 2020 e-government development index (EGDI), the government envisions the inevitable convergence of technologies (e.g. IoT, cloud-based services and data analytics) which can further lead to the improvements in the country's DG initiatives.

Another best practice is that of the Republic of Singapore. Branding itself as a smart nation, it has continuously strived to harness the powers of ICT to transform the country into one of the DG powerhouses in Asia. Ranked by the UN as number 11 among 193 countries in the 2020 EGDI, the country is known for its Singpass ID, which allows its citizens to access online DG services. The Singpass ID also provides its citizens with a convenient way to file documents and apply for services from the different government agencies. To further develop its digital transformation efforts, the country has weighed in on the importance of harnessing the creative powers of its citizens (Lung, 2018). For this, the government created innovation hubs promoting collaboration among the various innovation actors such as the government, the private sector and the academe. These hubs also serve as venues for entrepreneurs to incubate their ideas and avail of government support for its possible commercialization.

The Republic of China (Taiwan), also prides itself with its DG practices. With its slogan "digital nation, smart island", Taiwan has embarked on an 8-year plan (2017-2025) intended to grow its digital economy to USD $205 billion by 2025. The plan also envisions the country's shift from an industrial/

manufacturing economy to that of an innovation-driven economy. This strategy relies on promoting high degree of innovation supported by research and manufacturing in the areas of semi-conductors, personal computing, and mobile devices. It also adopted a 5+2 industrial innovation plan that identified the vital sector of its economy, namely: Biotech and pharmaceutical, green energy, defense, smart machinery and IT (Bhunis, 2017).

For its DG practices, Taiwan has improved its public administration through its online tax filing and management and the integration of its customs operations. It also boasts of its free WIFI access and the availability of public data through its open government data portal. By 2020, Taiwan is set to adopt a national digital ID which will allow the seamless access to public services (Burt, 2020).

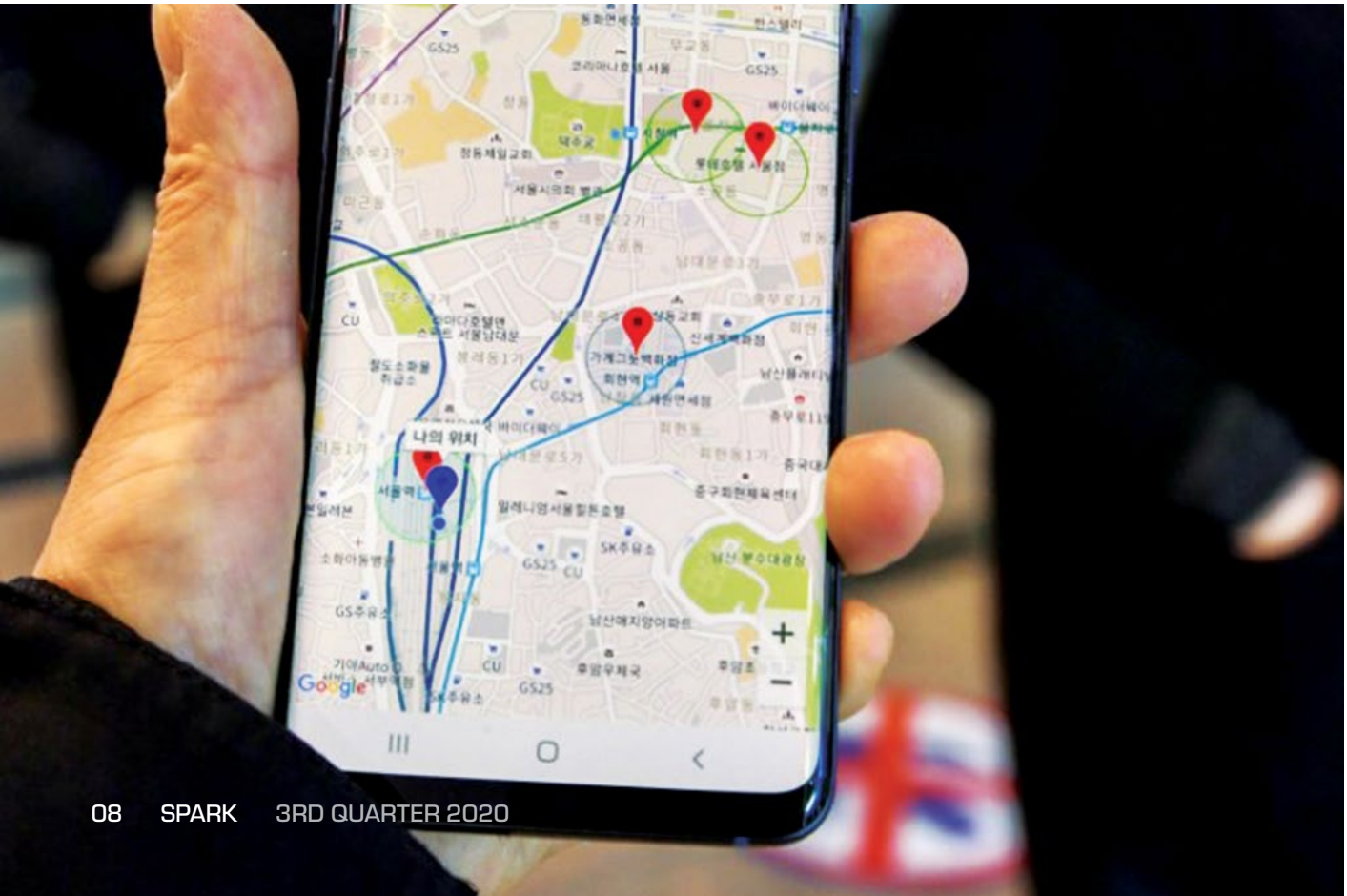
Responding to COVID-19

The coronavirus pandemic forced governments to adopt extraordinary measures to mitigate its effects. The examples of South Korea, Singapore and Taiwan underscored the importance of learning from experiences, ensuring trust, and the need for innovation. These countries also demonstrated the value of investing in a robust digital government infrastructure, which ultimately allowed their respective governments to get ahead of the virus, thus avoiding massive lockdowns and widespread social disruptions.

The case of South Korea is a good example of how a country can flatten the viral curve without resorting to devastating lockdowns. Its effective response to the pandemic can be traced to its investments in disaster management and digital government. Also, its experience with MERSCOV and its unique geopolitical situation, allowed its government to develop innovative approaches in ensuring the safety of their citizens and that basic government services remain unhampered (Huang et al, 2020). For instance, the ingenious drive through tests, body sprayers and self-check health applications are

Use of Smart Phones as Contact Tracing and Self-quarantine Tool in South Korea

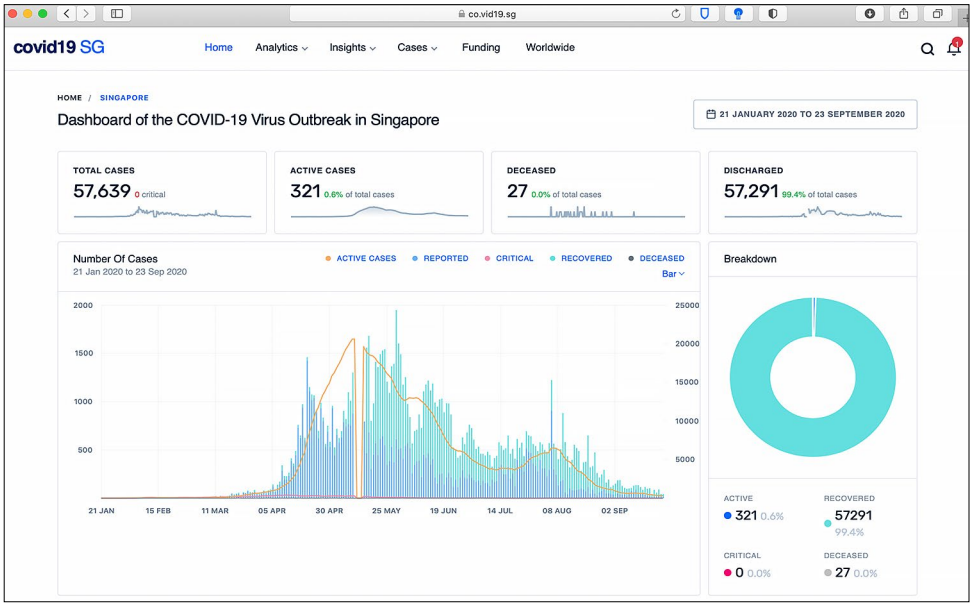
FIgure 1



all part of the government's preparation for terrorist attacks. This war-type preparation also enabled the large-scale movement of medical supplies (Jackson, 2020). These actions were further amplified with the use of innovative ICT solutions. Extraction of information through credit card purchases, GPS data, and CCTV footages allowed the government to monitor the movement of COVID-19 infected citizens. Furthermore, pushing information through social media and SMS augmented the government's awareness campaign. This massive awareness drive was also intended to counter misinformation (Huang et al, 2020). Additionally, citizens were given the opportunity to participate by giving access to public health data sets through the government's open data portal. For example, college students from Korea University developed digital maps to track the community spread of the virus (Ibid).

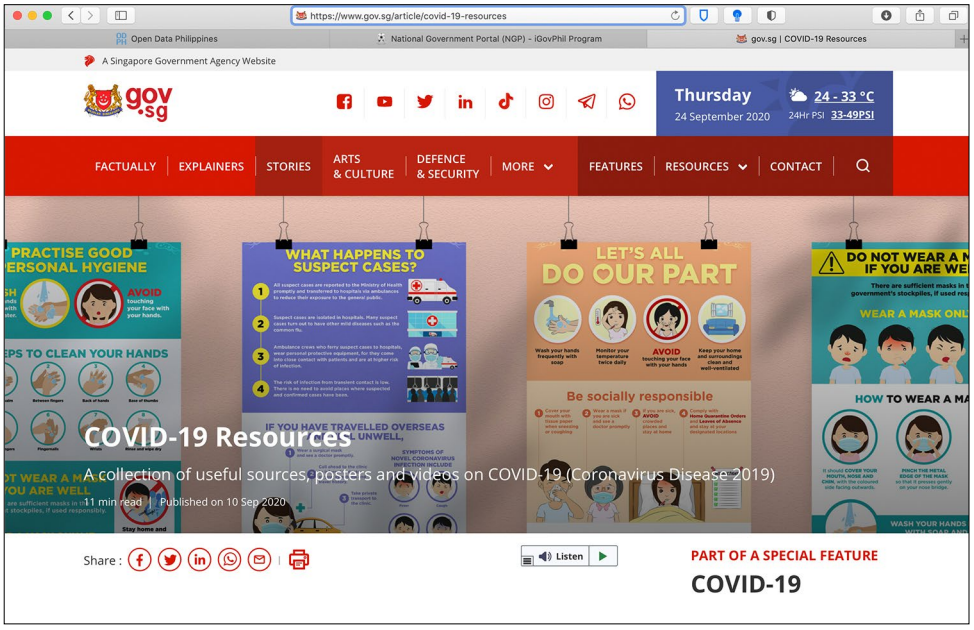
Similarly, Singapore's data driven, ICT-enabled response to COVID-19 is another best practice worthy of examination. To control the spread of the virus, the government's coordinated execution of its contact tracing, isolation, and treatment was supported by its ability to extract data and information from digital sources. For instance, its contact tracing efforts relied on the ability of tracers to establish the digital footprint by using credit card data, CCTV footages, and ATM transactions of the infected individual. In the first 24 hours of a case, an estimated 100 contact tracers work to establish a 14-day activity map for each infected person (Jackson, 2020).

Furthermore, the government also underscored the importance of maintaining trust by disseminating timely and accurate information to the public. For this, the government used social media outlets like Facebook and Twitter combined with messaging applications like Whatsapp to keep its citizens up to date with the latest public health announcements (Jackson, 2020). This is combined with the government's COVID-19 dashboard (https://co.vid19.sg/singapore/) which shows the case trends and infection rates according to districts. The dashboard also allows the disaggregation of data according to categories such as gender, ethnicity, and infection clusters.



Covid Dashboard and Online Resources of Singapore

Figure 2



For its part, Taiwan's COVID-19 response was driven by its experiences with the 2003 SARS outbreak and its investments in digital government. Its proximity to China also forced Taiwan to be proactive by using innovative technologies and common sense. Its ability to track citizens through their national ID enabled Taiwan to ration face masks to households (Ngerng, 2020). In addition, the country also invested heavily on the interoperability of public agencies, which proved to be

crucial for its coronavirus response. Anchored on its preparations for bioterrorism and pandemics, these interlocking sets of agencies allowed local authorities to collate data from various sources like its immigration and customs services, then correlating these datasets to its national health insurance database using data analytics (Jackson, 2020) (Blackwell, 2020). Because of this, Taiwanese authorities were able to track the travel history of its citizens and match it withtheir health activities such as clinic visits and checkups.

Similar to Singapore and South Korea, trust in government is one of the important characteristics of Taiwan's COVID-19 response. This was achieved through its robust contact tracing program to enable its public health agencies to get ahead of the virus. The use of the infectious disease contact tracing platform and management system enabled health authorities to efficiently track infection cases, pinpoint transmission clusters, and monitor patients in isolation (Huang et al, 2020). Using GPS data, alerts were broadcasted to inform citizens of emerging infection clusters, while local agencies distributed "gift packs" to patients in isolation.

Overall, the cases of Singapore, South Korea and Taiwan underscored the importance of learning from past experiences and of developing the needed competencies to effectively respond to the pandemic. Primarily focused on effective communication, rapid dissemination of information, and the ability to use innovative technologies to recognize emerging data trends, these measures significantly enhanced their abilities to address the challenges posed by the pandemic. Furthermore, these economies earned the trust of their citizens through aggressive public awareness campaigns using multiple digital channels. In each case, the investments made in digital technologies in government, especially in national security and public health agencies strengthened its capabilities and raise public confidence in government.

Digital Government and COVID 19 in the Philippines: Challenges and Opportunities

Overview of Digital Government in the Philippines

Since the 1990s, the Philippines has pursued an e-government strategy that was aimed primarily at improving the delivery of services and encouraging citizen participation. Different political administrations also viewed e-government as part of the country's overall development strategy, thus its mention in the numerous iterations of the national medium-term development plan. Furthermore, laws were enacted to push the e-government in the Philippines

One of the significant developments in this push toward digital government occurred in 2012, through the Medium-term Information Technology Harmonization Initiative

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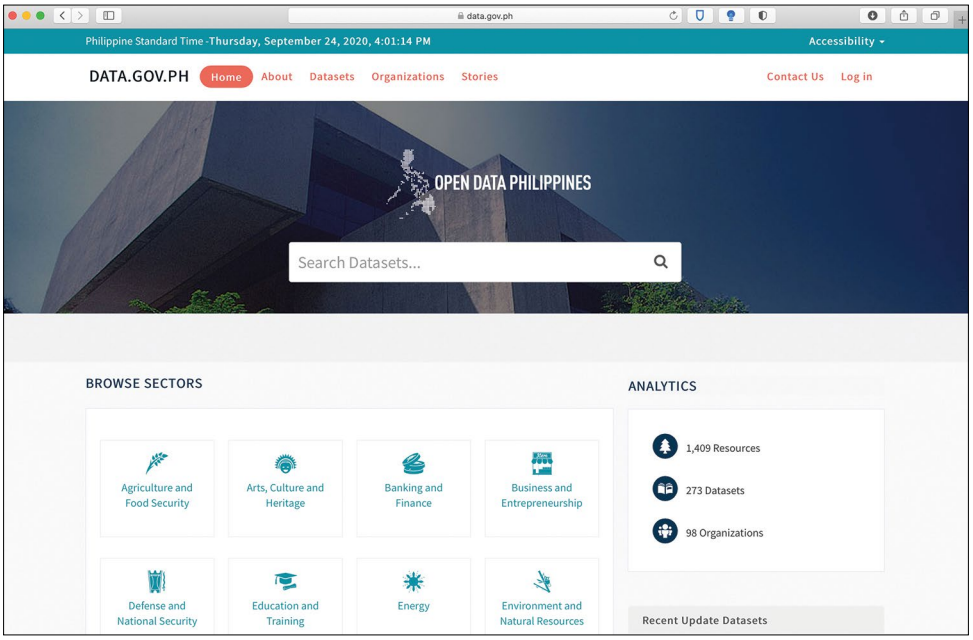
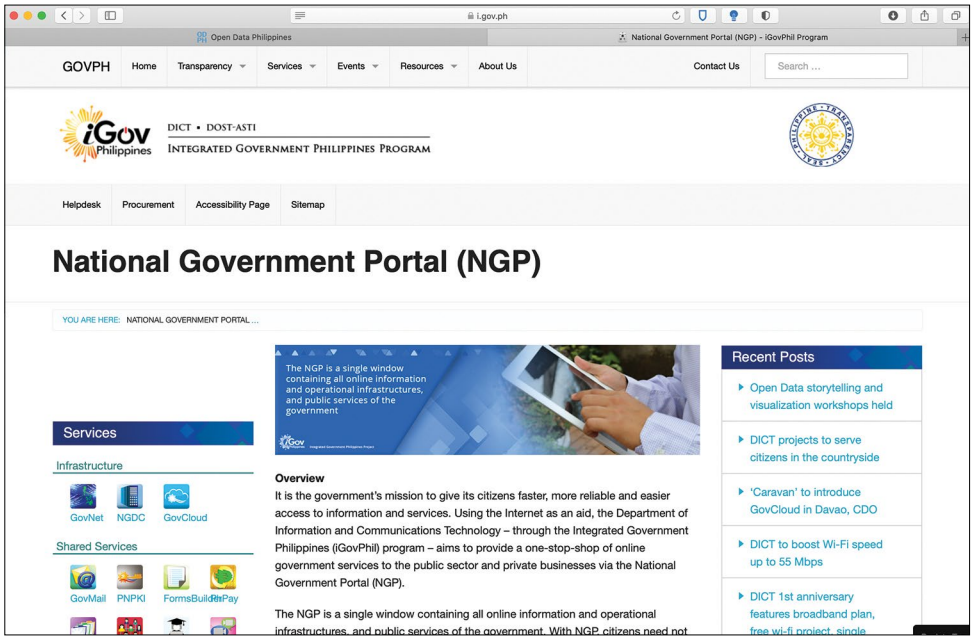


Screen Shots of the Philippine Open Data and National Government Portals

Figure 3



(MITHI). MITHI was designed to be the government's flagship program aimed at integrating the major agencies of the national government. Digital integration was to be achieved using a common set of standards and supported by interoperable systems. These service areas are the following: a) Health; b) Education; c) Transportation, and (d) Justice, Peace and Order (Magno, 2018).

In addition, the national government portal (NGP) was developed to serve as an online gateway for all web-based government services. It was also envisioned to include other government-to-government (G2G), government-to-citizen (G2C), and government-to-business (G2B) services. These systems together with the MITHI systems will operate under a unified cloud-based system using a common interoperability standard known as the Philippine e-Government Interoperability Framework (PeGIF). The PeGIF provides the general framework that allows government information systems to be integrated through the various enterprise levels, namely: (a) technical, (b) informational (data) and (c) organizational (business process) levels (DOST-ICTO, 2013) (Magno, 2018).

Also, the participation of the Philippines in the Open Government Partnership in 2011 resulted in the open government data initiatives. This brought the creation of the open government data portal (www.data.gov.ph) which contains public datasets from various government agencies. The purpose of releasing these datasets is to support the transparency initiatives of the government and encourage citizen participation. Figure 3 shows the opening page screenshots of the Open Government Data Philippines and the National Government portal websites.

Laying the Legal Foundation: Laws and Programs (2016-present)

In 2016, the bill creating the Department of Information and Communication Technology (DICT) was enacted into law. The DICT is the primary national government agency tasked with planning and implementation of digital government in the Philippines. The department pursued the completion of the Philippine Digital Transformation Strategy (PDTS) (2017-2022) which encapsulates the overall plan of the Philippine government to achieve its digital transformation goals. Furthermore, it also underscored the role of digital government in its strategy. Another notable plan developed in 2017

is the e-government master plan, which laid the foundation of digital government in the Philippines for the next 5 years. Summarized in the vision of achieving a "One Digitized Government for the Philippines", EGMP 2022 is the blueprint of the government's plan to achieve its e-government targets. The plan is also anchored on the 3 major pillars of the Philippine development plan (2017-2022) and claims to be a product of the previous ICT initiatives pursued by the government.

Significant accomplishments were also made in the area of legislation. The government enacted laws that can provide the foundation for digital government in the Philippines. These laws are the National ID Law (RA 11055), the Ease of Doing Business Law (RA 11035) and the Philippine Innovation Act (RA 11293).

The National ID Law of 2019 envisioned the creation of a national ID for all Filipino citizens that will serve not only as a tool for identification, but also provides access to the "seamless delivery of public services" (Sec. 20). The law also mandates the integration of local government systems into a national registration system. This law will provide every citizen with a unique citizen ID number that can facilitate access to public services and integrate records management across agencies. Similarly, the Ease of Doing Business (EODB) law is another legal tool that can be used to advance digital government. Intended to improve the country's competitiveness by improving the process and speed of government services, promote transparency and cut red tape, the law specifically mandates the creation of local business registries that will be accessed through a national service portal. If implemented, this is law can facilitate the registration of business permits and licenses. While the Philippine Innovation Act (2019) places innovation at the center of the country's development policies. The law also endeavors "to generate and scale up action at all levels and support MSME activities in the areas of education, training, research and development towards promoting innovation and industrialization activities". Furthermore, the law creates the National Innovation Council (NIC) mandated to develop the country's National Innovation Agenda and Strategy that will lay down the visions and long-term goals for innovation and a roadmap of strategies to improve innovation governance. (Ona and Ching, 2020)

Reexamining the Digital Government Agenda: Pathways for the Philippines

Despite the numerous e-government plans developed since the 1990s, DG in the Philippines remains to be in its initial/emerging stage. Ranked as 77 out of 193 countries in the 2020 UN e-government development index, it has continued to struggle to achieve its targets due to limited resources, changing political priorities and disjoint ICT plans (Ona et al, 2011) (Villanueva, 2016). Many agencies remained as transactional silos, thus impeding data sharing and interoperability (Ona, 2019). Furthermore, DG adoption at the local government level can be described as at its basic stages with many websites having one-way communication capability (Khalid and Lavilles, 2019). This phenomenon is further exacerbated by the inequitable access of citizens to online information and services due to income disparities (Urbina and Abe, 2017). As a result, citizens continue to wait in long lines in order to avail of government services. For functional e-government services in selected agencies, these cases merely focus on transactional efficiency (faster services) and are rarely interoperable. The existence of agency silos due to incorrect understanding of data ownership, supplier preference, and infrastructure limitations among others continues to hamper DG initiatives.

These persistent challenges also hamper the ability of the government to use DG and innovative technologies to mitigate the effects of COVID-19. For instance, the Department of Health (DOH) continues to struggle with the accuracy and usefulness of its datasets. Five months into the pandemic, the datasets suffer from incomplete data on location, gender among others (Bueza, 2020). These items are deemed to be crucial in contact tracing efforts in communities. In addition, the DOH Covid tracker website also lacks the ability to compare and aggregate data. For instance, specific data on the number of persons under investigation, their location and status, are not reflected in the website. The website also lacks a dashboard like capability that can be seen in the Singaporean and Korean sites. Also, the site is not capable of integrating COVID-related hospital data like hospital beds, ICU availability, and number of infected patients per facility. Lastly, the COVID site does not have an open data facility, where citizens can download open datasets.

Overall, DG in the Philippines can benefit from a strategic roadmap that can identify short- and long-term goals and targets as well as synergize existing laws to drive DG initiatives. An institutionalized DG roadmap should be supported by a policy regime developed through a consensus-driven, multi-stakeholder approach and composed of multi-year commitments. DG sponsors and champions should leverage the provisions of existing laws to formalize and consolidate

programs. Additional legislative proposals should be pursued. Moreover, national agencies should articulate their respective targets based on the national DG roadmap. Agency-specific policies should also be developed to ensure the sustainability of DG in their respective organizations.

Like the Asian best practices, the Philippine DG roadmap should also be treated as an indispensable part of the country's medium-term development plans. National development strategies should also underscore the importance of DG in attaining quality of life goals. By doing this, DG will avoid the frequent priority changes due to short political-administrative cycles.

The COVID-19 pandemic has also shown us that investments in DG can contribute to the resilience of governance systems. The examples from South Korea, Singapore and Taiwan on how to use their existing DG infrastructure to mitigate the effects of the virus are encouraging and worth emulating. Also, these cases showed that a robust DG infrastructure can avoid work stoppages in public offices and provide a solid information dissemination platform that can strengthen trust and confidence in government.

Recommendations

Clearly, the Philippines can do a "Carpe diem" move and take advantage of the opportunities that are afforded by investing in digital government. Below are the initial recommendations for government officials and policy entrepreneurs:

A. Creation of the National Digital Government Council

Political commitment and leadership are vital components in establishing DG and attaining its goals. The proposed National DG Council (NDGC) is a body that can be tasked to oversee all DG initiatives and provide strategic leadership. Ideally, the NDGC should be chaired by the President of the Republic, with the secretaries of budget, finance, and ICT as co-chairs. This council can also provide the much-needed political commitment for DG.

B. Recalibrate the Philippine Digital Transformation (Dx) Strategy

Concerned agencies should consider doing a review of the PDTS. Given the profound effects of COVID-19, recalibrating the strategy is highly beneficial and very practical. The possible area that can be re-examined are as follows:

B.1. Redefining the Roles of Dx Stakeholders

This paper underscores the need to redefine the roles of the various stakeholders. For one, a government-centric strategy is inadequate to address the widespread disruption due to the pandemic. The private sector will play a crucial role in defining industry-sectoral targets. Civil society may also contribute by ensuring that the public good aspect of Dx is not overshadowed by profitability. Furthermore, engaging the various sectors is important in fueling innovation. An example of this is the ability of citizen groups to examine datasets and provide innovative solutions to societal problems. The potency of citizen participation and the use of open government datasets was shown in the Taiwan and Korean COVID-19 cases.

Of course, the government still plays a vital part in completing the Dx puzzle. With its resources and legal mandates, it can create an environment where the various sectors can share and collaborate to address common concerns. Government can also prioritize Dx targets and provide incentives. While national agencies can provide the needed open formatted datasets to encourage data science entrepreneurs to mine these data and produce innovative solutions.

B.2. Identify Strategic Areas and Viable Targets

With the usual limited resources comes the need for the revised Dx strategy to identify strategic areas where Dx principles can be applied and projects can be pursued. For this, the development of a Dx roadmap and the identification of flagship projects are highly encouraged. This move will provide a clear and stable agenda to encourage stakeholders to commit their resources based on their interests. Having strategic areas and targets also provides the government with tangible outputs which it can use to communicate to the public.

Defining targets also promotes trust and accountability. In a pandemic situation, the numerous anomalies hounding the state's social amelioration and health insurance programs undermine trust in government. As shown in the examples of Singapore, Taiwan and Korea, trust remains an important commodity and plays a vital part in the overall strategy to get ahead of the virus.

C. Pursue Enactment of the Digital Government Law and Freedom of Information Act

Digital government is an investment. Like any other investment, the returns must be made clear. Enacting laws can provide the government with the basic legal guideline for implementing DG across national agencies and even in local governments. Moreover, a DG law can prescribe the basic elements of a DG strategy such as enabling policies, capacity building programs, and skills development as well as requiring interoperability among national agencies. In addition to a DG law is the need to pursue a freedom of information act. This will guarantee that public data sets can be accessed by citizens through online venues.

D. Investment in DG Infrastructure and Build Capacities

With political commitment and a robust policy regime comes the need to invest in digital infrastructure and organizational capacities. Ensuring reliable internet connectivity and the development of DG content (applications) are important components of the DG puzzle. Government agencies should conduct an audit of their existing resources and do a gap analysis based on the goals of the DG roadmap. Furthermore, changes in organizational structure, skills and culture will occur while adopting a citizen-centric and innovation driven paradigm is necessary to harness the power of new technologies.

E. Investment in Research and Development

The government must also support research in the areas of organizational development, information technology, data sciences, policy development, public administration among others, to foster the growth of DG. Scholarship in the areas of DG and digital transformation will lead to academic and research programs that can further push innovation in society. For this, new avenues for scholarship and investment in both basic and applied research must be prioritized by the government.

> “DG in the Philippines can benefit from a strategic roadmap that can identify short- and long-term goals and targets as well as synergize existing laws to drive DG initiatives.”

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