

# The Nexus between Data, Information and Knowledge during the COVID-19 Pandemic: Navigating the Knowledge Management Landscape in South Africa

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## Abstract

This viewpoint paper is based on desktop research focusing on the discourse of knowledge management (KM). We explore the situation in South Africa with reference to this global COVID-19 apocalypse that the world is being confronted with. By using a qualitative research approach, the concepts of data, information and knowledge are unpacked in the context of this pandemic. KM is evident in the creation, storing, using and effective sharing of information and knowledge in light of COVID-19. The sharing and dissemination of information are, however, technologically orientated as advances in this realm continue to elevate opportunities for transforming KM. All information that has been created and is available to inform society about the virus is shared and distributed through technological means such as electronic and print media, the Internet and social media. As people adjust to the new normal, they will have a hefty repository of pandemic stories, enriched with new vocabulary about the virus and centred on the three concepts of data, information and knowledge. Understanding this new terminology plays a key role in helping to prevent the spread of COVID-19. Incorrect use of this vocabulary can lead to misinformation and could endanger the lives of others. Both the public and government now need “moral knowledge” about the pandemic in the fight against this virus.

**Keywords:** data; information; knowledge; knowledge management; infodemic; COVID-19

## Introduction

The world, as we know it, has changed; so have our daily lives and the prominence of data, information and knowledge. Coronavirus (commonly known as COVID-19) poses a threat to human life, which has led to unavoidable drastic changes in normal life around the globe. Tedros Adhanom Ghebreyesus, Director-General of the World Health Organisation (WHO), reported on 31 July 2020 that this global pandemic is a once-in-a-century health crisis that will impact humanity for decades to come (Reuters News Agency 2020).

COVID-19 is a deadly virus that attacks the respiratory system with symptoms of fever, cough, sore throat, and tiredness. According to Cennimo (2019), it was reported to the WHO on 31 December 2019 and was declared a global pandemic on 11 March 2020. Governments, scientists, health professionals, scholars and researchers are hard at work gathering data and information to create knowledge and to find a vaccination and cure for this virus. Indeed, research, data and information are a core part of the capacity of a state, without which a government cannot lead, innovate and exploit the opportunities offered by COVID-19 (Mazzucato 2020 as cited by Gumede 2020, 10).

In South Africa, strict laws and regulations have been enforced in order to plateau or flatten the curve or rate of infections and save lives, including a massive public health awareness campaign. Chisholm (2020, 111) correctly notes that the COVID-19 pandemic in South Africa has been accompanied by a massive public health and sanitation campaign. This campaign has been conducted via television and all other social and print media, with the president, minister of health, and leading medical professionals championing it. While the cure and vaccination efforts are continuously underway, with trials for several vaccine candidates, the creation, use, and sharing of information about the virus are instrumental tools crucial in the fight against COVID-19.

Human beings strongly rely on the creation of information in order to be informed and knowledgeable about the virus. There are various approaches being used to gather data and create information for people to be knowledgeable about this deadly virus. In order to track the spread and rate of infections, tests are conducted daily, and the results are then used to produce figures. These figures inform us of how many people have been infected, and they also provide vital, useful information on the people who have been confirmed as positive cases. As one is required to complete forms that require personal details and information, this provides the necessary information required to assist, link, and learn more about the virus. Information and data such as a physical address, age, gender, medical history, and past travels have been valuable in the creation of knowledge on COVID-19. This modelling has provided governments worldwide with the ammunition to study the virus's patterns in an effort to contain the virus and save lives.

## Methodology

Researchers understand the what, how, when, where and why of Knowledge Management (KM) by using qualitative research (Ngulube 2019, 96), and this research approach informed this paper's methodological stand-point. Ngulube (2019, 86) correctly notes that research aimed at exploring and understanding KM dynamics should be based on robust and thorough research procedures. Ngulube (2019, 86) further notes that the quality and rigour of research are of the utmost importance if that research is to gather appropriate knowledge and evidence to support practice (Ngulube 2019, 86). It is, therefore, important for researchers to reveal their methodology and methods in their research projects for replication and validity purposes. This was a purely qualitative study, from an interpretivist paradigm, that used desktop research or secondary research as the main method to gather information on this topical subject. This involved the collection, synthesis and summary of existing research. Researchers thus used modulated searching to identify specific and base-line information pertaining to COVID-19 and KM. Desktop research is basically involved in collecting data from existing resources; hence it is often considered a low-cost technique as compared to field research, which was not possible during this global pandemic. This was Internet Mediated Research (IMR), in which primary data were gathered from newspapers, television programmes and websites (virtual documents) and complemented by secondary sources for social scientific analysis.

## Data, Information and Knowledge Discussed

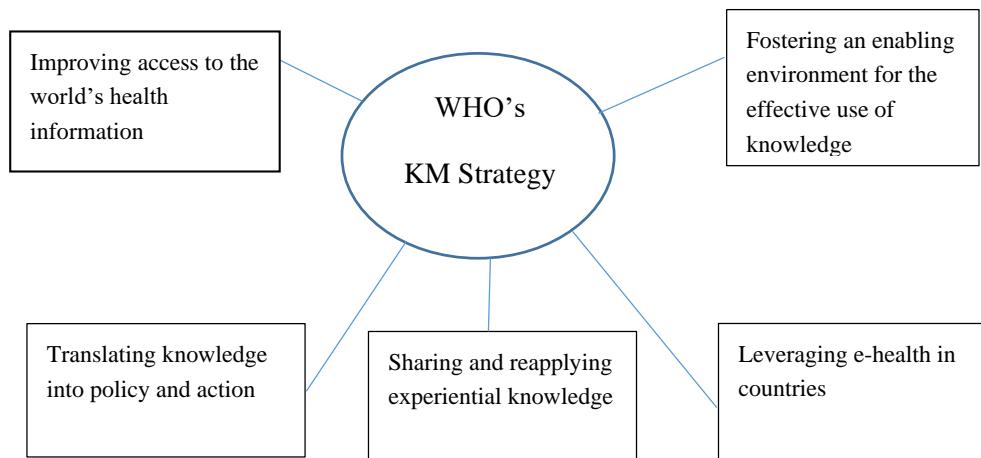
These threefold concepts provide the foundation for KM and, as correctly noted by Nazim and Mukherjee (2016, 4), any discussion on KM needs an understanding of the concept of knowledge and its relationships to information and data. These three elements are often presented as discreet in a hierarchical model, and from an information studies point of view, data are converted into information and then transformed into a higher state of knowledge by means of some process of distillation (Yeo 2018, 114). Alternatives exist, however, as some datafication proponents reject this continuum thinking. One school of thought on datafication proposes the conversion of information into data to facilitate further analysis and reuse, breaking down the traditional understanding of data as numbers and information as texts and audio-visual material (Mai 2016, 193; Mayer-Schönberger and Cukier 2013, 15), but is muted on the knowledge aspect.

On the other hand, Millar (2017, 5), for instance, notes that human beings gather data through our senses, interpret those symbols and signals to make sense of them, which is knowledge generation, and then this can be shared and turned into information. Data are thus transformable into knowledge, which can then be shared and turned into information (Millar 2017, 5). Similarly, Nenungwi (2018, 16) notes that it is through knowledge that data are analysed and information used. Data are thus the building blocks of information and knowledge (Rubin 2016, 360). This two-way perception of inverting or subverting the standard model applies equally well in this COVID-19

situation we are in, especially from a KM point of view. Yeo (2018, 115) is thus correct with the view that there is a diversity of opinion when it comes to discussion of these three elements, as these are contested constructs, and their supposed relationships and transformations can be interpreted in many different ways.

The term “knowledge management” (KM) is multi-disciplinary; hence it is obscured and variegated in meaning since there is no universal consensus on its conceptualisation, as beauty is in the “eye of the beholder.” Professions interested in KM tend to present and interpret the term from their own perspective (Nazim and Mukherjee 2016, 10). KM, as a concept, is used in many disciplines, and so it has come to mean different things to different people, and there is no single agreed definition of KM (Nazim and Mukherjee 2016, 10). From a public health perspective, the WHO’s KM strategy provides a good starting point that informed this paper, which is to foster an environment that encourages the creation, sharing and effective application of knowledge to improve health. Accordingly, WHO considers KM to be the dual challenge of, first, managing information and processes and, second, managing people and their environment so that knowledge is created, shared and applied more systematically and effectively (WHO KM Strategy 2005, 8).

### Knowledge Management Strategy at WHO



**Figure 1:** KM strategy at WHO

**Source:** North and Kumta (2018, 211)

The KM strategy of WHO, as shown in figure 1, focuses on national policymakers, WHO programmes and health professionals (WHO KM Strategy 2005, 1). The objectives of the strategy cover three main areas, which are as follows:

1. Strengthening health systems in different countries through better knowledge management.
2. Establishing KM in public health.
3. Enabling WHO to become a better learning organisation (WHO KM Strategy 2005, 1).

These three objectives cascade to any country's health system in line with KM international best practices, to which South Africa subscribes as a global member of WHO. As earlier noted, the "know-do" gap concept, as advocated by WHO, which is the gap between what is known and what is done in practice (WHO KM Strategy 2005), informed the context of this treatise. For this paper, KM will be viewed from a holistic perspective as referring to the government and its interaction with its citizens in the context of the COVID-19 pandemic. KM is thus defined as the process of capturing, storing, sharing and using knowledge about the virus to inform the public. In order to facilitate these processes, there has to be the management of information (explicit/recoded knowledge); management of people (tacit knowledge); generation of new knowledge; using knowledge in decision-making; and representing knowledge in documents, databases, software and websites about COVID-19. Over the years, the popular adage has been "knowledge is power"; however, in the modern era—especially during this COVID-19 pandemic—it is now "knowledge is life" (eNCA 2020a). This treatise proposes that knowledge is both power and life in the fight against COVID-19, largely because, as correctly noted by Davis-Reddy (2020, 18), it is through insights and information about the disease, its spread and effects, amongst many other factors, that responses to help fight the pandemic are being sought.

Data are essential information in an elementary and crude form; information represents data endowed with meaning; knowledge represents information with experience, insight and expertise (Zins 2007); and wisdom represents the ability to use knowledge and experience to make good judgements (Nazim and Mukherjee 2016, 4). Knowledge, in turn, can only become wisdom if applied correctly (Swart 2019, 115). Data have been defined as forms of information and data existing in a context, taking on meaning from that context and from the perspective of the beholder (Borgman 2015, 18; Swart 2019, 115). Examples of data include facts, numbers, letters, sound, text, moving images and symbols.

In the context of the COVID-19 pandemic, reference is made to epidemiological data, reported, unreported or under-reported cases (actual and projected) about the infections, testing, recoveries, vaccines uptake and deaths. This data can also be extended to health system data (data about hospitals, clinics and health resources). Marivate (2020) notes that there is a need for South Africa to have good data and information on the pandemic itself to enable an appropriate response to the virus in terms of modelling. Swart (2019, 115) correctly notes that data should be used to enrich the lives of people or empower them, rather than just being used for statistical or marketing purposes, and this should inform the KM landscape in South Africa in view of this global COVID-19 pandemic.

However, data need to be transformed into information by adding context and then into knowledge by adding meaning. Finally, it must be applied in the correct way to enable the acquisition of wisdom that truly enriches or empowers a person (Swart 2019, 115).

The WHO COVID-19 Dashboard (2020) recorded that as of 23 August 2020, there have been 23 057 288 confirmed cases of COVID-19, including 800 906 deaths globally. As of 24 August 2020, for instance, South Africa's COVID-19 death toll had passed 13 000. The total number of COVID-19 infections or positive cases had risen to 609 773 (SAcoronavirus, 2020a).<sup>1</sup> What this means is that from the figures recorded daily, data are created and then generated and captured to different categories of statistics that allow it to be appropriately presented and shared across the board. Data are thus a prerequisite to information.

During this pandemic, there has been a growing influence of scientists to influence evidence-based decisions in policy-making by using scientific data. Hugo (2020) avers that science is done by specialists, whereas decision support and policy development are performed by generalists who synthesise some answers from a large number of inputs from different scientific domains. Decision-makers thus need to be equipped with evidence-based information to inform their response plans and interventions on COVID-19. Hugo (2020) suggests that the main benefit of science to society is growth in knowledge. In view of the fact that this knowledge is a product of social collaboration, this should be owned and placed in the service of the community (Pillay, Damonse, and Ellis 2020, 20). However, the data about COVID-19 have been a subject of contestation in South Africa with regards to the management process. Accusations and counter-accusations about unavailability, under-documenting, under-reporting and manipulation of the data to reveal the true picture of the virus have been bandied about in some quarters for accountability and transparency purposes (Brodie 2020; Mashaba and Nqola 2020). Steenhuisen (2020) was pointed in his remarks when he noted that:

It is very important that data, the modelling and statistics are shared as widely as possible with members of the media, political parties as well as the general public. In this game, knowledge is power. The more people have knowledge of where we are at in combating the virus and what needs to be done, the more powerful it is going to make the general response for society to be able to deal and win the war against COVID-19 in South Africa.

The then Health Minister of South Africa, Dr Zweli Mkhize, was quick to point out (and correctly so) that more than 70 medical advisories drafted by the Ministerial Advisory Committee (MAC) on COVID-19 would not be released, despite calls from senior

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1 The data and information pertaining to cases in South Africa are in a state of flux. On submission of this paper, the statistics were as follows: as of 23 July 2021, there have been 192 284 207 confirmed cases of COVID-19, including 4 136 518 deaths, and 3 646 968 156 vaccine doses administered globally (WHO Dashboard 2021). As for South Africa, as on 26 July 2021, there have been 2 377 823 positive cases, 69 775 deaths and 6 384 382 vaccine doses administered (SAcoronavirus 2021).

scientific advisors that it can only enhance public understanding of the pandemic (Cowan, Karrim, and Hunter 2020). These advisories, which are central to government formulating policy and regulations, should be released in the interest of transparency and responsible government, as advocated by some members of the MAC (Cowan et al. 2020). It is a widely known historical fact that in public health emergencies like this COVID-19 pandemic, governments worldwide are mean with data and information, as this is deemed sensitive information and confidential. Revealing such data and information might give the public the wrong perception in the handling of this emergency by the government, and it may cultivate fear in the public domain and cause civil unrest. Karrim and Cowan (2020), for instance, report that some disgruntled scientists in the MAC expressed their concerns on the lack of transparency, as this was complicating the fight against the virus because the public was increasingly questioning the rationale behind regulations. Brodie (2020) similarly observed and acknowledged the sterling efforts being made by private volunteers in their efforts to help ordinary citizens make sense of the dizzying COVID-19 data, as this is a landscape that governments and statisticians have struggled to make accessible.

In a recent memorandum, the International Council on Archives (ICA) and its alliance partners reiterated that the duty to document does not cease in a crisis but becomes even more essential. Decisions must thus be documented, records and data should be secured and preserved and made accessible for governance purposes (ICA 2020).

The concept of information is elusive and has proven to be difficult to delineate, as Yeo (2018, 85–86) notes, and it is a hall of mirrors (Yeo 2018, citing Morville 2005). Information is considered as facts and data that have been organised and made meaningful, irrespective of form or medium (Millar 2017, 5–7, 298; World Bank Group Records Management Roadmap 2020). Furner (2015) advances five propositions to explain what information is, three of which are adopted for this paper. Furner (2015, 364) correctly posits that information can either be data, knowledge and news. As earlier noted, Millar (2017) contends that data and information can be in any form to which meaning can be ascribed (Furner 2015, 364). Information as knowledge means that there is a shared meaning corresponding to facts (Furner 2015, 364). Last but not least, information as news is dependent on the interpretation of which causes a change in the set of beliefs held by an interpreter (Furner 2015, 364), and the variable “meaning” is a recurring theme in the three definitions put forward by Furner (2015).

In the context of this COVID-19 pandemic, information is being created for the public to be informed and knowledgeable about the virus. Knowledge is the state of knowing about a particular fact or situation (McIntosh 2013, 861). The process of informing thus amounts to converting data into knowledge (Nazim and Mukherjee 2016, 6). The origins of the virus and conspiracies, symptoms, treatment, prejudices, myths, fears, and so forth provide information for the general public to know about the virus and for the government to make informed decisions in handling the pandemic. Tedros Adhanom Ghebreyesus, Director-General of the WHO, reported in mid-February 2020 in

Germany that “we’re not just fighting an epidemic; we’re fighting an infodemic” (United Nations Department of Global Communications 2020).

The term “infodemic” refers to an over-abundance of information, which is confusing and poses a challenge in distinguishing between correct or false information about the virus. The United Nations Under-Secretary-General for Global Communications, Melissa Fleming (2020), notes that not only is the pandemic a public health emergency, but it is also a communication crisis. WHO explains that infodemics are an excessive amount of information about a problem, which makes it difficult to identify a solution. People or sources can spread misinformation, disinformation and rumours during a health emergency. Infodemics can hamper an effective public health response and create confusion and distrust among people (United Nations Department of Global Communications 2020).

The challenge of an infodemic is that it travels faster, broader and deeper, far more than accurate information. Its power is also in the use of videos, pictures, text, songs, and films to substantiate false claims. The challenge of an uncontrolled infodemic is that it negatively influences policy and public debate (Mutula 2020). Misinformation on the virus is proving highly contagious (Klepper 2020), and in South Africa, the spreading of false information on COVID-19 has since been criminalised.

The rapid spread of false information through social media is among the emerging risks identified by the World Economic Forum in its global risks 2013 report (Mukwevho, Ngoepe, and Ngulube 2019, 9). Mutula (2020) reports that social media sites such as Twitter, Instagram and blogs have been awash with conspiracy theories on the origin of the coronavirus. Klepper (2020) agrees with Mutula (2020) and also notes that social media has amplified the claims and helped believers find each other. When COVID-19 hit South Africa with its first case on 5 March 2020, people turned to social media for information and began sharing news items and circulating jokes and memes about the virus (Bosch 2020). The flood of misinformation has posed a challenge for Facebook, Twitter and other platforms, which have found themselves accused of censorship for taking down virus misinformation. The theories advanced have included that the virus is man-made as a bio-weapon created in an American lab in Wuhan, and that sulphur-dioxide emissions over China were evidence of the pervasive and mass cremation of COVID-19 victims. Some other conspiracy theories have advanced the position that leading global foundations such as Roche child, Rockefeller, Bill and Melinda Gates Foundations played a role in the outbreak of the coronavirus for their business interests (Mutula 2020).

Mutula (2020) also notes that some of the misinformation and disinformation border on racism and xenophobia. For example, it has been claimed that young people or people of African descent are immune to COVID-19, the virus is being spread by foreigners, and that people in warm countries need not worry about the pandemic. One hoax in the early stages of the pandemic outbreak (and recently from an African National Congress

cadre) claimed that new 5G towers were spreading the virus through microwaves (Matiwane 2021). In a nutshell, a tsunami of hate, xenophobia, scapegoating, and scare-mongering has been unleashed (Guterres 2020). On a positive note, information is being used to keep track of the spread of the virus and identify areas that are most affected, which are now called hot-spot areas or epicentres.

This information about the virus also provided the link to chronic diseases as they weaken the immune system, indicating that “people of any age with certain underlying conditions are at increased risk for severe illness from COVID-19” (Centre for Disease Control and Prevention 2020).

Through research, scientists have been able to find measures that are now regulated as law that decrease the chances of infections. As noted by Desai and Patel (2020) as well as Lessels (2020), in terms of transmission dynamics, this is mainly through droplets and contact. Current evidence shows that the virus is spread through respiratory droplets when an infected person sneezes, breathes, talks or coughs and through the touching of infected surfaces. These surfaces can be a table, door handle, inanimate objects like a pen, phone, and so forth, and these inanimate objects where droplets can settle on are called fomites. Upon touching these inanimate objects containing the virus, one gets infected and may self-inoculate by touching the face, eyes, mouth and nose (Lessels 2020). This information has allowed people to be informed on how to protect themselves and stay safe. Therefore, the wearing of a mask, the use of gloves, the wearing of protective personal equipment (PPE) by health professionals, sanitising, disinfecting surfaces, regular washing of hands, hygiene regarding cough and sneezing etiquette, isolation, and social distancing, are practices that need to be employed religiously. Baxter (2021) correctly notes (from personal COVID-19 trauma experience) that despite the expected vigilance by the public with regards to virus-avoidant behaviour, what is now needed is “moral knowledge” of the pandemic. This means that lived experiences and encounters with close family members who have succumbed to illness and even death are painful reminders as to how deadly this virus is, and should serve as a wake-up call for the public. Baxter (2021, 12) poignantly remarks that:

COVID-19 is a physically painful, mentally taxing, lonely disease. Families are not allowed to comfort their loved ones as they lie in hospital. Patients are often left to pass away on their own. Even the burials are less natural, with limited numbers of people allowed to pay their respects.

Although a cure has not been found, information has been shared of possible medicine and remedies that can help infected people to recover. Western medicine is leading in the search for a cure. However, this has not been successful, which has motivated some to try traditional medicine as an alternative. Madagascar became popular in the wake of President Rajoelina’s insistence months back that a locally produced remedy—COVID-Organics or Tambavy CVO—could cure and also prevent the virus (*Africanews* 2020). Madagascar’s proposed organic remedy that was suggested to cure COVID-19 has led to the advocacy of indigenous knowledge systems to be incorporated in the bid to find

a cure. The herbal tonic is made with the plant called Artemisia, which in Nguni languages is called *Umhlonyane* or *Langane* in Tswana. “It is widely used for numerous ailments including colds, coughs, diabetes, heartburn, bronchitis and asthma” (Nigam et al. 2019). *Umhlonyane* is a traditional herb used by African people since time immemorial and is part of tacit knowledge based on beliefs and experiences. Former Health Minister Dr Zweli Mkhize confirmed the use of *Umhlonyane* to defeat flu, saying indeed this was true as he also grew up drinking it. However, he cautioned against beliefs that the plant known as artemisia could cure COVID-19 (Mvumvu 2020).

After Madagascar had shared this remedy with the world, it was tested by WHO for scientific evidence if it could cure the virus. Scientific tests confirmed that COVID Organics is effective for malaria treatment and not COVID-19. Ironically, Madagascan hospitals are overwhelmed with COVID-19 patients, which seems to confirm that the remedy is a fluke without proven efficacy, despite a dozen African countries importing the purported cure from Madagascar (Africanews 2020). Apparently, WHO had warned of untested remedies, but this did not sit well with some proponents for indigenous remedies, as the argument was that Africa’s time had arrived to provide the cure for this global pandemic.

Human trials are also being done to test possible vaccines. This is also a result of information and knowledge that people have been empowered with on the importance of conducting these trials and the benefit it will yield for human life when the most effective vaccine is discovered. For the public to be enlightened about all the information that has been discovered on the coronavirus, it has to be shared on all platforms that are accessible to people. Published and unpublished articles and journals from different disciplines of research are available on the internet in explicit form. The Internet is the most used medium to disseminate and share information on COVID-19 and the pandemic in general.

Due to the digital divide, some people cannot access information via the Internet; hence other traditional approaches are used to create awareness. In rural areas of KwaZulu-Natal (KZN), chiefs run awareness campaigns within their communities to enlighten people about the virus, teach them about the symptoms and prevention measures they need to practise and what to do if they suspect they are infected. This was commended by the KwaZulu-Natal Member of the Executive Council (KZN MEC) for Cooperative Governance and Traditional Affairs (COGTA), Sipho Hlomuka, as he thanked “Amakhosi for the important role they play in reinforcing government’s message to communities about social distancing, wearing of masks and washing of hands” (Hlomuka 2020).

Newspapers are also some of the traditional methods used to provide information to the community as they are affordable and issued on a daily basis. The media plays a significant role in giving access to information through its numerous platforms. There are advertisements to enhance awareness of the virus on all the radio stations and

discussions where the public may engage with radio presenters. Also, news broadcasts on the radio report every hour on all new information regarding the coronavirus, such as the number of new infection cases, number of newly recorded deaths and all other related information released regularly by the government on the advances it has made in the fight against coronavirus.

Television is also playing a huge part in the sharing of information. As mandated by the Minister of Sports, Arts and Culture, Nathi Mthethwa, on 4 May 2020, telenovelas, soapies and all programmes must have storylines that have infused COVID-19 in order to educate millions of South Africans that enjoy audio-visual entertainment. This enlightens people on all the information they need to know about the virus. Even cartoons are playing their part in educating children through visual demonstrations, as this is more effective for them. A national address is held regularly by the president to share information and updates that are in line with the management of the pandemic.

Social media is the platform that the majority of people, particularly the youth, rely on for social engagements and communication. According to Kamatula (2017, 29), it is the fastest growing online activity worldwide, with an extensive reach having the most significant impact in the shortest amount of time. Hence, all government, business and information services such as the news and newspapers have a social media presence. Facebook has a COVID-19 Information Centre where one can get updates on the virus. There is also a page of The Presidency of the Republic of South Africa that reports regular updates and information from the president's office relating to COVID-19. It does this by hosting live videos where the president is addressing the nation, releasing updates on lockdown levels and regulations, posting nationwide visits and the challenges faced by the state and health care system, which are all specifically focused on COVID-19.

Social media enthusiasts also share information amongst themselves through sharing posts, using hashtags and Twitter threads about the virus and on some of the decisions made that are affecting their social lives, especially the purported "assault" on civil liberties. Some critics have pointed to the ineptitude shown by the government in handling the pandemic. February (2020), for instance, criticised the National Coronavirus Command Council (NCCC) and advocated the need for clear COVID-19 messaging, as this has been confusing and irrational from a decision-making point of view. February (2020) further suggests that in terms of public health education, a bottom-up approach—in which the public is educated about the virus—and not a top-bottom approach as in dictatorships would have done the trick. This sounds rather harsh, considering the novel nature of the virus. The government is continuously learning and admits its shortcomings in tackling the virus, which is understandable as this crisis is unprecedented.

Websites have been up and running since the start of the lockdown, and some of these are data-free sites in efforts by the government and corporate world to provide data and

information for the public to be knowledgeable about the virus. These official and authentic websites provide online resources with codified or explicit knowledge and information about COVID-19 stored in databases and other platforms. The leaflets, reports, infographics and so forth are rich in terms of resources (data, information and knowledge) on COVID-19. South Africa has the SAcoronavirus website, which provides all information on COVID-19 from symptoms, prevention tips, to economic guidelines for relief and daily statistics (SAcoronavirus 2020b). On the website, there is an emergency hotline and WhatsApp support line to assist people with enquiries or when seeking help. In his Level 2 lock-down address on 15 August 2020, to mark five months of the national state of disaster, President Ramaphosa announced that the government would soon unveil a new application (App) that would assist in contact tracing. The president, in his risk-adjusted strategy to manage the spread of COVID-19, remarked as follows:

In addition to manual contact tracing and the national WhatsApp channel, a mobile application will be used to notify contacts more quickly while preserving their privacy and anonymity (eNCA 2020b).

A few examples of such websites include The National Institute for Communicable Diseases (NICD), the South African Medical Research Council (SAMRC), and WHO.

## Conclusion and Recommendations

COVID-19 has defined the knowledge hierarchy in a continuum, proceeding from data (facts and figures) to information (data with context) to knowledge (information with meaning) (Nazim and Mukherjee 2016, 6). The rich vocabulary or terminology (quarantine, lockdown, flattening the curve, community spread, super spreader, social distancing, infodemic, covidpreneurs, covididiots, self-isolation, dashboard, hot-spot, droplet transmission, asymptomatic, epicentre, bio-bubble, to name a few) that has developed crystallises around the three concepts of data, information and knowledge. This is evidence of an effort to inform the public, to save human lives, and for transparency and accountability. It defines the relationship between the governed and the governing. Being empowered with information will help one to be knowledgeable, to practise social distancing, uphold shelf hygiene practices and hold the government to account. Interventions by governments (use of lockdowns, scientists, and so forth) are creating a rich body or glossary of information in efforts to contain or flatten the curve. For people to be knowledgeable, information has to be created, and this has been the focus in the fight against coronavirus.

One could argue that if people were not knowledgeable, matters could be much worse, infection rates would be higher, and a lot of lives would not have been protected. This clearly illustrates and confirms the importance of knowledge and knowledge management during this pandemic. The processes in which data and information have been created, shared and used to produce knowledge that has enlightened people about COVID-19, demonstrate and validate the importance of KM in these difficult times.

Without knowledge, there is no power. This pandemic has proved that power lies in knowledge. Knowledge is the tool for survival, and thus, it is the essence of life. It is evident that in the midst of COVID-19, human survival depends on knowledge—and this knowledge is life.

Misinformation and conspiracy theories around vaccines have proven to be new major challenges in measures to control the virus. Negative and incorrect information about vaccines is shared on social media and reaches millions of active social media users. This has caused a lot of people around the globe to fear vaccinations that are on roll-out. However, the strategies used to educate and inform the public on the coronavirus can also be applied to educate and inform people about all the vaccinations that are currently available.

Government can do public outreach programmes to educate the public about the vaccine. Social media can be a strategic tool in order to reach a larger audience in the most convenient, affordable, efficient and safe way, as COVID-19 preventative measures still have to be observed. Other traditional tools such as newspapers, radio and television can also be utilised. These strategies can play a significant role in discarding false information already shared on vaccines. In this way, measures to control the virus will be more effective. The rate of infections can decrease, and deaths can be prevented as people will be well informed. Lastly, as Baxter (2021) earlier observed, the “moral knowledge” of the pandemic now represents a significant step in the fight against this invisible enemy.

## References

Africanews. 2020. “Madagascar COVID-19: Public Hospitals full as Cases Spike.” Accessed July 28, 2020. <https://www.africanews.com/2020/07/21/madagascar-prez-dismisses-all-critics-would-they-doubt-european-cure/>.

Baxter, K. P. 2021. “The Terror of COVID-19.” *Sunday Times* (Johannesburg). 17 August, 12.

Borgman, C. L. 2015. “Big Data, Little Data, No Data: Scholarship in the Networked World.” Cambridge, Massachusetts: *The MIT Press*. Accessed July 29, 2020. University of KwaZulu-Natal Libraries Catalogue. <https://doi.org/10.7551/mitpress/9963.001.0001>.

Bosch, T. 2020. “Citizen Surveillance and Social Media during South Africa’s Lockdown.” *Corona Times Blog, Understanding the World through the COVID-19 Pandemic*. Accessed August 22, 2020. <https://www.coronatimes.net/citizen-surveillance-social-media-south-africa-lockdown/>, 1 July.

Brodie, N. 2020. “Infodemic to Infowar: The Circus of Disinformation Will Spin on.” *Mail and Guardian*, 18 December. Accessed December 27, 2020. <https://mg.co.za/health/2020-12-18-infodemic-to-infowar-the-circus-of-disinformation-will-spin-on/>.

Cennimo, D. J. 2019. "Coronavirus Disease 2019 (COVID-19)." *Medspace*. Accessed July 28, 2020. <https://www.medscape.com/answers/2500114-197401/what-is-covid-19>.

Centre for Disease Control and Prevention. 2020. "People of any Age with Underlying Medical Conditions." Accessed July 4, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>.

Chisholm, L. 2020. "Corona, Crisis and Curriculum: History of Health Education in South Africa." *Southern African Review of Education* 26 (1): 100–115.

Cowan, K., A. Karrim, and Q. Hunter. 2020. "Mkhize Doubles Down on Keeping Advice Secret as Scientists Push for Transparency." *News24*, 19 July. Accessed July 19, 2020. <https://www.news24.com/news24/southafrica/investigations/mkhize-doubles-down-on-keeping-advice-secret-as-scientists-push-for-transparency-20200719>.

Davis-Reddy, C. 2020. "Producing Data to Help Fight COVID-19." *National Research Foundation Science Matters Magazine* (Special Issue, May): 18–19.

Desai, A. N., and P. P. Patel. 2020. "Stopping the Spread of COVID-19." *JAMA: The Journal of the American Medical Association* 323 (15): 1516. Accessed July 27, 2020. <https://jamanetwork.com/journals/jama/fullarticle/2763533>. <https://doi.org/10.1001/jama.2020.4269>.

eNCA. 2020a. "TV Advertorial on COVID-19 Awareness." *DStv Channel 403*, 20 May.

eNCA. 2020b. "President Cyril Ramaphosa Addresses the Nation." Accessed August 16, 2020. <https://www.youtube.com/watch?v=lrXEjmH9J>.

February, J. 2020. "We Need clear COVID-19 Messaging from Government." Accessed June 20, 2020. <http://www.msn.com/en-za/health/coronavirus/judith-february-we-need-clear-covid-19-messaging-from-government/ar-BB15FMRi?ocid=ientp>.

Fleming, M. 2020. "'Verified' Initiative Aims to Flood Digital Space with Facts amid COVID-19 Crisis." Accessed July 26, 2020. <https://www.un.org/en/coronavirus/%E2%80%98verified%E2%80%99-initiative-aims-flood-digital-space-facts-amid-covid-19-crisis>.

Furner, J. 2015. "Information Science is Neither." *Library Trends* 63 (3): 362–367. <https://doi.org/10.1353/lib.2015.0009>.

Gumede, W. 2020. "A New Coach for our Fractious Team." *Sunday Times* (Johannesburg). 2 August, 5.

Guterres, A. 2020. "Good Communication Saves Lives." Accessed July 28, 2020. <https://www.un.org/en/coronavirus/good-communication-saves-lives>.

Hlomuka, S. 2020. "KwaZulu-Natal Department of Cooperative Governance and Traditional Affairs' (KZNCOGTA) Webinar Reflects on Government's Response to COVID-19, Outlines Recovery Plan." Accessed July 28, 2020. <http://www.kzncopta.gov.za/kzncoftas-webinar-reflects-on-governments-response-to-covid-19-outlines-recovery-plan/>. Webinar, 2 July.

Hugo, W. 2020. "Open Science and Societal Benefit: It Needs a bit of Work." University of KwaZulu-Natal data@breakfast. Accessed August 14, 2020. <https://www.youtube.com/watch?v=P68ONWqFLDM>. Webinar, 14 August.

International Council on Archives (ICA). 2020. "COVID-19: The Duty to Document Does not Cease in a Crisis, it Becomes more essential." Accessed June 20, 2020. <https://www.ica.org/en/covid-19-the-duty-to-document-does-not-cease-in-a-crisis-it-becomes-more-essential>.

Kamatula, G. A. 2017. "Social Media: A Potential Technological Tool in Fostering Knowledge Sharing in Government Agencies." In *Managing Knowledge Resources and Records in Modern Organizations*, edited by P. Jain, N. Mnjama, and P. A. Hershey. IGI Global, 29–43. <https://doi.org/10.4018/978-1-5225-1965-2.ch003>.

Karrim, A., and K. Cowan. 2020. "Scientists Plead for COVID-19 Transparency: 'The Social Contract with Government is Broken'." Accessed July 19, 2020. <https://www.news24.com/news24/southafrica/investigations/scientists-plead-for-covid-19-transparency-the-social-contract-with-government-is-broken-20200718>.

Klepper, D. 2020. "Misinformation on the Virus Is Proving Highly Contagious." Accessed July 30, 2020. <https://www.ctvnews.ca/health/coronavirus/misinformation-on-the-virus-is-proving-highly-contagious-1.5044206>.

Lessels, R. 2020. "Responding to the COVID-19 Epidemic: Local and Global Perspective." University of KwaZulu-Natal data@breakfast. Accessed March 27, 2020. [https://www.youtube.com/watch?v=IWVQw\\_SA0jg](https://www.youtube.com/watch?v=IWVQw_SA0jg). Webinar, 27 March.

Mai, J. E. 2016. "Big Data Privacy: The Datafication of Personal Information." *The Information Society* 32 (3): 192–99. <https://doi.org/10.1080/01972243.2016.1153010>.

Marivate, V. 2020. "Use of Available Data to Inform the COVID-19 Outbreak in South Africa." University of KwaZulu-Natal data@breakfast. Accessed May 29, 2020. <https://www.youtube.com/watch?v=FF4gMsCtJNY>. Webinar, 29 May. <https://doi.org/10.5334/dsj-2020-019>.

Mashaba, N., and R. Nqola. 2020. "Malema Calls for Review of COVID-19 Data." *Power News*, 28 July. Accessed July 28, 2020. <https://www.power987.co.za/news/malema-calls-for-review-of-covid-19-data/>.

Matiwane, Z. 2021. “ANC eThekwini Councillor Says ‘5G Towers Spread COVID-19’ and ‘Whites have Vaccine’.” *The Sowetan*, 4 January. Accessed January 18, 2021. <https://www.sowetanlive.co.za/news/south-africa/2021-01-04-anc-ethekwini-councillor-says-5g-towers-spread-covid-19-and-whites-have-vaccine/>.

Mayer-Schönberger, V., and K. Cukier. 2013. “Big Data: A Revolution that Will Transform how we Live, Work and Think.” John Murray.

McIntosh, C. 2013. *Cambridge Advance Learner’s Dictionary*. Cambridge: Cambridge University Press.

Millar, L. A. 2017. *Archives: Principles and Practices*, 2nd edition. London: Facet Publishing. <https://doi.org/10.29085/9781783302086>.

Mukwevho, J., M. Ngoepe, and P. Ngulube. 2019. “Doing More with Less: Application of Soft Power Theory to Enhance Visibility and Accessibility of Public Archives in a Resource-constrained Environment.” In *Handbook of Research on Advocacy, Promotion, and Public Programming for Memory Institutions, Information Science Reference*, 1–30, edited by P. Ngulube and P. A. Hershey. <https://doi.org/10.4018/978-1-5225-7429-3.ch001>.

Mutula, S. 2020. “Infodemic during the COVID-19 Pandemic: Ethical Implications.” Accessed June 26, 2020. <https://clms.ukzn.ac.za/infodemic-during-the-covid-19-pandemic-ethical-implications/>.

Mvumvu, Z. 2020. “Take your Umhlononyane, but no Evidence it can Cure COVID-19: Mkhize.” *Sunday TimesLive*, 27 May. Accessed July 20, 2020. <https://www.timeslive.co.za/politics/2020-05-27-take-your-umhlononyane-but-no-evidence-it-can-cure-covid-19-mkhize/>.

Nazim, M., and B. Mukherjee. 2016. *Knowledge Management in Libraries*. Cambridge, MA: Chandos Publishing. <https://doi.org/10.1016/B978-0-08-100564-4.00009-0>.

Nenungwi, F. 2018. “Readiness for Knowledge Management Implementation: The Case of the KwaZulu-Natal Provincial Department of Public Works in Pietermaritzburg.” Master’s dissertation. School of Social Sciences. Information Studies. Pietermaritzburg Campus: University of KwaZulu-Natal. Accessed August 8, 2020. [http://researchspace.ukzn.ac.za/bitstream/handle/10413/15875/Nenungwi\\_Fulufhelo\\_2018.pdf?sequence=1&isAllowed=y](http://researchspace.ukzn.ac.za/bitstream/handle/10413/15875/Nenungwi_Fulufhelo_2018.pdf?sequence=1&isAllowed=y).

Nigam, M., Maria Atanassova, Abhay P. Mishra, Raffaele Pezzani, Hari Prasad Devkota, Sergey Plygun, Bahare Salehi, William N. Setzer, and Javad Sharifi-Rad. 2019. “Bioactive Compounds and Health Benefits of Artemisia Species.” *Natural Products Communications* (July): 1–17. <https://journals.sagepub.com/doi/pdf/10.1177/1934578X19850354>.

Ngulube, P. 2019. “Mapping Methodological Issues in Knowledge Management Research, 2009–2014.” *International Journal of Knowledge Management* 15 (1): 85–100. <https://doi.org/10.4018/IJKM.2019010106>.

North, K., and G. Kumta. 2018. *Knowledge Management: Value Creation through Organizational Learning*, 2nd edition. Cham, Switzerland: Springer.  
<https://doi.org/10.1007/978-3-319-59978-6>.

Pillay, D. G., B. Damonse, and M. Ellis. 2020. “Coronavirus Shows the Urgency of Ensuring that Research Gets into the Public Domain.” *National Research Foundation Science Matters Magazine* (Special Issue, May): 20–23.

Reuters News Agency. 2020. “WHO: Coronavirus Pandemic is a ‘once-in-a-century’ Health Crisis.” Accessed August 1, 2020. <https://www.aljazeera.com/news/2020/07/coronavirus-century-health-crisis-200731153149323.html>.

Rubin, R. E. 2016. *Foundations of Library and Information Science*, 4th edition. London: Facet Publishing.

SAcoronavirus. 2020a. “COVID-19 Statistics in South Africa.” Accessed August 18, 2020. <https://sacoronavirus.co.za/>.

SAcoronavirus. 2020b. “Online Resource and News Portal.” Accessed July 28, 2020. <https://sacoronavirus.co.za/>.

SAcoronavirus. 2021. “COVID-19 Statistics in South Africa.” Accessed January 18, 2021. <https://sacoronavirus.co.za/>.

Steenhuisen, J. 2020. “Lockdown: Steenhuisen Outlines DA’s Coronavirus Plan.” *SABC News*, 13 April. Accessed June 20, 2020. <https://www.youtube.com/watch?v=0cJyCLJlqg4>.

Swart, A. J. 2019. “Citation Analysis of Master Dissertations at the Central University of Technology, South Africa.” *African Journal of Library, Archives and Information Science* 29 (2): 115–129.

United Nations Department of Global Communications. 2020. “UN Tackles ‘Infodemic’ of Misinformation and Cybercrime in COVID-19 Crisis.” Accessed July 20, 2020. <https://www.un.org/en/un-coronavirus-communications-team/un-tackling-%E2%80%98infodemic%E2%80%99-misinformation-and-cybercrime-covid-19>.

World Bank Group Records Management Roadmap. 2020. “Part 8: Records Management Glossary.” Accessed August 6, 2020. <http://pubdocs.worldbank.org/en/902721594065773238/WBG-RM-Roadmap-010-Part-8-Glossary-FINAL-PDF.pdf>.

World Health Organisation COVID-19 Dashboard. 2020. “Global Cases.” Accessed August 18, 2020. [https://covid19.who.int/?gclid=EAIAIQobChMI34ems4vw6gIVSYBQBh3wwgxQEAAAYASABEgKfiPD\\_BwE](https://covid19.who.int/?gclid=EAIAIQobChMI34ems4vw6gIVSYBQBh3wwgxQEAAAYASABEgKfiPD_BwE).

World Health Organisation COVID-19 Dashboard. 2021. “Global Cases.” Accessed January 18, 2021.  
[https://covid19.who.int/?gclid=EAIAIQobChMI34ems4vw6gIVSYBQBh3wwgxQEAAAYASABEgKfiPD\\_BwE](https://covid19.who.int/?gclid=EAIAIQobChMI34ems4vw6gIVSYBQBh3wwgxQEAAAYASABEgKfiPD_BwE).

World Health Organisation. 2005. “Knowledge Management Strategy.” Accessed August 1, 2020.  
[https://apps.who.int/iris/bitstream/handle/10665/69119/WHO\\_EIP\\_KMS\\_2005.1.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/69119/WHO_EIP_KMS_2005.1.pdf?sequence=1&isAllowed=y).

Yeo, G. 2018. *Records, Information and Data: Exploring the Role of Record-keeping in an Information Culture*. London: Facet Publishing. <https://doi.org/10.29085/9781783302284>.

Zins, C. 2007. “Conceptual Approaches for Defining Data, Information and Knowledge.” *Journal of American Society of Information Science and Technology* 58 (4): 479–493.  
<https://doi.org/10.1002/asi.20508>.