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**Research Paper**

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## ABSTRACT

This paper investigates factors influencing the adoption of social media analytics (SMA) for citizen relationship management (CzRM). Three real-world cases of government departments, two in South Africa and one in Germany, were investigated, and focus group discussions were conducted. The technological, organizational, and environmental (TOE) theory and qualitative content analysis guided the data analysis. The findings revealed that in all cases, staff usually conducted a manual analysis of social media and SMA had not been implemented sufficiently to realize its full potential. Insights were obtained from TOE and factors were identified that should be considered for improving the planning of SMA adoption in government. Data quality, methods and tools for SMA, and resources (e.g., skills and budget) were the most important factors identified for achieving success in SMA projects in government. The contribution is an improved understanding of the adoption of SMA for CzRM and can lead to effective monitoring of social media posts by citizens to improve service delivery and, hence, lead to more citizen-centric government.

## Keywords

Citizen relationship management, social media analytics, big data, business intelligence, government, and service delivery.

## INTRODUCTION

The big data explosion presents challenges with respect to deriving value from large amounts of data, particularly when striving to improve service delivery through e-government (Siddiqui & Mehmood, 2021). Industry 4.0 has contributed to this massive amount of available data by using technologies with embedded sensors and actuators, such as robotics, radio frequency identification, and wearables (Kar & Dwivedi, 2020). The growth of big data information assets has facilitated a shared economy and assists organizations with value creation. In government, online platforms such as MyGov in India and in Singapore empower citizens by providing them with the ability to provide feedback on service delivery and government policies. One type of

data used is obtained from social media; this includes data obtained from various social network sites (SNS) (Edet & Bolarinwa, 2020). Big data analytics (BDA), therefore, includes SMA. Both BDA and SMA offer advantages for governments, including more credible agenda-setting and policy formation stemming from wide-ranging debate and citizen involvement (Gouache, 2022; Pencheva et al., 2020). This in turn improves decision-making and hence the effectiveness and efficiency of government operations (Shamim et al., 2020). Governments can utilize SNS to provide supplementary channels for information dissemination, communication, citizen involvement, and informed decision-making (Yigitcanlar et al., 2020). According to Cho and Melisa (2021), several governments have already demonstrated a willingness to use social media as a medium for engagement and communication with citizens regarding service delivery. One way of fostering this dialogue is CzRM (Carvalho et al., 2021). CzRM can be enhanced through SMA, thereby facilitating data management, data analysis and data intelligence, and consequently adding value in innovation and decision-making in government (Yakobi et al., 2019).

However, despite these benefits governments face challenges in dealing with unstructured social media data. According to Moura and Serrão (2015), these are related to increased security and privacy risks due to the large volume, variety, and deployment of the system infrastructure across wide areas to support SNS. People share a lot of personal information on these networks without any concern for what the organization behind the networks will do with their data; this results in a huge threat to personal privacy (Moreno et al., 2016). Furthermore, inadequate analysis of social media data limits the ability of governments to gain value from that data (Acharjya & Ahmed, 2016). For example, it is difficult to determine which groups of social media users exist and how they decide what to post on SNSs; therefore, it is difficult to confidently interpret social media posts (Lopez et al., 2019).

The problem addressed in this paper is the limited research available on real-world implementations of SMA in government, particularly regarding factors influencing SMA adoption. Some research (for example, Holsapple et al. (2018), Osman (2019) and Singh and Verma (2020)) has outlined the benefits of a big data strategy in government while other researchers have proposed frameworks for BDA and SMA in the context of government (Bao et al., 2022; Faini & Palmirani, 2016; Yan, 2018). However, these studies were not based on investigations of empirical real-world implementations of SMA in the context of CzRM. Research related to the use of SMA, especially for decision-making during crises such as pandemics, has not been sufficiently explored (Yigitcanlar et al., 2020).

Whilst some studies have proposed SMA frameworks, few have grounded their research on theories from the broader field of Information Systems (IS) or related theories from other disciplines. There is, therefore, a need for theory-driven research related to BDA, specifically about how to analyze and extract this data so that the benefits of technologies such as social media can be realized whilst reducing related risks (Kar & Dwivedi, 2020). In the context of government, the stakeholders include the government as an organization, employees working in government, and its citizens.

The purpose of this paper is to investigate factors that influence SMA adoption (either achieved or potential) by governments and to understand the extent of SMA adoption and the complexities involved. The TOE theory of DePietro et al. (1990) was considered to be a suitable theoretical basis from which to understand the adoption of SMA in government. TOE provides a lens through which technology adoption can be understood in terms of three dimensions, namely technology, organization, and the environment. SMA is one type of technology. The current paper's contribution is in applying the TOE theory for SMA in government so as to assist

governments and researchers to view, analyze and understand SMA adoption and the behavior of the consumers or end users of the resulting information (who are the employees of government departments).

Three real-world cases of SMA use in government departments were investigated, two in South Africa and one in Germany. In South Africa, the first case is the Department of e-Government (eGov) of the Gauteng Provincial Government (GPG), which has launched a pilot project to create a big data (including SMA) strategy. The second case in South Africa is the Free State Provincial Government (FSPG), which has also prioritized big data and SMA in its strategy. The third case investigated was that of the German North-West Metropolitan regional government, which is making efforts to use social media data to understand the views of its citizens and for CzRM. These three departments were selected for investigation based on the relevance of their social media efforts and their availability and willingness to participate.

The paper is structured as follows. The next section provides a summary of the literature reviewed, which provided the foundation for the research. Following that is an explanation of the research design activities, which were undergirded by the TOE theory and consisted of focus group discussions (FGDs) and qualitative content analysis (QCA) of the data collected. A presentation of the results and analysis of the research and a discussion of the findings follow. Lastly, several conclusions are drawn, and recommendations are made in the last section.

## LITERATURE REVIEW

According to Alam et al. (2021), governments in countries with developing economies are struggling to determine how opportunities offered by big data can be used to promote effective service delivery to their citizens as part of a CzRM strategy. The study by Edet and Bolarinwa (2020) emphasizes that BDA is starting to be used in Africa and could provide a way to address service delivery-related issues in various contexts including for the improvement of healthcare. Driss et al. (2019) show that globally citizens are using SNSs to express their opinions and to keep governments accountable. A strategy to make use of social media can assist government in overcoming existing challenges, such as low levels of accessibility to e-government by citizens and a resulting lack of citizen e-participation (Singh et al., 2020). Social media has proved to be a major enabler of real-time interactions between government and citizens allowing e-participation at low cost (Cho & Melisa, 2021). Governments can use SNS as a source of big data and a way to communicate and engage with the public (Okuah et al., 2019). However, organizations such as the government often perceive data analytics as complex and challenging (Milicevic & Eybers, 2022). The emergence of SMA has provided much needed methods and tools for monitoring, analyzing, and visualizing social media data (Ahmed et al., 2019). By adopting SMA, governments can use social media data optimally, as SMA offers approaches, methods, and tools to support Business Intelligence (BI) (Lee, 2020; Okuah et al., 2019). BI is defined as a decision-making process that is supported by the integration and analysis of an organization's data resources (Romero et al., 2021).

Reported benefits of SMA are: improved CzRM and service delivery (Wu, 2021); improved decision-making (Kim et al., 2019); improved data management and quality (McGilvray, 2021; Qiao et al., 2021; Yaqoob et al., 2022); and data analysis and data intelligence (Malomo & Sena, 2017). SMA can also be used to monitor emerging concerns and to predict government crises (Choi et al., 2020).

A challenge to SMA adoption for governments that was mentioned by Chon and Kim (2022) and encountered during the Coronavirus Disease 2019 (COVID-19) pandemic, is the struggle to gain actual intelligence from big data due to a lack of training, little or no budget, and scarce

resources. Other challenges relate to data quality and reliability, particularly in data pre-processing; this can negatively impact the potential of big data and SMA adoption (Faroukhi et al., 2020). Challenges regarding using and interpreting social media data in SMA have also been identified in socio-environmental systems research; these are due to the acknowledged biases of SMA users, i.e., those who are interpreting the SMA results (Lopez et al., 2019).

Various SMA frameworks have been proposed as a way to overcome the challenges. The modified B-DAD framework provides a decision-making approach that presents a clear linkage between BDA, effective decision-making, and intelligence (Elgendy & Elragal, 2016). This framework includes an overview of tools for BDA. A subsequent SMA framework was designed for a political context and provided a comprehensive list of the challenges, methods and tools and a description of four main stages of SMA (Stieglitz et al., 2018). Challenges identified included identifying topics and trends, data visualization and data quality. The use of visual analytics was highlighted, as it focuses on analytical reasoning about data from SNS and combines computational analysis with interactive visualizations (Wamba et al., 2016). The four stages of SMA in the framework provided by Stieglitz et al. (2018) are data discovery, data tracking and monitoring, data preparation, and data analysis. Segooa and Kalema (2018) proposed a BDA decision-making framework for universities. This was a conceptual framework and was designed based on the TOE theory and other literature reviewed. The authors suggested that the framework could help universities to discover weaknesses in their current environment that could hinder sound decision-making. However, there was no empirical testing of the proposed model and its underlying theories in the context of BDA.

It is evident that none of the frameworks recommended for SMA (or BDA) were validated empirically, nor were factors influencing SMA success or adoption identified. There are limited studies that investigate real-world cases but are still underpinned by a theoretically driven approach to SMA and provide a deep understanding of the status of SMA adoption in government. Only one real-world case, that of Reddick et al. (2017), was found that reported on the implementation of a framework for enhancing citizen-centric service quality using SMA in a government department. This study was also theoretically grounded and empirically validated through the analysis of Facebook posts. However, the focus was on the citizens' perceptions and organizational learning. The Reddick et al. (2017) study provided insights into the adoption of SMA for enhancing service quality but argued that there was a need for additional empirical studies of SMA adoption. Researchers reported a lack of comprehensive systematic research on government social media and SMA adoption (Medaglia & Zheng, 2017). More recently, Kankanamge et al. (2020) confirmed that this lack of research on SMA adoption persists, particularly regarding the potential role of citizen feedback, shared insights, and organizational learning enhancing government policy processes. In addition, there is a lack of theory-driven research in the field of information management, specifically related to big data and SMA.

## RESEARCH DESIGN

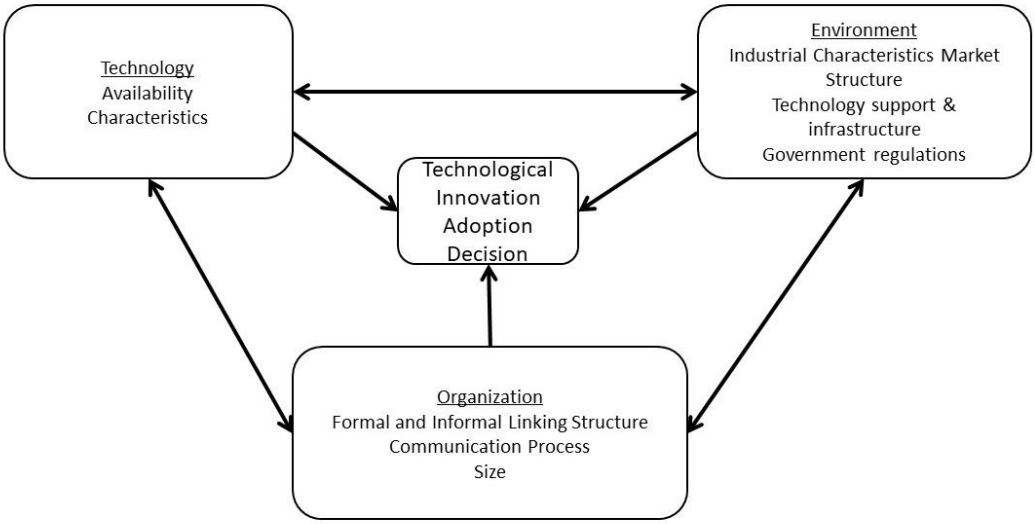
This paper reports on a research study that was conducted to address the following research objective: *To analyze the factors influencing SMA adoption in governments in South Africa and Germany.*

From an organizational perspective, the adoption of technology involves the incorporation of a new tool or practice to achieve a business objective (DePietro et al., 1990). The stages involved are usually awareness problems, matching-selection, adoption-commitment, implementation, and routinization. If the use of the given technology has become routine it is no longer considered innovative or new; it has at that stage become embedded as part of a larger set of tools and

procedures. The TOE theory of DePietro et al. (1990) was used as a guide to view and understand the adoption of SMA in government in the three cases. This theory suggests that the decision to adopt and use technological innovation is based on a number of factors in the organizational and environmental contexts, as well as in the technological context (see Figure 1). The theory was, therefore, viewed as relevant and appropriate since SMA is a type of technology.

**Figure 1**

*TOE Theory*




*Note*. TOE = technology, organization, and environment.
Adapted from DePietro et al., 1990.

The Technological context considers technologies that are already in use (internal to the organization) as well as those that are external but relevant - not currently being used but of interest possibly for future use or in some way having an impact on the efficiency and competitive advantage of the organization. The availability and characteristics, i.e., the factors, of these technologies are considered. The characteristics include their perceived usefulness, technical and organizational compatibility, complexity, and learning curve. Usefulness is determined by its utility (tasks) and usability. Utility can be viewed as an attribute of an information technology (IT) system as well as the functionality the system provides (Johannessen & Hornbæk, 2014). According to Jooste et al. (2014), usability is the extent to which the user can use a system, product, or service to achieve specific goals effectively, efficiently, and with a high level of satisfaction in the specified context of use.

Secondly, the Organizational context provides measures or indicators describing key features of the organization. These indicate the scope of business, support received by top management for technology adoption, organizational culture, managerial structures, human capital, and issues related to the size of the organization such as resources and degree of specialization. The Environmental context considers the social, legal and business environment in which the organization operates. The factors include operational facilitators and inhibitors such as encouragement from the government, technology support infrastructure, access to quality Information and communication technology (ICT) skills, competitive pressure, trading partners' readiness, and sociocultural issues. Although many authors have used the TOE theory to understand factors within the three contexts that influence adoption, those that were considered

to be relevant for a particular study have differed slightly (Baker, 2011). Factors often vary across disciplines or implementations.

The research reported on in this paper viewed the TOE theory as suitable for formulating the critical pillars for SMA adoption. Data related to SMA adoption was collected from the three government cases using FGDs. An FGD aims to collect high-quality data in a social context (Dilshad & Latif, 2013). The purpose of using FGDs was to determine the status of SMA adoption in each of the three government cases and the factors that influenced or were impacted on by this adoption. The selection of the cases was one of convenience as in each case there were key participants who were interested in the project and willing and available to participate. The German case was used to obtain a broad perspective and was convenient as one of the authors was a professor in Germany. The target participants for the FGDs were managers and decision-makers in provincial government departments employed at provincial offices or in city regions. The participants were required to have knowledge and experience of social media and to use it in their daily activities. Participants who met these criteria were invited to participate in a FGD via email. All ethics protocols were adhered to, and permission to conduct the study was granted.

The first FGD (FGD1) was conducted with employees of the German North-West Metropolitan region. The second FGD (FGD2) was conducted with the GPG Department of e-Government whose gatekeeper was their Director of ICT. The third FGD (FGD3) involved the FSPG Department of Public Works and Infrastructure; the gatekeeper was their Deputy Director of IT. A summary of the study where the research and the purpose of the FGDs were explained was sent to the gatekeepers before briefings were presented to the employees. The gatekeepers identified employees that met the criteria for participants and granted access to these employees via email. A formal letter and research summary were drafted describing the purpose of the FGD and the target profile, and these documents were distributed to prospective participants. After the participants confirmed their availability, an online FGD meeting of one hour was set up for each organization's participants using Microsoft Teams. The meeting links were distributed together with a consent form to be signed digitally and a Microsoft Form link to capture the biographic information of participants. The FGDs were conducted over three months from May to July 2021.

The QCA approach described in Erlingsson and Brysiewicz (2017) was used to analyze the FGD data. The objective of QCA is to systematically transform a large amount of text into a highly organized and concise summary of key results. The first steps of the QCA followed for this study were to extract meaning units from the data, based on the research objectives, and then to condense these units while preserving core meaning. A meaning unit may be a word, sentence, or section of text that conveys a single central meaning. From these meaning units, condensed meaning units were created that still retained the essential message of the text. In the next step, codes were generated for each condensed meaning unit. Codes can be considered to be labels that concisely describe the condensed meaning unit. The codes were then organized into generic categories, which represented different aspects, similarities, or differences of the text's content that belonged together. The products of this categorization are known as "generic categories" (Elo et al., 2014).

In each of the QCA steps, the researchers endeavored to transform the large bodies of text systematically and to present them at increasingly high levels of abstraction. After the codes and categories had been decided on, the components of the framework of Yakobi et al. (2022) were used as pre-existing themes, and categories were allocated to these themes based on the underlying meanings of both. A theme can be seen as expressing an underlying meaning found in two or more categories. Since these constructs are based on pre-existing knowledge, they are

referred to as *a priori* themes. If no suitable *a priori* theme was found, a new one was created. Two expert researchers independently reviewed the codes, categories and themes to reduce bias. Discussions were held to reflect on the allocations made and to reach a consensus. Saturation became evident as codes and themes mentioned previously reappeared, thus providing validity to some themes and categories. Once no more themes emerged, the analysis process was considered complete.

## RESULTS AND ANALYSIS

### FGD Participant Profile

Eleven participants took part in the FGDs. The participant profile is presented in Table 1. The German FGD (FGD1) involved four participants (G1 to G4), the second FGD (FGD2) with the GPG had four participants (GP1 to GP4), and the third FGD (FGD3) with the FSPG had three participants (FS1 to FS3). The participants were junior, middle, or top-level management members of a government department and were involved in projects for service delivery or CzRM. The participants used SNS themselves and had active accounts on platforms such as Facebook, X (previously known as Twitter), LinkedIn, YouTube, Instagram, WhatsApp, and Telegram.

**Table 1**

*Summary of Participants' Profile (n = 11)*

| Participants | Age | Job role | Job experience | Number of years using social media | Level of qualification |
|---|---|---|---|---|---|
| **FGD1: The German North-West Metropolitan Region Case** | | | | | |
| **G1** | 31-50 Years | Administrative Officer | >10 Years | >10 Years | Masters |
| **G2** | 51-70 Years | Mayor | 6-10 Years | 6-10 Years | Diploma |
| **G3** | 18-30 Years | Communication Officer | <1 Year | >10 Years | Bachelor |
| **G4** | 51-70 Years | Politician | >10 Years | >10 Years | Postgraduate |
| **FGD2: The Gauteng Provincial Government Case (GPG)** | | | | | |
| **GP1** | 51-70 Years | ICT | 3-5 Years | 6-10 Years | Postgraduate |
| **GP2** | 31-50 Years | ICT | 1-2 Years | 6-10 Years | Postgraduate |
| **GP3** | 31-50 Years | E-service | 3-5 Years | >10 Years | Bachelor |
| **GP4** | 31-50 Years | ICT | 3-5 Years | 6-10 Years | Advanced Diploma |
| **FGD3: The Free State Provincial Government Case (FSPG)** | | | | | |
| **FS1** | 31-50 Years | IT specialist | >10 Years | 6-10 Years | Diploma |
| **FS2** | 31-50 Years | ICT | >10 Years | 3-5 Years | Diploma |
| **FS3** | 31-50 Years | ICT | >10 Years | 3-5 Years | Bachelor |

*Note*. ICT = information and communication technology; IT = information technology.

### The TOE Factors of SMA for CzRM

The QCA revealed 42 codes that were first classified according to the three TOE factors and then into the main themes and generic categories. Tables 2 and 3 summarize the codes, categories, and themes identified. Quantitative data were derived as recommended by Creswell (2014), where *n* is the number of codes in the category or theme, and *f* (the frequency) indicates how

often the code was mentioned (this was the number of participants that mentioned a concept that was allocated to that code). Negative codes are in italics; these are codes that were allocated to statements that had a negative connotation, i.e., were indicated to be a challenge.

## Technological Factors of SMA

The Technological context had 24 related codes categorized into two themes (Data Quality; and Methods and Tools) and six categories (see Table 2). Of the 24 codes, eight were negative, and noted challenges related to SMA adoption. Seven of these were related to the theme of Data Quality ($n = 7$; $f = 13$), which was put into this context since data and information are core aspects of social media and thus of SMA as a technology. The Data Quality theme was further divided into two categories, Accuracy and Accessibility**.** The six codes for Accuracy included those related to the abundance of misinformation and others related to the skewed sentiments of the data. The "Not representative/biased" code was based on comments made by participants G1, G2, and GP3 saying that it is dangerous to rely entirely on citizens' views because there are generally only a few opinions posted, and these may not represent the opinions of the entire population or majority. GP3 stated that the government rarely receives compliments from citizens; citizen-posted sentiments are usually in the form of complaints and so these sentiments are skewed towards negativity. Two participants, G1 and G2, mentioned that citizens' comments on social media often contain misinformation. Participants suggested that challenges exist relating to account verification because of account anonymity and that fake profiles are sometimes used. This makes it difficult to verify the accounts from which the posts are made. G1 highlighted that he was skeptical of SMA because, to his understanding, it is associated with the manipulation of data. Data quality problems stemming from fake data and news were mentioned. One participant mentioned that posts are often not transparent. GP3 stated that social media should be approached with caution due to accuracy and reliability problems with the posts. Only one comment related to accessibility, where GP4 mentioned that her government assumes that all citizens have access to digital devices and the internet, but in the real-world context not all citizens do have this access. If citizens do not have access to digital devices or the Internet, data provision will be affected. Lack of digital device access can negatively influence the adoption of SMA as citizens will not be able to engage with the government successfully using social media.

Four of the categories in the Technological context were grouped into the theme Methods and Tools, which is an *a priori* theme from the component of the same name in the SMA framework proposed by Yakobi et al. (2022). This component includes methods, approaches, techniques, platforms and tools for SMA. The four categories that further classified the Methods and Tools theme were Manual Analysis ($n = 3$; $f = 7$); Data Sources ($n = 3$; $f = 6$) Platforms ($n = 5$; $f = 7$); and Methods ($n = 6$; $f = 8$). Under Manual Analysis the participants highlighted that they mostly analyze social media posts manually; this analysis includes personal streaming, survey analysis, and viewing specific posts related to citizens' comments and inquiries. G3 stated that she observes Facebook groups where citizens post their views. Several platforms were used. X (Twitter) was used by GP3 and FS2, whereas Instagram and Facebook were more commonly used in the German case. G3 said that she uses Facebook Ads as part of the Facebook Business Suite to promote posts and she also mentioned that Instagram was much more popular amongst citizens than Facebook. Data sources for SMA included: government posts about policy and budget; citizen posts such as inquiries, opinions, and feedback; and a general collection of relevant topics.

**Table 2**

*Technological Factors of SMA Adoption in Government*

| TOE | Theme | Category | Code | Participant |
|---|---|---|---|---|
| **Technological** | Data Quality (*n* = 7*; f* = 13) | *Accuracy* | *Skewed sentiments* | GP3 |
| | | | *Misinformation (false/unreliable data)* | G2 & G1 |
| | | | *Anonymity/not transparent* | G3 |
| | | | *Fake or manipulated data and accounts/verification challenge* | G3, G1, G2 & GP3 |
| | | | *Approach social media with caution* | GP3 |
| | | | *Not representative/biased* | G1, G2 & GP3 |
| | | *Accessibility* | *Assumption of accessibility* | GP4 |
| | Methods and Tools (*n* = 17*; f* = 28) | Manual analysis | Posts (stream/view) | G2, G1, G3 & FS2 |
| | | | Facebook group observations/ discussions | G3 & G1 |
| | | | Survey analysis | G3 |
| | | Platforms | Facebook Business Suite | G3 |
| | | | Instagram more popular than Facebook | G3 |
| | | | Twitter | GP3 & FS2 |
| | | | Facebook/Instagram insights | G3 & G2 |
| | | | Microsoft PowerBI | GP3 |
| | | Data sources | Government posts (policy/ budget) | FS2 |
| | | | Citizen posts (inquiries, opinions & feedback) | G2, G1, GP1 & FS2 |
| | | | Collection of relevant topics | G1 |
| | | Methods | Sentiment analysis | GP3 |
| | | | Tweets collected/aggregated with BI | GP3 |
| | | | Trend discussion and analysis | G1 & FS2 |
| | | | Issue notification/escalation & reporting | GP1 & FS2 |
| | | | Hashtags | G3 |
| | | | *Lack of tools* | FS2 |

*Note*: Negative categories and codes are in italics.
SMA = social media analytics.

Analytical methods used included sentiment analysis (GP3), and trend discussion and analysis (G1 and FS2). G2 and G3 agreed that they use Facebook and Instagram insights daily and find the input interesting. GP3 stated that:

> The BI teams work with the requirements that are defined by the client so the client may be saying at this point, we are busy with vaccinations so we would like to pick up all social media conversations around vaccination and then we may be busy with another aspect that may be topical at that moment so then the client would say we are interested in finding out sentiments around these topics then the whole setup of the sentiment analysis will be centered around hashtags or posts that carry those words that will be keywords of interest that time, so in a way then sentiment analysis to an extent is driven by what is topical in current affairs of that time.

In the German FGD, G1 stated that relevant topics raised, and suggestions made by citizens on social media, are selected for discussion at their weekly Council meetings and provide input for political discussions of trends concerning service delivery. Another technique used was issue

escalation and reporting. For example, FS2 stated that their government reports on social media posts through their communication unit, where the unit will follow up and manage all citizen-related posts on social media that inquire about a particular issue. An issue can be escalated to the chief director who notifies the accounting officer to address problems identified by citizens. Other useful methods used were the aggregation of Tweets using BI tools and using specific criteria, and the use of hashtags. The lack of tools for SMA was highlighted as a challenge for FS2.

## Organizational Factors of SMA

Within the Organizational context, three themes were identified, namely CzRM, Culture and Skills (see Table 3). The first theme was related to the CzRM benefits of SMA ($n = 7$; $f = 11$). The first category in this theme was Citizen-centric/Service Delivery ($n = 4$; $f = 8$). These codes were all positive and were based on comments made about how SMA contributes to organizational (in this case government) performance; is people-centered; provides service delivery insights; allows for citizen engagement through queries and complaints; and facilitates citizens' interactions and provides a record of sentiments and intentions. These data confirm other published findings, for example, Carvalho et al. (2021) and Wu (2021), who argue that service delivery and CzRM are benefits of SMA. The second category in this theme was Citizen Monitoring and Reporting ($n = 3$; $f = 3$), which had three codes: citizen view analysis (FS2); social media monitoring; and generation of BI reports. These BI reports assist GPG managers with citizen monitoring and ultimately with service delivery. Having a clear understanding of citizens' views is important to these managers and a big benefit of SMA. About the generation of BI reports, GP3 highlighted that an SMA tool had been built by their e-gov department from which they had generated COVID-19-related reports from their Twitter account. He explained that the SMA tool analyzed sentiments from Twitter posts relating to service issues such as "water shortages, electricity problems or power failures and so on." It was clear from this statement that the SMA tool was successfully assisting staff with monitoring and performing sentiment analysis on data to gain insights into citizens' attitudes and behavior.

The remaining codes related to general sub-topics around SMA Awareness ($n = 5$; $f = 6$) and were related to the organizational awareness and culture toward data analytics and specifically SMA. Hence the second theme that emerged was classified as Culture. One participant stated that they perceived social media to involve hacking, which implies a negative view of social media. Another stated that it was about comments analysis, and others that it incorporated information collection and responses. FS2 believed that SMA involved a strategic or scientific approach.

The last theme in the Organizational context was Skills ($n = 3$; $f = 3$) which had three primary codes: *Limited time for upskilling*, *generational gap (age)*, and *small teams*. It was generally agreed by participants that there is currently a lack of skills and capabilities for data analytics within their governmental departments and that departments were not focused on analyzing social media data from their citizens. Two participants stressed that SMA was not considered a priority as there is a limited budget allocated for data analytics projects. G1stated:

> No, we had a discussion about where to actually employ more staff and they decided that it's probably best if they have child protection services instead, and then of course if you compare the two vendors that decided maybe social media is not as important as child protection services and so these discussions, they usually go on quite long. Because it relates to investing some budget that is limited also in the municipality that I am working in.

Two participants suggested that it could be advantageous for the government to upskill and enhance capabilities in the area of data analytics. GP3 stated that to ensure sufficient skills additional resources might be needed. FS1 and FS2 agreed that the unavailability of specific skills for data analytics caused their government to handle social media data in other ways, for example, using manual reports that may take a lot of time to prepare. G3 stated that she has an immense interest in the topic of social media, and for that reason she has obtained qualifications through webinars related to the topic. GP1 highlighted that they have a reliable and responsible communication unit that deals with messages and the publication of information. Two German participants, G1 and G2, highlighted that the generational age gap was a challenge because SMA feels like a technical exercise to them (the German participants) since they did not grow up with social media. As a result, the learning curve was large, and the time needed for upskilling was a lot.

**Table 3**

*Organizational Factors of SMA Adoption in Government*

| TOE | Theme | Category | Code | Participant |
|---|---|---|---|---|
| **Organizational** | CzRM ($n$ = 7; $f$ = 11) | Citizen-centric/service delivery | Government performance | FS1 |
| | | | People-centered | FS2 |
| | | | Service delivery insights, queries/complaints | GP3, GP2 & GP1 |
| | | | Citizen's engagement - sentiments/intentions | GP3, FS3 & GP2 |
| | | Citizen monitoring and reporting | Social media monitoring | GP3 |
| | | | Generates BI reports for service delivery | GP3 |
| | | | Citizen view analysis | FS2 |
| | SMA Awareness (Culture) ($n$ = 5; $f$ = 6) | | *Hacking* | GP4 |
| | | | Comments analysis/management | GP1 |
| | | | Strategic/scientific approach | FS2 |
| | | | Interpretation | FS3 |
| | | | Information collection/response | GP2 & FS2 |
| | Skills ($n$ = 3; $f$ = 3) | | *Limited time for upskilling* | GP1 |
| | | | *Small teams* | G2 |
| | | | *Generational gap (age)* | G2 |

*Note*. SMA = social media analytics; CzRM = citizen relationship management; BI = business intelligence.

## Environmental Factors of SMA

The Environmental context considers the broader environment or area in which the organization (in this case the government) operates its business. All comments relating to government's attempts to encourage or support citizen engagement and to provide support infrastructure and policies to protect its citizens were classified into this context.

Only three codes were relevant to the Environmental context, and they were all related to the theme of Government regulations and policies ($n$ = 3; $f$ = 3). The three codes are summarized in Table 4 and were: national/international information policies; social media guidelines; and awareness-of-policy campaigns. All these codes were from the FSPG focus group, where it was pointed out that a social media policy and guidelines document exists in the FSPG. This document was recently approved by top officials in their government and was influenced by the Protection of Personal Information Act (POPIA) and the national communication strategy which

provide protocols on how government should use social media. The POPIA reflects the South African national data and information policy that promotes a sense of confidence and integrity towards the use of personal information (Netshakhuma, 2020). Data policies and regulations can either positively or negatively influence the success of SMA adoption and should be carefully considered before planning such a project. In addition, the GPG had a guidelines document that was a deliverable related to their big data strategy. The German FGD told us that they adhere to the European Union's General Data Protection Regulation but had not yet drafted their own guidelines. The General Data Protection Regulation is a regulation on data protection and privacy in force in the European Union and the European Economic Area (https://gdpr-info.eu/). The main purpose of the General Data Protection Regulation is to enhance individuals' "control and rights over their personal data and to simplify the regulatory environment for international business". Several statements were also made in the FSPG focus group regarding ongoing awareness campaigns in the FSPG related to the possible impacts and implementations of social media guidelines across different departments.

**Table 4**

*Environmental Factors of SMA Adoption in Government*

| TOE | Theme | Category | Code | Participant |
|---|---|---|---|---|
| **Environmental** | Data policies/regulations ($n$ = 3; $f$ = 3) | | National/international information policies e.g., POPIA | FS2 |
| | | | Social media guidelines | FS2 |
| | | | Awareness of policy campaigns | FS2 |

*Note*. SMA = social media analytics; TOE = technology, organization, and environment; POPIA = Protection of Personal Information Act.

## DISCUSSION

In a digital society, SNS and social media data can assist governments in eliciting citizens' views, attitudes, and perceptions efficiently without the need for physical interaction (Yigitcanlar et al., 2020). Understanding these views and perceptions can assist managers in government with citizen-centric decision making and CzRM, particularly during a pandemic or crisis.

From the analysis of the FGD data, it was evident that all three cases were using social media and SMA to some extent but none of them were using these technologies to their full potential. At the GPG, SMA was already being used prior to COVID-19, but the pandemic dramatically spurred on their efforts. Being forced to some extent into adopting SMA more rapidly than planned could have led to resistance to using the technology. However, the findings revealed that whilst there were several challenges involved with the quality of the social media posts, the participants were generally positive about SMA adoption. Of the three cases, the GPG was the most advanced in their adoption. It was the only case to provide an account of successfully automating some decision making with SMA using a visualization tool to collect datasets from X (Twitter) accounts using sentiment analysis. They had also conducted the largest number of successful SMA projects which analyzed citizens' attitudes, perceptions, and trends. They had the most extensive strategy for BDA and had experience in using SMA and SMA tools. However, even though the GPG had already adopted SMA, the full potential of SMA had not been realized because of the challenges faced.

Data quality was a frequently mentioned factor in the Technological context and compromised SMA adoption in all three cases. Most of the comments related to data quality were about the

challenges. Participants in all three cases were uncertain but pessimistic about the quality of data that could be received from SNSs. Most of the data quality challenges that they were aware of were related to fake accounts, misinformation, manipulation of data, and non-verified accounts. Accuracy and the perception that the data set was skewed due to accessibility challenges for certain groups of citizens were frequently mentioned as impacting the FDG participants' trust in the data, thereby hindering the ability to gain real insights into citizens' views. Without the assurance of data quality and being able to confidently interpret the content of social media data, effective decision making is not possible (Lopez et al., 2019). Challenges regarding data quality are an ongoing problem with data-driven decision-making using BDA/SMA. Similar data quality challenges have been cited by authors such as Adrian et al. (2018), Stieglitz et al. (2018), and Faroukhi et al. (2020). Data reliability was highlighted by Qiao et al. (2021) as an attribute of data quality influencing SMA adoption and success. For data to be reliable, it needs to be accurate. Ensuring data reliability forms part of data management. This finding confirms the study of Faroukhi et al. (2020), which found that a lack of data quality and reliability can impact SMA adoption in a negative way.

The platforms, tools, and SNS used are also key factors in the Technological context and influenced the users' adoption of SMA. Specifically, the complexity and popularity of the methods used and the sources of tools influenced FGD participants' attitudes toward them. The German participants used Facebook and the Facebook Business Suite for survey purposes; however, in their department, SMA was used relatively infrequently and analysis was very often done manually. Instagram was highlighted to be more popular than Facebook in Germany because citizens found it interesting and informative as it provides insights into citizen behavior. The lack of tools was also considered to be a factor since only a few tools were available "off the shelf" that could effectively analyze social media data. So, whilst the government departments did use SNS and SMA tools to various extents, they were a long way from using these tools to their full capacity. Sentiment mining is an approach offered by a variety of tools and can assist researchers with theory building within sectors such as e-commerce and e-government (Kar & Diwedi, 2020). However, if the quality of the data cannot be trusted, then neither can the outputs obtained from approaches like sentiment mining be trusted. Bagga and Sharma (2018) confirmed this and showed that effective data management tools and approaches are essential for gaining value from the voluminous and multifaceted big data that is required for the decision-making process of any business. From the FGDs, a theme emerged that had not been identified in literature before the writing of this paper, namely the assumption that digital devices, and thus information, were easily accessibility to all.

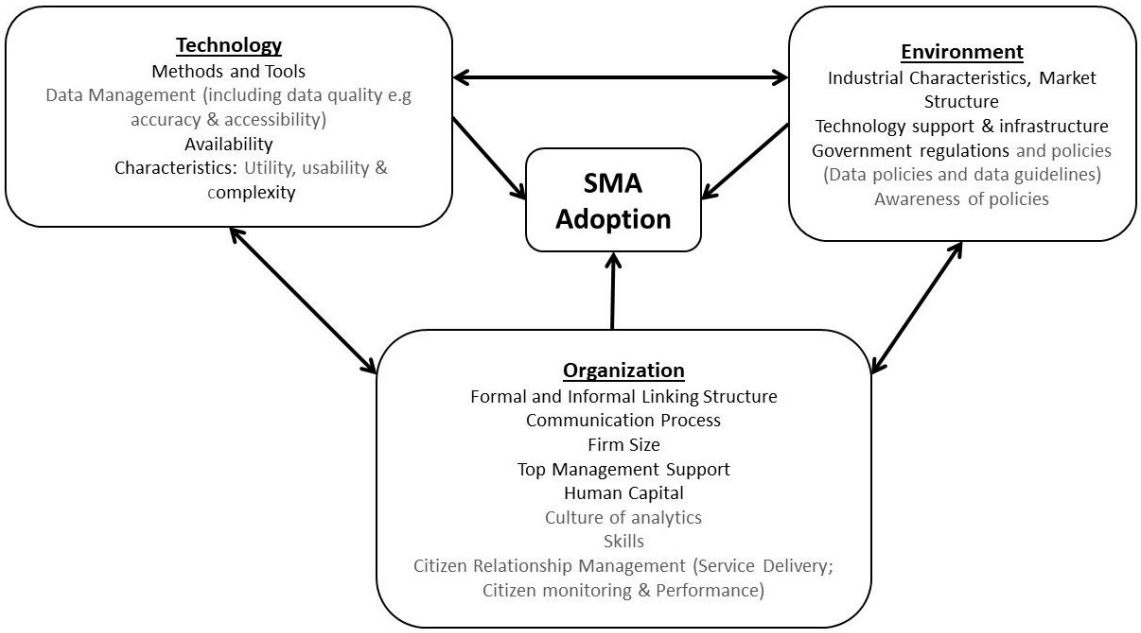
In the Organizational context, participants highlighted the fact that they struggle with a limited budget to develop and recruit skills related to SMA. This finding confirms that of Chon and Kim (2022), who reported that inadequate budgets and resources mean that the potential intelligence that could be obtained from big data is not realized. It was evident that the two biggest challenges faced in all three cases were the lack of skills, and problems with time constraints. This also influenced participants' perceptions towards SMA and their ability to adopt the technology to its full extent. Another issue stated by a participant was the generational gap amongst staff members in internet use, as some groups may struggle with a high learning curve. This might lead to reluctance to master the skills and also hinder the quick adoption of technology-based projects such as SMA. Adrian et al. (2018) and Lopez et al. (2019) support the findings of the current research as they also note the skills challenge, the generational gap, and the issues encountered with specific SMA methods and tools. The FGDs confirmed the benefits of SMA for their respective government departments, such as the ability to monitor trends related to concerns raised in citizens' posts, and improved citizen engagement.

The findings in the Environmental context highlighted the importance of policy and regulations for social media use. In both South Africa and Germany, policies have been introduced to protect citizens' privacy. However, considering all the challenges with data quality that were highlighted in the three cases, these governments need to take greater responsibility for ensuring the privacy and security of citizen data. This confirms the findings of previous studies (Moura & Serrão, 2015; Stieglitz et al., 2018; Yakobi et al., 2022) which all note that the privacy and security challenges of big data, as well as the data quality problems related to the heterogeneity, scale, timeliness, and complexity of the data, are hindering attempts at event and topic detection. Events are real-world occurrences that unfold over space and time, and the objective of event detection is to discover new or previously unidentified events.

In this study, the TOE theory provided the theoretical underpinning to explain technology adoption, in this case, SMA adoption. The TOE framework for SMA adoption in government (see Figure 2) was designed based on the findings of this paper and using the foundation of the TOE theory. The proposed framework is an appropriate tool for formulating the three primary contexts and pillars that enable governments to delve into critical issues that need to be addressed before the adoption of SMA into their organization. The pillars relate to the conditions that should be met for an SMA project to be successfully implemented. The pillars/contexts of technology adoption highlighted by the TOE theory, technology, organization, and environment, create an important link between strategic plans for SMA and measurable outcomes when adopting SMA. A theoretical approach can assist researchers not only with understanding what has happened but also why it happened. The pillars assisted in reaching an understanding of why adoption was a success or not when analyzing the factors related to SMA adoption in the government cases used in the research. Figure 2 illustrates the extended TOE framework of SMA adoption for CzRM based on the findings of this paper. The extended framework includes additional attributes for each of the three pillars that relate to the current issues provided by social media data relevant to governments.

**Figure 2**

*TOE Framework for SMA Adoption in Government*




*Note*. TOE = technology, organization, and environment; SMA = social media analytics

Platforms and tools, methods and techniques, and information quality/data quality were added to the technology context. Data management was also added to this context since data quality and privacy form part of this broader field. In the context of the organization, culture, skills, and the learning curve for SMA were important considerations for SMA adoption. These are key factors for successful CzRM, citizen monitoring, and satisfactory service delivery. In the environmental context, the awareness of policies was added as a factor since it is not enough to have policies in place if individuals are not aware of them.

There are two-way relationships between each of the three contexts. For example, between the organization and environment, the creation of a data-driven culture (in the organization) can be expected to have an impact on awareness of policies and guidelines (in the environment). This will increase the potential benefits of SMA adoption for decision-making, and ultimately improve the performance of the organization (Chatterjee et. al, 2021). In the case of government, improved performance would, amongst others, be improved citizen monitoring, CzRM, and service delivery, which are factors are considered in data management in the context of technology. However, there are other relationships between the environmental and organizational contexts; for example, the existence of policies is necessary but not sufficient, capability and skills are also required.

## CONTRIBUTION TO THE FIELD OF IS

The world we live in today is one of unprecedented inter-connectedness. The resulting big data, including data derived from social media, enables artificial intelligence (AI) technologies such as machine learning and data analytics. The potential that AI brings to governments in terms of collective citizen behavior analysis can only be achieved if important concerns related to data privacy are tackled appropriately (Saura et al., 2022). AI-related approaches could be used to improve government's interactions with citizens, facilitate city planning, and provide more efficient service delivery. Such approaches could also support intelligent, data-driven decision making, decision automation, and even behavior modification. However, for AI to be successful, the underlying data needs to be of high quality and suitable data management and data governance mechanisms must be adopted. The implications for governments are that they should prioritize appropriate data quality, security, and privacy approaches in their data management and data governance strategies. Other issues related to data quality, such as accessibility and bias, should also be investigated and techniques implemented that can improve the quality of the underlying data. They should also focus on acquiring the resources and developing the competencies required to meet these strategies.

Higher education institutions need to address the demand for graduates with these competencies. Therefore, the data and information management competencies required from graduates in the field of IS have been added as one of the core competency areas to the IS2020 international standard curricula (https://is2020.org). It is evident that data management forms a crucial part of the field of IS. AI was also included in the IS2020 curricula as an elective module within the data and information competency areas. The availability of vast amounts of data on a wide variety of platforms has clearly changed and is continually changing the nature of IS research (Kar & Dwivedi, 2020). Research is required that contributes to theory building within the IS discipline. The research reported on in this article contributes to the development of theory in data and information management (in this case social media and SMA), and therefore also contributes to IS disciplines as well as associated research topics such as e-government, policy, and innovation in science and technology.

## CONCLUSION

The COVID-19 pandemic triggered lockdowns and restricted movement for citizens across the world. The Internet has become the primary platform for commerce and communication, providing many new opportunities for researchers, industry, and the government. The use of online sharing platforms in government, especially SNS, can encourage transparency by governments and provide for citizen empowerment, effective data-driven decision-making, and improved service delivery. However, the adoption of any technology always faces the risk of not being able to achieve its full potential if it is not carefully planned and executed.

This paper has extended the research into the adoption of technology, in this case SMA, for government, as well as the work conducted on TOE theory for understanding technology adoption. It has confirmed the suitability of TOE as a guide to consider and evaluate SMA project adoption and its main contribution is the extended TOE framework of SMA for CzRM. This framework was found to be useful to determine the status of SMA adoption in the three case studies and in identifying factors that influenced this adoption. Primary data was successfully collected through FGDs for the three cases. The FGDs were conducted during the COVID-19 pandemic, which had propelled government departments into using online platforms to engage with citizens, and the findings need to be viewed within this context. The themes identified from the data collected in the FGDs were interesting and informative. Participants stated that social media had become an important technology for their government and provided an effective way to reach out to citizens; they had experienced a tremendous increase in their social media following. However, posts were reported as being mostly one-directional, that is, posting from the government to its citizens. Although the participants from the three case studies seemed to be interested in implementing SMA to a much larger extent, they were concerned about several challenges and these were similar across the cases. It was clear across all three cases that SMA was not being used to its full potential.

Participants in the three government departments noted that they had limited access to skilled staff and had only a small social media team for SMA-related projects. This was possibly due to time constraints and restricted budgets. Hence, the findings confirmed that the acquisition of skills is a key factor for SMA success. Governments need to secure resources and funding to attract and acquire new skills and also need to provide a continuous learning environment for employees that use SMA tools. These skills are essential to obtain reliable insights from social media data while citizens' rights to privacy are still respected. The research participants in all the cases were concerned about the quality of social media data received from SNS. The main challenges faced related to data quality (i.e., accuracy and accessibility), and the methods and tools used for SMA. New themes that emerged that were not found in previous literature related to the view in some quarters of SMA as a negative concept involving hacking, the need for campaigns that promoted awareness of policies and guidelines for social media, and the assumption that all citizens have access to devices and data.

The findings of this study, particularly relating to data quality, confirm that additional research is needed to improve strategies and tools for ensuring data quality related to SMA, which falls within the larger disciplines of data management, data governance, and IS. In conclusion, the findings of this research recommend that government departments:

- Take advantage of the AI revolution and its potential benefits for predicting citizen-related trends and behavior relating to social media. To do this, they need to develop data/information management, data governance, and AI strategies.

- Focus on implementing extremely important data/information management and data governance initiatives to increase the awareness of and adherence to national and international policies.
- Implement data management and data governance mechanisms that create a data-driven culture.
- Prioritize skills development, budgets, and capacity building to enable projects that analyze massive amounts of data and predict citizens' perceptions and behavior through SMA, with a particular focus on collective intelligence and security. These will make it possible to identify trends relating to the citizens' perceptions and behaviors.

The research contributes to an increased understanding of the factors influencing the adoption of SMA for CzRM, particularly the need for more skills, financial resources, and quality data. The contribution is the TOE framework of SMA adoption for CzRM, which can assist practitioners and managers in government with strategies to improve SMA to support decision making, e-services, citizen engagement, and becoming more citizen-centric. Researchers can benefit from the lessons learned as well as from the theoretical findings that extended the application of the TOE theory to the context of SMA adoption in government. The findings were also used to theorize the behavior of social media consumers, in this case, the employees of government departments, in terms of how they perceive, interact with, and engage with SMA technology and the implications thereof. The research thus also contributes to the development of theory in information management (in this case relating to social media) and contributes to the field of IS as well as the neighboring disciplines of e-government, policy, and innovation in science and technology. A limitation of the study was that only three case studies, all at the provincial level, of South Africa and Germany were conducted. However, it still contributes to the research fields of SMA and TOE theory. Future research could conduct additional real-world investigations of the TOE factors influencing SMA adoption in other government departments or corporate organizations.

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