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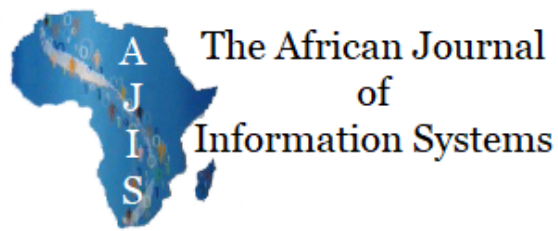
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Traditional and Information Technology Anti-Corruption Strategies for Curbing the Public Sector Corruption in Developing Economies of Sub-Saharan Africa: A Systematic Literature Review

Research Paper

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ABSTRACT

The pervasiveness of public sector corruption has been a major concern by successive governments and their citizenry. In order to curb such corruption, previous studies have focused on the anti-corruption strategies adopted by governments in isolation, but little or no study has focused on the interactions of the anti-corruption strategies. Using the concept-centric approach, we reviewed 91 studies systematically to understand the trends of government anti-corruption strategies. From the synthesized studies, we identified three dominant themes of anti-corruption strategies and their associated concepts. In addition, we also identified one dimension that captures information technology (IT) as a vehicle that enhances corrupt practices in the public sector. The identified themes include traditional, technological, transparency, and accountability anti-corruption strategies. We leveraged the identified themes and their associated concepts to develop a conceptual model that could explain the trends of anti-corruption strategies for curbing the public sector corruption. Our findings suggest that there are things we still need to know, particularly in the case of IT anti-corruption strategies that have been misused for corrupt purposes, especially in the context of e-government systems' adoption in the public sectors as a new stream of IS research.

Keywords: Anti-corruption strategies, information technology, corrupt practices, public sector, systematic literature review, e-government, misuse of information systems.

INTRODUCTION

While there is a consensus that corruption is a global phenomenon that impedes the economies of developed countries as well as those with developing economies, its prevalence and effects are more common in nations within the latter category (Organization for Economic Cooperation and Development [OECD], 2016). This is substantiated by the report of the African Union (AU), suggesting that over US\$148 billion (i.e., 25% of gross domestic product [GDP] is lost to corruption yearly in Africa [Ewi, 2018; Uneke, 2010]). Despite the ceaseless debates on what constitutes corruption, it is difficult to

define it concisely (Lumumba, 2014) or even operationalize it (Kanyam, Kostandini, & Ferreira, 2017). This is because what constitutes corrupt practices differs across countries and socio-cultural backgrounds (Angel & Bates, 2014; Askari, Rehman, & Arfaa, 2010). Consequently, the definition of corruption can be contingent upon the context of its occurrence (Angel & Bates, 2014). Thus, following the United Nations' report of 2004, we define corruption as the “misuse of a public or private position for direct or indirect personal gain” (United Nations, 2004, p. 1).

Corruption has been categorized into: grand, political, and bureaucratic or petty types of corruption. The grand type of corruption manifests at the highest level of government in a democratic or authoritarian regime. It involves the sabotage of legal and economic systems and the political environment (Kanyam et al., 2017). This is seconded by the political brand of corruption where governmental powers and resources are misused in a clandestine manner by government in power and their political lackeys to advance private gain in cash or in kind (OECD, 2007). The third one is the bureaucratic or petty corruption. This is where the misuse of entrusted power by low- and mid-level public officials in their interactions with ordinary citizens brazenly holds sway. It is even assumed to be the norm when citizens “are trying to access basic goods or services in places like hospitals, schools, police departments, and other agencies” (Kanyam et al., 2017, p. 273). However, regardless of its category, corruption is argued to be difficult to measure or even to estimate the precise extent of its occurrence (Kanyam et al., 2017). The debate on the key determinants of corruption continues, because there seems to be no consensus on the key determinants of corruption (Elbahnasawy & Revier, 2012).

In Africa, especially in sub-Saharan Africa, the consequences of corruption are enormous. Reports from the African Union (AU) suggest that over US\$148 billion (i.e., 25% of GDP) is lost to corruption yearly (Ewi, 2018; Uneke, 2010). Another AU report in 2016 indicates that money laundering costs between 2% and 5% of the global GDP (in US\$, i.e., roughly US\$1 trillion to US\$2 trillion), with Africa constituting the larger share of the cost (Ewi, 2018). In particular, the OECD February 2018 report suggested that Africa, including sub-Saharan Africa, lost an average of about US\$50 billion through illicit flows on an annual basis and over US\$60 billion had been siphoned off by corrupt African leaders (Ewi, 2018; Global Financial Integrity, 2017; Kazeem, 2017). Since most of these corrupt practices are centered on financial crime, sustainable economic, political, and social development of the African nations have been undermined (Global Financial Integrity, 2017). Consequently, private sectors' productivity is in a shambles, leading to stagnation of innovation and the emergence of new companies (Lumumba, 2014; OECD, 2016). Within the public sector, productivity is not aligned with the said public expenditure due to corruption. Moreover, skills and professionalism are being detached from bureaucrats, prompting them to align with politicians in power in the form of political clientelism and undue patronage (Liedong, 2017; OECD, 2016). Considering the negative effects of corruption, scholars have proposed traditional anti-corruption strategies to curb this malaise (Kim, 2013). In addition, other scholars have considered information technology (IT) anti-corruption strategies as well (Elbahnasawy, 2014; Krishnan & Teo, 2012a; Linhartová, 2017). Despite the effort of these scholars in their respective streams of research, little or no study has considered how traditional anti-corruption strategies and IT anti-corruption strategies interact to curb corruption in the public sector. Thus, we pose the following research question: “How do traditional and IT anti-corruption strategies intertwine to curb public sector corruption in the developing economies of sub-Saharan Africa?”

To answer the research question, we adopt the systematic review method. Systematic review is a rigorous and transparent form of literature review (Mahdavi, Galster, & Avgeriou, 2013; Okoli &

Schabram, 2010; Schryen, 2013) and is the most reliable and comprehensive method about what works (Okoli, 2015; Schryen, 2013). It involves identifying, synthesizing, and assessing all available evidence, quantitative and/or qualitative, in order to generate a robust, empirically derived answer to a focused research question (Okoli & Schabram, 2010). However, despite its growing interest, systematic literature review has been very scant in the synergistic relation of the traditional anti-corruption and the IT anti-corruption strategies in curbing public sector corruption. Thus, this paper aims to address this gap by offering critical reflections on the use of systematic review to answer the research question posed.

The next section discusses the systematic review methodology in more detail and outlines how it is applied. Section 3 discusses its findings, while in sections 4 and 5, we present the discussion and conclusion respectively.

SYSTEMATIC LITERATURE REVIEW METHODOLOGY

To review a specific topic, according to information systems (IS) scholars (e.g., Rowe, 2014; Schryen et al., 2017; Webster & Watson, 2002), one should: (1) survey and synthesize prior studies, (2) identify the relationships between key concepts, (3) identify gaps, and (4) set directions for future research. To do this, we followed the work of Mahdavi et al. (2013) to adopt a systematic literature review process, as shown in Figure 1. Having a research question that focused on the need for retrospective research, we developed the review protocol (Mahdavi et al., 2013). We accessed the e-government reference library (EGRL) version 14.0, which is a database dedicated to only e-government literature. Since the database does not have features to indicate titles, abstracts, and references of studies, we engaged EndNote (citation and referencing software) to extract over 10,000 titles, abstracts, and references from the EGRL. We are not alone in using Endnote for a literature search or reviews, as it has been advocated by IS scholars (e.g., Beecham, Baddoo, Hall, Robinson, & Sharp, 2008; Fischer, Righi, Rodrigues, & Costa, 2019; Hossain, Babar, & Paik, 2009; Trindade et al., 2017). Consequently, we searched for studies that were published between 2008-2018 in EGRL, using “corruption” as the keyword and placed them in the EndNote library, that we called Endnote Library One. Moreover, we got 128 studies that matched the search keyword (i.e., corruption) within the same period as in Endnote Library One and we moved them to a different folder and called it EndNote Library Two. We accessed other databases, such as EBSCO, Elsevier, Taylor and Francis, Palgrave and Emerald Insight, using Google scholar for studies between 2008-2018, with the search keywords “corruption and e-government” OR “anti-corruption strategies” AND “curbing corruption with ICT”. First, we got 200 papers, which we exported to EndNote Library Two. Using studies kept in Endnote Library Two, the lead author hand-searched (snowballing technique) the reference list of each study included and identified an additional 29 studies that might be missing from the indexed databases, which were also moved to EndNote Library Two, as illustrated in Figure 1.

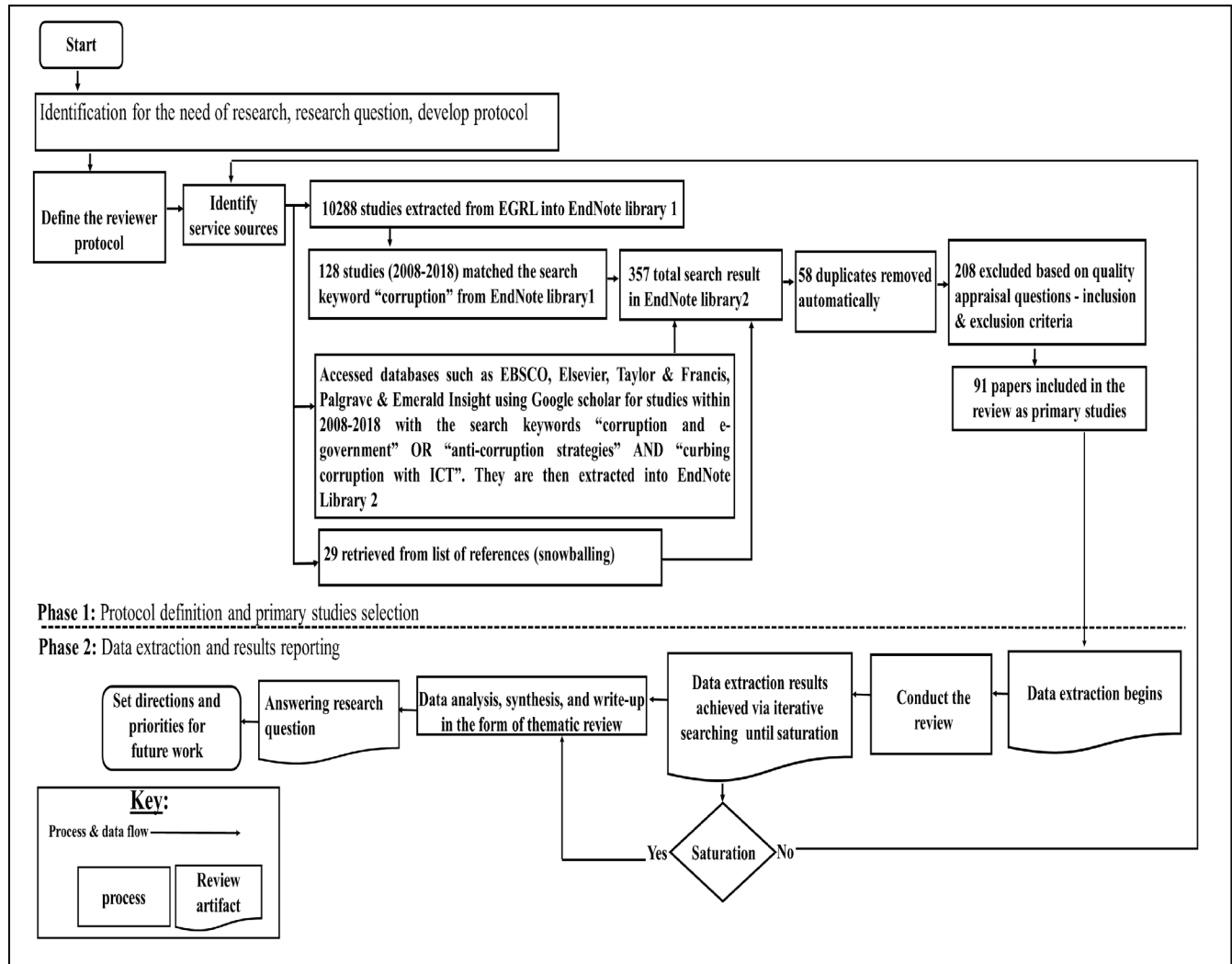


Figure 1. Process for the Systematic Literature Review

In total, there were 357 papers residing in EndNote Library Two. Fifty-eight of the papers were expunged due to duplication, while 208 papers were excluded because of not meeting the inclusion-exclusion criteria questions, as specified by Mahdavi et al. (2013), which we adapted to come up with the criteria questions suitable for this research. Such questions included, among others: (1) Does the study clearly define concepts and the relationship among such concepts? (2) Are there specifications of concepts moderating the relationships among concepts? If not, can we use the moderators to infer concepts in operations by the researchers? (3) Does the study use theory/theories to drive the identification of the concepts? In the end, we had 91 papers as primary studies used in the review, as shown in phase one of Figure 1.

We used a concept-centric approach (Webster & Watson, 2002) to extract theoretical concepts from each of the 91 studies, which were further arranged as concept matrixes of anti-corruption strategies for curbing the public sector corruption, as shown in Table 1. Similar concepts, which sometime have different semantic sense but with commensurable functional meanings from different studies, were merged as one concept (Templier & Paré, 2017) and placed in Table 1.

Theme	Sub-theme	Concept	Author
Traditional anti-corruption strategies	Political and governmental anti-corruption strategy	Political stability, government effectiveness, bureaucratic quality, professionalism, and the rule of law	(Basyal, Poudyal, & Seo, 2018; Bhattacharjee & Shrivastava, 2018; Elbahnasawy, 2014; Elbahnasawy & Revier, 2012; Fabayo, Posu, & Obisanya, 2011; Farzanegan & Witthuhn, 2017; Fjelde & Hegre, 2014; Garcia-Murillo, 2013; Kaufmann, Kraay, & Mastruzzi, 2009; Kim, 2013; Kim, Kim, & Lee, 2009; Palvia, Anand, Seetharaman, & Verma, 2017; Schumacher, 2013; Shim & Eom, 2008, 2009; Shrivastava & Bhattacharjee, 2015; Zhao & Xu, 2015).
	Economic anti-corruption strategy	Education/literacy level, level of income, and gross domestic product (GDP)	(Elbahnasawy & Revier, 2012; Farzanegan & Witthuhn, 2017; Garcia-Murillo, 2009; Kim, 2013; Saxena, 2018; Zhao, Ahn, & Manoharan, 2017).
	Socio-cultural anti-corruption strategy	Public trust, culture, religion (Catholicism, Islam, & Protestantism), population size, and gender ratio	(Bertot, Jaeger, & Grimes, 2010b; Cox, 2014; Elbahnasawy & Revier, 2012; Grimmelikhuijsen, 2010; Heacock & Sasaki, 2010; Hoffmann & Patel, 2017; Kim, 2013; Kim et al., 2009; Nam, 2018; Saxena, 2017; Zhao & Xu, 2015).
Transparency and accountability anti-corruption strategies	Open-government data initiatives	Press freedom, social accountability, social budget, and transparency in government budget	(Altayar, 2018; Andersen, 2009; Brito, Costa, Garcia, & Meira, 2015; Garcia-Murillo, 2009; Gonzalez-Zapata & Heeks, 2015; Granickas, 2014; Jetzek & Avital, 2013; Jetzek, 2015; Kock & Gaskins, 2013; Kock & Gaskins, 2014; Krishnan & Teo, 2012a; Linde & Karlsson, 2013; Máchová, 2017; Mimbi & Bankole, 2016; Mungai, 2018; Schopf, 2017; Ubaldi, 2013; Zhao & Xu, 2015).
IT Anti-corruption strategies	Internet and corruption	Internet diffusion	(Andersen, Bentzen, Dalgaard, & Selaya, 2011; Elbahnasawy, 2014; Garcia-Murillo, 2009; Goel, Nelson, & Naretta, 2012; Kanyam et al., 2017; Kock & Gaskins, 2013; Kock & Gaskins, 2014; Lee & Lio, 2016; Lio, Liu, & Ou, 2011; Schopf, 2017; Shim & Eom, 2009).
	E-government measures and perception indexes	E-participation index, e-government effectiveness index, e-government readiness, and e-government development/maturity index	(Abu-Shanab, Harb, & Al-Zoubi, 2013; Amagoh, 2016; Asogwa, 2013; Asorwoe, 2014; Bhuiyan, 2011; Ear-Dupuy & Serrat, 2014; Elbahnasawy, 2014; Garcia-Murillo, 2013; Hossan & Bartram, 2010; Kim, 2013; Korkpoe, 2011; Krishnan & Teo, 2012a, 2012b; Krishnan, Teo, & Lim, 2012; Lee & Lio, 2016; Linde & Karlsson, 2013; Linhartová, 2017; Máchová, Volejnikova, & Lnenicka, 2018; Martinez, 2012, 2014; Martins, Fernandes, Rohman, & Veiga, 2018; Mimbi & Bankole, 2016; Mistry & Jalal, 2012; Nam, 2018; Palvia et al., 2017; Pathak et al., 2010; Saxena, 2017; Seo & Mehedi, 2016; Sheryazdanova & Butterfield, 2017; Shim & Eom, 2008, 2009; Shrivastava & Bhattacharjee, 2015; Singh, Pathak, Naz, & Belwal, 2010; Sola, 2017; Srivastava, Teo, & Devaraj, 2016; Walle, Janowski, & Estevez, 2018; Zhao & Xu, 2015).
	Social media technologies	Social media, communicability, interactivity, collaborative ability, anonymity, and visibility	(Arpit, 2012; Bertot, Jaeger, & Grimes, 2010a; Bertot et al., 2010b; Bertot, Jaeger, & Grimes, 2012; Chêne, 2016; Enikolopov, Petrova, & Sonin, 2018; Essien, 2017; Garcia-Murillo, 2013; Gonzalez-Zapata & Heeks, 2015; Grimmelikhuijsen, 2010; Grönlund, 2010; Heacock & Sasaki, 2010; Hellström, 2010; Jha, 2017; Jha & Sarangi, 2017; Kanyam et al., 2017; Kock & Gaskins, 2013; Kock & Gaskins, 2014; Krishnan & Teo, 2012a; Lee & Lio, 2016;

Theme	Sub-theme	Concept	Author
			Ma, 2017; Manrique & Manrique, 2017; Mimbi & Bankole, 2016; Shrivastava & Bhattacharjee, 2015; Stamati, Papadopoulos, & Anagnostopoulos, 2015; Ubaldi, 2013; Waller, 2017; Zhao & Xu, 2015).
	Adoption of e-government systems, (e.g., e-procurement)	Acceptance, perceived usefulness, perceived ease of use, information asymmetry, intention to adopt anti-corruption technology, and trust	(Addo, 2018; Neupane, Soar, & Vaidya, 2012; Neupane, Soar, Vaidya, & Yong, 2014; Saxena, 2017, 2018; Schopf, 2017; Sheryazdanova & Butterfield, 2017; Vaidya & Neupane, 2014).
Table 1. Concepts Extracted from the Synthesized Studies			

Being an iterative process, after a thorough reading of the papers, we stopped harvesting more papers when we reached saturation (Cecez-Kecmanovic, Galliers, Henfridsson, Newell, & Vidgen, 2014). We engaged a data extraction procedure, which was designed to hold the data by manually following a thematic coding process, which has been advocated by IS scholars for conducting a systematic literature review (e.g., Leidner & Kayworth, 2006; Roberts, Galluch, Dinger, & Grover, 2012; Wiener, Mähring, Remus, & Saunders, 2016). “Such a coding process systematically categorizes content of text and identifies relationships among the categories . . .” It is valuable for making sense of a large domain of research, and it can guide future research (Roberts et al., 2012, p. 634). Thus, following Braun and Clarke (2006), our thematic coding process is in six stages: (1) familiarizing with data, (2) generating initial codes, (3) developing themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. We discuss next the six stages in a manner that reflects how we adapted them to our data analysis, by starting with stage 1.

Stage 1: Familiarizing with data

Two authors read and re-read each of the 91 studies that were selected for the review in an active way (Braun & Clarke, 2006). This was done to become more familiar with the selected studies and further clarify any discrepancies that might have occurred during the selection processes. Thus, we identified meanings and patterns from the studies.

Stage 2: Generating initial codes

Two of the three authors independently identified the data, or rather the concepts, as in-vivo codes from empirical studies with theoretical underpinnings while, for the conceptual papers, only key concepts and phrases were considered. Among the identified in-vivo codes, we noticed that there were similar concepts or meaningful phrases. When such similar concepts from different studies seemed to have the same functional meaning, we merged them into one concept (Templier & Paré, 2017). The aggregation of the concepts now formed the first order concepts (Gioia, Corley, & Hamilton, 2013) or basic codes (Braun & Clarke, 2006). Both authors compared their individual coding results and found a substantial consensus, while discrepancies were solved, through mutual agreement, to develop the first order categories, as shown in Figure 2. This stage prompted our move from provisional to more substantive categories (Ravasi & Phillips, 2011).

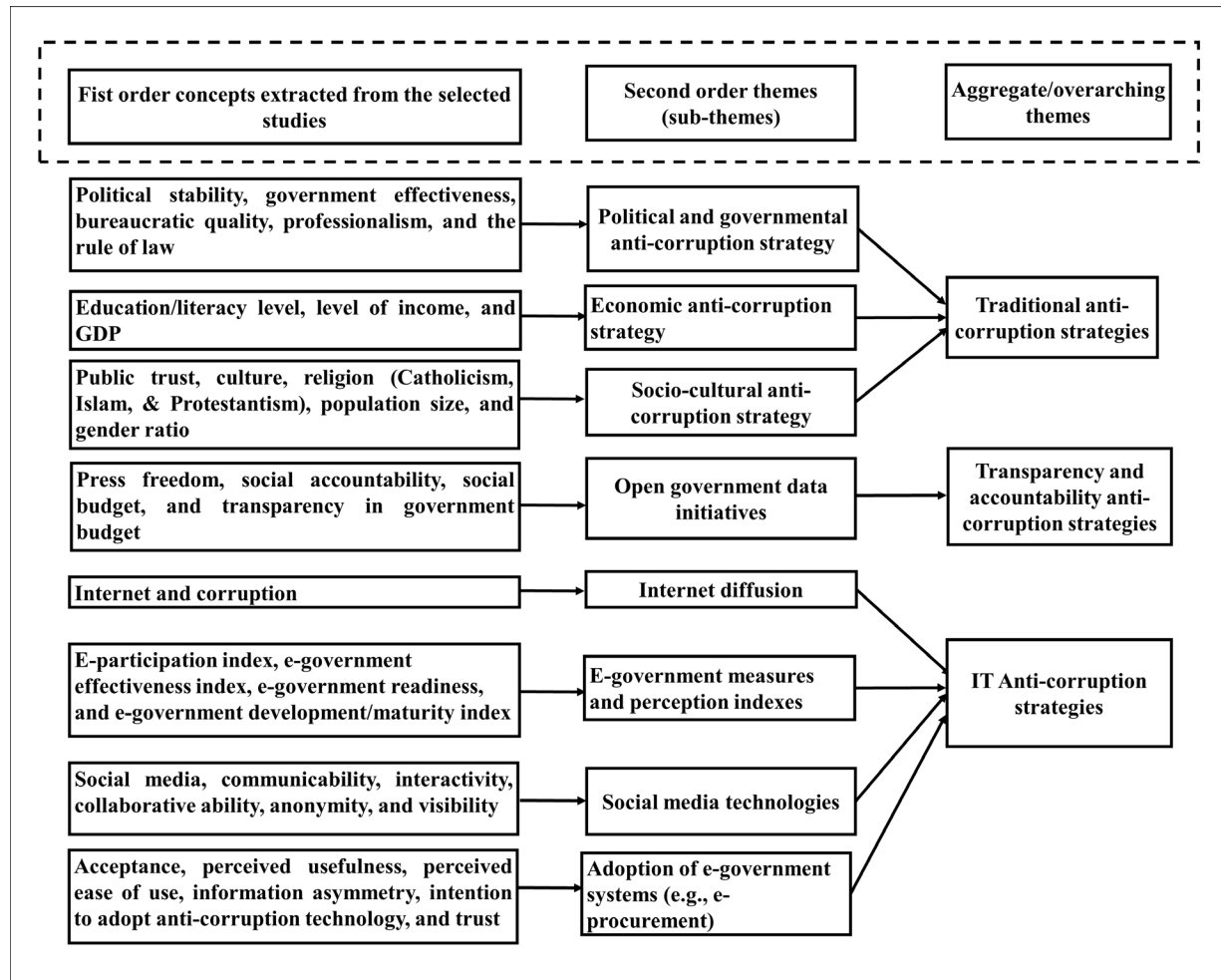


Figure 2. Thematic Data Analysis Process

Stage 3: Developing themes

While grouping the in-vivo codes that stayed closed to the sliced-out concepts from studies reviewed, which were placed into first-order categories, conceptual links among the emerging categories were seen. Thus, we tentatively combined first-order categories into fewer, broader, and more theoretically relevant second-order categories (Ravasi & Phillips, 2011). The second-order categories suggested close examination in order to answer the overarching research question of the study. As the process is pursued reiteratively, we carefully scrutinized our first-order categories and its contents across the 91 papers for concepts that would—or would not—fit with each emerging category. In some cases, we agreed to redefine some concepts when we noticed that their semantic incommensurability existed, but with the same essence in meanings (Braun & Clarke, 2006; Gioia et al., 2013).

Stage 4: Reviewing Themes

We ran through the entire data set to search for disconfirming ones, and continued developing our second order theme until we reached saturation, while engaging in constant comparison (Belgrave & Seide, 2019; Braun & Clarke, 2006). Constant comparison here is where a concept or a phrase is not considered on its own but compared with all previous concepts or phrases. We noticed that the process

of constant comparison generated theoretical properties of the categories of the second order (Belgrave & Seide, 2019). Consequently, we started to see the dimensions of the categories, conditions influencing the categories, relationships between them, the antecedents, and consequences of the categories (Belgrave & Seide, 2019). We wrote such theoretical properties in our memo, which helped to establish the relationships, antecedents, and consequences of the categories represented in blue arrows in Figure 6 throughout the process. This is similar to the axial coding process in the grounded theory approach of analyzing data (Strauss & Corbin, 1998).

Stage 5: Defining and Naming Themes

We integrated the second-order categories to form three broader overarching themes—traditional anti-corruption strategies, transparency and accountability anti-corruption strategies, and IT anti-corruption strategies. At this stage, we were now in a better position to establish the theoretical relationships between the overarching themes, as shown in Figure 6, with blue arrows. In doing this, we discovered the distinct underlying uniformities that exist among certain sets of second-order categories and their theoretical properties. Thus, we grouped such uniform sets, which reduced the number of the second-order categories into the aggregate/overarching themes. Besides, we noticed how the three identified overarching themes converge around a core theme (public sector corruption), similar to the selective coding approach of Strauss and Corbin (1998), which we noted in our memo. At the same time, we saw that the categories had become theoretically saturated. Figure 2 shows the complete data structure that emerged through this process, presenting the first-order codes and their relation to the second-order categories, and the overarching themes we had generated.

Stage 6: Producing Report

At this stage, we had a theory, as well as coded data and memos, with which to work. Thus, we presented the final analysis and write-up of the report, as detailed in the next section

FINDINGS

In our findings, we give the descriptive statistics of the literature reviewed, as well as discuss the three broader overarching themes—traditional anti-corruption strategies, transparency and accountability anti-corruption strategies, and IT anti-corruption strategies. We start next with the descriptive statistics.

Descriptive statistics

We reviewed 91 primary studies in relation to technology and corruption; 58 of these studies were published as journal articles between 2008 and 2018. Only one study was published in 2008; however, since 2009, the number of published articles has gradually increased, as shown in Figure 3.

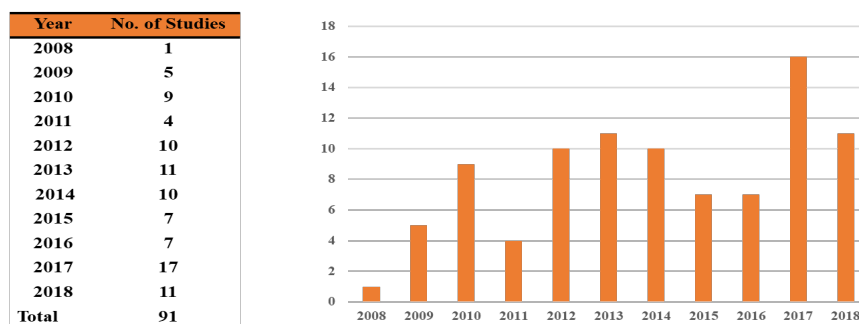


Figure 3. Number of Articles by Year of Publication

In terms of the type of publication, more than half (58 articles, i.e., 64%) of the reviewed articles were published in journals, 16 (17%) were published as conference papers, 6 (7%) as reports from international organizations such as Transparency International, and the remaining 11(12%) articles were published as books/book sections, as shown in Figure 4.

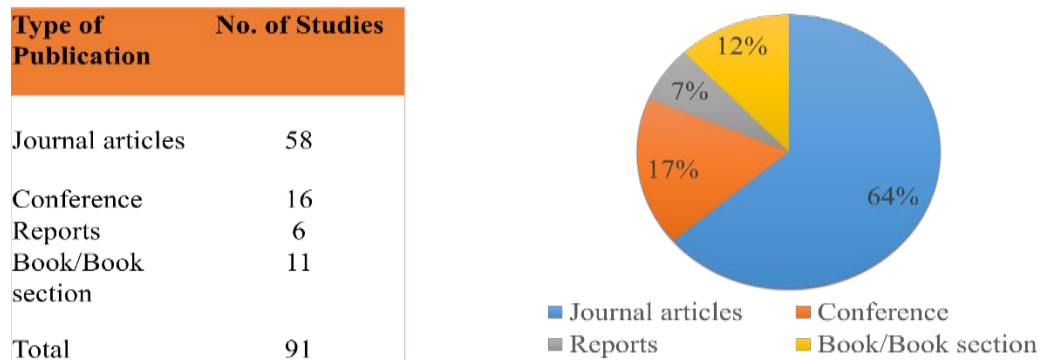


Figure 4. Number of Articles by Type of Publication

With respect to the research method used, 47 (52%) of the studies used a quantitative technique as method of data analysis, such as descriptive statistics and regression models. However, 44 (48%) of the remaining articles were purely qualitative or conceptual in nature, as shown in Figure 5.

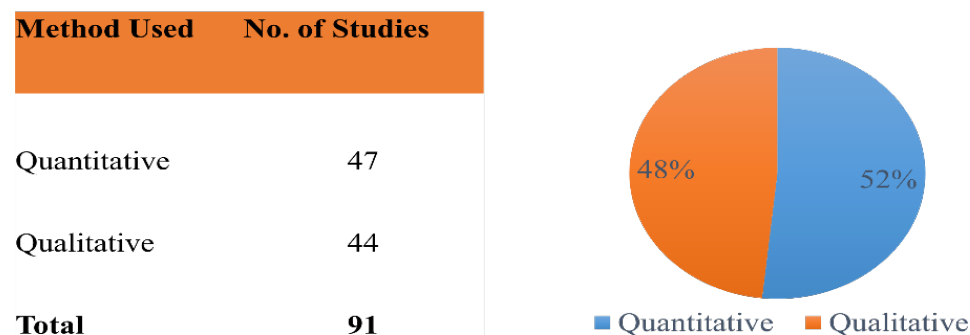


Figure 5. Number of Articles by Method Used

To understand the spread of the reviewed literature across countries, we organized them across the three dominant themes—Traditional anti-corruption strategies, IT anti-corruption strategies, and Transparency and accountability anti-corruption strategies—that we had identified from literature, as shown in Figure 6. It is interesting that most of the studies, (over 20% from each theme), used multiple dynamic panel data that stemmed from the corruption and e-government perception indexes of different countries.

Such datasets emanated from the annual or quarterly reports of the Transparency International and World Bank, among others. Additionally, ten studies within the IT anticorruption theme did not report on the countries where the studies had been conducted and, as such, we classified them as not applicable (N/A). Similarly, within the traditional anti-corruption theme, only two studies were classified as not applicable, suggesting that no countries were specified in the paper.

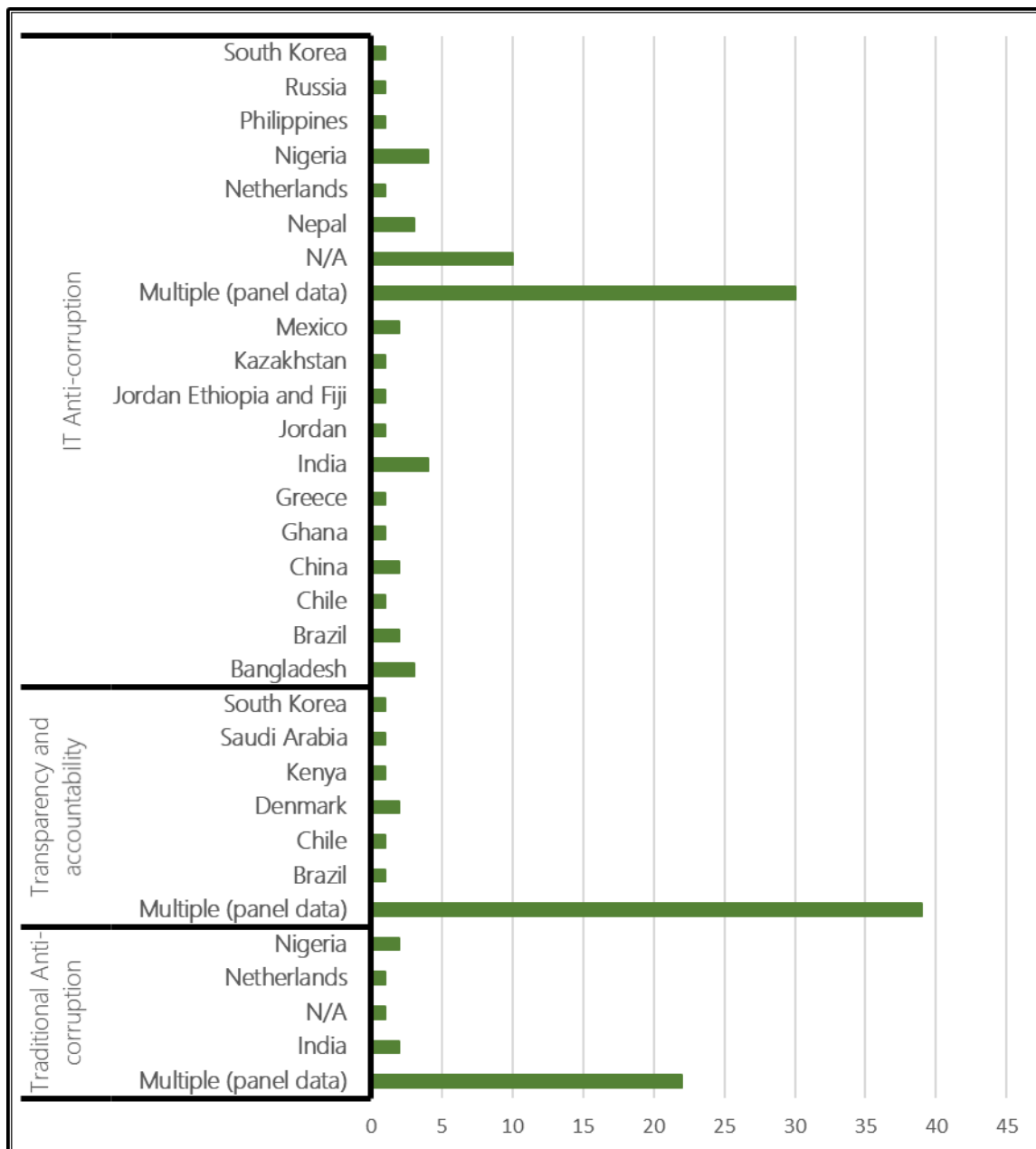


Figure 6. Distribution of Studies by Countries and Themes

THE OVERARCHING THEMES AND THEIR RELATIONSHIPS: TOWARDS THEORY DEVELOPMENT

As we stated earlier, the three broader overarching themes we discovered from the data analysis were: (1) traditional anti-corruption strategies, (2) transparency and accountability anti-corruption strategies, and (3) IT anti-corruption strategies. Thus, we discuss them in this section, with the aim of developing a theory. Such a theory encapsulates the overarching themes' relationships with public sector corruption and misuse of IS for corrupt practices. We started with theme one, which is traditional anti-corruption strategies.

Theme 1: Traditional Anti-Corruption Strategies

Within this theme, researchers argue on the relevance of the traditional anti-corruption strategies that span political and governmental, economic, and socio-cultural factors as sub-themes. We discuss next the political and governmental strategy.

Political and governmental anti-corruption strategy

Political and governmental anti-corruption strategy is one of the subsets of traditional anti-corruption strategies adopted by the governments. The goal of such a strategy is to ensure transparency and accountability. The governments leverage such a strategy to enhance good governance, national development, and prevention of corruption. This aids in shaping the bureaucrats' and citizens' confidence and trust in their government (Disch, Vigeland, Sundet, & Gibson, 2009). Much of Kaufmann et al.'s (2009) work focused on the political and governmental anti-corruption concepts. Such concepts include: (1) political stability, (2) government effectiveness or bureaucratic quality, (3) professionalism or professional ethics, and (4) the rule of law.

Political stability refers to the probability that government will be disrupted or be removed from power by illegal or violent means, including domestic violence and terrorism (Kaufmann et al., 2009). Thus, political stability as defined here is seen to be a variable that influences the perception of the pervasiveness of corruption in governance (Elbahnasawy & Revier, 2012). While individual governments' efforts to reduce the levels of corruption have focused on political stability via steady and uninterrupted democracy, some researchers have argued also for the relevance of government effectiveness or bureaucratic quality (Basyal et al., 2018; Garcia-Murillo, 2013; Kim, 2013; Shim & Eom, 2008; Zhao & Xu, 2015). Government effectiveness takes the shape of perceptions people have about the "quality of public services, the quality of the civil service, and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann et al., 2009, p. 6). The goal of government effectiveness in a bureaucratic regime is to limit bottleneck tendencies during service delivery to the citizenry. The quality of bureaucracy focuses on organizational structure and processes that can reduce opportunities for corruption systematically (Shim & Eom, 2008). Thus, democratic government that is effective and transparent can expose corruption (Shim & Eom, 2008; Zhao & Xu, 2015). Even though the concept of government effectiveness or bureaucratic quality were found to be statistically significant in a number of empirical studies (e.g., Garcia-Murillo, 2013; Kim, 2013; Shim & Eom, 2008; Zhao & Xu, 2015), individual governments can harness its potential to deter corruption. This is the case, especially when government effectiveness is mediated by other traditional anti-corruption variables such as enforcement of rule of law and bureaucratic professionalism (Kim, 2013; Shim & Eom, 2008, 2009).

When the studies skewed towards bureaucratic professionalism, two dimensions were evident: (1) competency, and (2) anti-favoritism. The relationship between competence and anti-favoritism was negatively significant to perceived level of corruption (Shim & Eom, 2008). By this, it means that when the levels of competence and anti-favoritism arise, the perception of corruption tends to decrease. This is especially the case when the presence of regulatory quality and the enforcement of rule of law exist (Shim & Eom, 2008, 2009).

The concept of rule of law refers to the "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property-rights,

the police, and the courts, as well as the likelihood of crime and violence” (Kaufmann et al., 2009, p. 6). Researchers have noted that the abuse of rule of law is one of the key determinants of corruption (Elbahnasawy, 2014; Elbahnasawy & Revier, 2012; Kim, 2013). Rule of law falls within the legal-administrative anti-corruption strategy that focuses on prevention and curbing public sector corruption. It may be challenging to implement and harness the influence of rule of law and regulatory quality in a bureaucratic setup (Palvia et al., 2017). This is true especially when such bureaucratic setups reside in a quasi-democratic governance such as in Nigeria, where politicians and agents of the law enforcement agencies have institutionalized and normalized corruption (Adeleke & Olayanju, 2014; Bazuaye & Oriakhogba, 2016; Palvia et al., 2017). Scholars have noted the positive effects of political and governmental anti-corruption strategy on reducing public sector corruption (e.g., Bhattacharjee & Shrivastava, 2018; Elbahnasawy & Revier 2012; Kim et al., 2009; Shim & Eom, 2008; Fjelde & Hegre, 2014), even when tested as a control variable (Shim & Eom, 2008; Shrivastava & Bhattacharjee, 2015). We thus state the following proposition:

P1: The adoption of political and governmental anti-corruption strategy will reduce the public sector corruption in the developing economies of sub-Saharan Africa.

Economic anti-corruption strategy

The economic anti-corruption strategy is based upon the premise that “humans are products of economic conditions” (Kim, 2013, p. 3). It is assumed that a better economic condition of individuals in a country can determine their corruption level (Kim, 2013). For example, wealthy countries can dedicate their resources into education in order to curb corruption (Elbahnasawy & Revier, 2012). On the one hand, the complementary effects of developmental indices, such as levels of education, income, and GDP, have an influence on perceptions of corruption (Elbahnasawy & Revier, 2012; Garcia-Murillo, 2009; Kim, 2013). On the other hand, income or the economic condition of bureaucrats and citizens does not seem to be applicable in measuring the extent of corruption in society (Kim, 2013). However, despite the conflicting results emanating from the individual levels of economic conditions, it is evident that some politicians and bureaucrats engage in corruption in order to fulfil their selfish desires, as opposed to the national interest, when measured with developmental indices such as levels of education, income, and GDP (Kim, 2013). Besides, measures of such indices and their impact on corruption have been carried out by third party agencies (Palvia et al., 2017). The validity of such measures might be questionable, especially when it depends on the context and variable of interest. For instance, measures of education are subjected to the Education Index in the United Nation’s (UN) Human Development Report, which might not reflect the case in countries with developing economies (Garcia-Murillo, 2009). Such a report indicates the “measures a country’s relative achievement in both adult literacy and combined primary, secondary and tertiary gross enrolment” (Garcia-Murillo, 2009, p. 15). Farzanegan and Witthuhn (2017) have leveraged the percentage of the total secondary school enrollments as a proxy to measure the level of education in a country in their study. Consequently, higher levels of education can shape economic condition, which will in turn moderate the association between income levels and public sector corruption (Farzanegan & Witthuhn, 2017; Garcia-Murillo, 2009). For example, Kim (2013) argues that public sector corruption declines if bureaucrats are well educated, with better-paid remuneration, leading to a high standard of living. Besides, high index value of a country’s economic development (i.e., in terms of its GDP) might have a potential effect on the levels of its public sector corruption. This is because a wealthy country might decide to channel a considerable amount of its wealth to the detection and prevention of corruption in its public sector. Thus, institutionalization of economic anti-corruption strategies can be influential in curbing public sector corruption (Elbahnasawy

& Revier, 2012; Garcia-Murillo, 2013; Kim, 2013; Kim, Kim, & Lee, 2009). Therefore, we formulate proposition two as follows:

P2: The adoption of economic anti-corruption strategy will reduce the public sector corruption in the developing economies of sub-Saharan Africa.

Socio-cultural anti-corruption strategy

Socio-cultural anti-corruption strategy focuses on public ethics and normative mechanisms in order to change human conduct in relation to corrupt practices (Bertot et al., 2010b; Kim, 2013; Kim et al., 2009). Also, the strategy hinges on “advancing a strong sense of public service ethics, and building organizational integrity” (Kim, 2013, p. 3). It is designed to enhance the transparency and accountability of government. This is done through incremental or radical changes of public officials’ and citizens’ behaviors toward high ethical standards and bureaucrats holding onto professionalism (Kim et al., 2009). Such standards and professionalism may be encoded into organizational norms (Kim et al., 2009). When such norms are institutionalized and become part of the organization’s culture, people tend to avoid corruption (Kim et al., 2009). Thus, ethically conscious human behaviors are endorsed to ensure public trust (Bertot et al., 2010b; Cox, 2014). The endorsement of an ethical organizational culture tends to take a much longer time when compared with the establishment of an anti-corruption system (Kim, 2013). Consequently, building social norms and high ethical values in an organization take far longer than correcting unethical behaviors (Kim, 2013). While the social norms are mediated by bribe-seeking behaviors of bureaucrats, the giving of bribes is mediated by people’s beliefs and circumstances (Kim, 2013). The dominant religious cultures (e.g., Catholicism, Islam, and Protestantism) also were found to be statistically insignificant in reducing corruption (Elbahnasawy & Revier, 2012). Social trust in the form of public trust (Cox, 2014), and demographic factors such as population size, despite the controversy attached to the nation’s population density, and gender ratio (Saxena, 2017; Zhao & Xu, 2015) were perceived to have an effect on how people perceive corruption (Elbahnasawy & Revier, 2012; Saxena, 2017; Zhao & Xu, 2015). Moreover, the integration of behavioral norms into anti-corruption strategy can influence people’s preferences and choices around corruption (Hoffmann & Patel, 2017). Based on this discussion, we formulate the following proposition:

P3: The adoption of a socio-cultural anti-corruption strategy will reduce the public sector corruption in the developing economies of sub-Saharan Africa.

Theme 2: Transparency and Accountability Anti-Corruption Strategies

This theme explores the concepts that describe the relevancy of government transparency and accountability as anti-corruption strategies. Government transparency is defined as “the extent to which [government] reveals relevant information about its internal workings, such as decision [making] processes, procedures, functioning and performance” to its citizenry (Grimmelikhuijsen, 2010, p. 9). By this, it means that through governmental social empowerment, citizens can have the opportunity to participate in official governmental “reform movements and by cultivating a civil, law-based society as a long-term deterrent to corruption” (Bertot et al., 2010b, p. 265). With more governmental information available, the citizen can use such information to mitigate corruption (Bertot, Jaeger, & Grimes, 2010a). The right-to-know and transparency are “internationally regarded as essential to democratic participation, trust in government, prevention of corruption, informed decision-making, accuracy of government information, and provision of information to the public, companies, and journalists, among

other essential functions in society” (Bertot et al., 2010b, p. 264). This overarching theme seems to hold open government data initiatives as a sub-theme from our findings, as discussed next.

Open government data initiative

From our findings, an open government data initiative seems to be the major source for digital transparency and accountability (Brito, Costa, Garcia, & Meira, 2015; Gonzalez-Zapata & Heeks, 2015; Ubaldi, 2013). The open government data initiative embodies press freedom, voice, and accountability (Garcia-Murillo, 2013; Kock & Gaskins, 2013; Kock & Gaskins, 2014; Krishnan & Teo, 2012b; Krishnan et al., 2012; Stamati et al., 2015; Zhao & Xu, 2015). Open government data refers to “any sets of data which can be reused with no restrictions by any form of licensing or patents, data that are well structured and can be easily accessed and reused” by the citizenry (Mungai, 2018, p. 1). With the advent of Web 2.0 technology, open government datasets were made available on the government portals for the citizenry. Such datasets include registers, public tenders, government expenditures, transportation around metropolitan cities where government operations reside, health, budget, and public administration (Brito et al., 2015; Ubaldi, 2013). The information on the portals can be used to scrutinize bureaucrats for accountability and thereby reduce corruption in government (Brito et al., 2015). Voice and accountability entails “capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media” (Kaufmann et al., 2009, p. 6). Voice and accountability is a vital dimension of governance through which the citizenry and organizations can participate in public governance via the use of technologies (Garcia-Murillo, 2013; Heacock & Sasaki, 2010).

Public access to information about governance can allow the citizenry to exercise their political and civil rights to curb electoral corruption and demand accountability for any expenditure of the government (Brito et al., 2015; Strand, 2010). Due to open government data, bureaucrats who misuse their powers for corrupt practices can be identified easily or held accountable by the citizens. As Strand (2010) would say: “[a] better informed and active citizenry, who can put pressure on national institutions to be accountable and responsive to citizens’ needs and priorities, is a fundamental component of a functioning democracy” (p. 1). Therefore, for democracy to function, the citizenry should have access to government information in a participatory manner. This is because, through open government data, the citizenry can have access to information—a participatory society can decide the fate of corrupt bureaucrats (Saxena, 2017).

Recently, countries that upheld the open government data initiatives, especially via the Freedom of Information Act (FOIA), have witnessed high rates of conviction for corruption (Cordis & Warren, 2014; Mungai, 2018). Consequently, corrupt bureaucrats will weigh the cost of committing corruption, especially if they are aware that the citizens have adequate information that can hold them accountable for any corrupt act (Garcia-Murillo, 2013). Recent empirical findings suggest that open government data initiatives have led to reduction in the levels of corruption perceptions (Garcia-Murillo, 2013; Granickas, 2014; Kock & Gaskins, 2014; Máchová, 2017; Mimbi & Bankole, 2016). Thus, higher levels of open government data initiatives lower the levels of corruption. Therefore, we state the following proposition:

P4: The adoption of an open government data initiative will reduce public sector corruption in the developing economies of sub-Saharan Africa.

While there is a consensus that open government data initiatives can reduce corruption, there are certain factors that may affect the effectiveness of this initiative (Parung, Hidayanto, Sandhyaduhita, Ulo, & Phusavat, 2018; Zuiderwijk & Janssen, 2014). Such factors include citizens or bureaucratic resistance, public trust in government data, culture, and fear of criticism on the part of the government, among others (Bertot et al., 2010b; Cox, 2014; Grönlund, 2010; Heacock & Sasaki, 2010; Parung et al., 2018). Thus, open government data initiatives might not thrive in democracies unless there is political will, change readiness, and enforcement of rules and regulations (Bertot et al., 2010b; Heacock & Sasaki, 2010). Thus, based on this discussion we posed that:

P5: Synergy arising from the complementarity effort of open data initiative (as a sub-theme of transparency and accountability anti-corruption strategies) with traditional anti-corruption strategies will be more effective in curbing the public sector corruption in the developing economies of sub-Saharan Africa.

In the past, studies that investigated the impact of technologies and the traditional anti-corruption strategies on public sector corruption have argued that the technology seems to be more influential and statistically significant in curbing public sector corruption (Kim, 2013; Krishnan & Teo, 2012a, 2012b; Mimbi & Bankole, 2016; Shim & Eom, 2009). Thus, the use of technologies alongside open government data initiatives also can be instrumental in curbing public sector corruption. In particular, recent studies (e.g., Bertot et al., 2010b; Grönlund, 2010; Stamati et al., 2015) have argued that IT anti-corruption strategies also can enhance the effects of the transparency (open government data initiatives) and accountability in curbing public sector corruption. Therefore, proposition six is stated as follows:

P6: Synergy arising from the complementarity effort of open government data initiative (as a sub-theme of transparency and accountability anti-corruption strategies), with that of IT anti-corruption strategies, will be more effective in curbing the public sector corruption in the developing economies of sub-Saharan Africa.

Theme 3: IT Anti-Corruption Strategy (Role of Digitalization)

Within this theme, IS scholars have maintained that digitalization of government's services via Internet diffusion, adoption (implementation and use) of e-government systems, and e-government measures and its perception indexes are considered to be IT anti-corruption strategies. Such strategies could constrain corrupt practices within the public sector domain. We start our discussion with Internet diffusion.

Internet diffusion

Internet diffusion or penetration rate of Internet relates to the percentage of the overall population (per 100 inhabitants) in a nation that uses Internet. It measures the number of Internet users or people that have access to the Internet. Such measure can be obtained from the World Development Indicators (WDIs) (Elbahnasawy, 2014). The introduction of the Internet has mitigated corruption, and fostered economic development globally (Jin & Cho, 2015), and there is evidence that the Internet has suppressed corruption since its emergence (Elbahnasawy, 2014; Lee & Lio, 2016; Shrivastava & Bhattacharjee, 2015). Internet diffusion can exert its effects on corruption perception primarily in bi-directional or indirect ways; both government and citizenry have employed the Internet to foster bureaucratic processes (Kock & Gaskins, 2013; Lio et al., 2011). However, an effective government also can use the Internet to manipulate the messages available on the Internet to its favor. In addition, the

Internet can offer corrupt political elites the opportunity to remain in power, which could be a breeding ground for corruption (Kanyam et al., 2017; Linde & Karlsson, 2013), especially in the absence of rule of law or severity of sanction (Shrivastava & Bhattacharjee, 2015). Thus, we formulate the following proposition:

P7: The adoption of an Internet diffusion strategy will reduce public sector corruption in the developing economies of sub-Saharan Africa.

Social media technologies

In principle, the citizenry can use electronic social media (e.g., Facebook & WikiLeaks) (Jha & Sarangi, 2017) to publish their dislikes and criticisms about government misuse of power for corrupt tendencies (Bertot et al., 2010b; Grönlund, 2010). Social media refers to mobile and web-based technologies for social interaction among individuals that share user-generated contents (Bertot et al., 2010a; Bertot et al., 2012). Social media technologies have properties such as communicability, interactivity, collaborative ability, anonymity, and visibility that can afford openness and accountability (Stamati et al., 2015). Thus, in recent years, many public sectors have leveraged the transparency and openness affordances of social media technologies to curb corruption (Arpit, 2012; Bertot et al., 2010a; Bertot et al., 2010b; Bertot et al., 2012; Enikolopov et al., 2018; Essien, 2017; Hellström, 2010; Jha, 2017; Jha & Sarangi, 2017; Kanyam et al., 2017; Lee & Lio, 2016; Ma, 2017; Manrique & Manrique, 2017; Shrivastava & Bhattacharjee, 2015; Waller, 2017). Social media technologies and mobile phones can be instrumental in empowering the citizenry to participate and uphold good governance that will amount to transparency, accountability, openness, and mitigate corruption (Bekri, Dunn, Oguzertem, Su, & Upreti, 2011; Chatfield & Brajawidagda, 2013; Kanyam et al., 2017; Shrivastava & Bhattacharjee, 2015). For example, the launching of mobile phones against corruption in 2014 by the United Nations Development Program (UNDP) in Papua New Guinea has paved a way for the citizenry to report corruption cases via mobile phone applications (Kanyam et al., 2017). Similarly, the WikiLeaks site has over a million user-generated documents in relation to anti-corruption struggles (Bertot et al., 2010b; Bertot et al., 2012; Shrivastava & Bhattacharjee, 2015). Such documents have been used to expose and prosecute corrupt bureaucrats and serve as a deterrent to future corrupt officials (Kanyam et al., 2017; Shrivastava & Bhattacharjee, 2015). However, there seems to be inconsistent evidence to show that social media technologies have a significant effect on citizens' perceptions of corruption (Valle-Cruz, Sandoval-Almazan, & Gil-Garcia, 2015, 2016). By this, it means that social media technologies seem not to have an effect on government performance and government-to-customer (G2C) interactions (Valle-Cruz et al., 2016). This could be the result of fewer public services based on the social media technologies and lack of public trust on the use of social media for G2C interactions (Valle-Cruz et al., 2015). Based on this discussion, we formulate the following proposition:

P8: The adoption of a social media technologies strategy will reduce the public sector corruption in the developing economies of sub-Saharan Africa.

E-government measures and perception indexes

Governments in their respective countries have continued to engage e-government measures and perception indexes to streamline, adopt, and strategize their e-government initiatives towards anti-corruption strategies. Such circumstances have been reflected in the literature (e.g., Abu-Shanab et al., 2013; Andersen, 2009; Bertot et al., 2010a; Bertot et al., 2010b; Máchová et al., 2018; Martins et al.,

2018; Mistry & Jalal, 2012; Nam, 2018; Shanab, Harb, & Zoubi, 2013; Sheryazdanova & Butterfield, 2017; Srivastava et al., 2016; Walle et al., 2018; Wickberg, 2013). Researchers also have used the e-government perception indexes published by external bodies in order to assess the impact of e-government initiatives on anti-corruption drives. Such perception indexes include e-participation index, e-government effectiveness index, and e-government readiness (i.e., e-government maturity/development) index, among others. In particular, the e-participation index measures the degree at which different countries use online tools in mediating interactions among citizens and between G2C (Linde & Karlsson, 2013), while the e-government effectiveness “measures the overall e-government competency and provides a snapshot of webpage presentations [of a country]” (Shim & Eom, 2009, p. 105). Webpage penetration (government websites for public participation), human capital (literacy & school enrollment rates), and technology infrastructure (users of computers, the Internet, telephones, and mobile phones in a country) were used by the UN to determine the e-government effectiveness of a country (Shim & Eom, 2009). The UN’s e-government readiness index measures the e-participation and e-government effectiveness on a scale of zero for low e-participation or low e-government effectiveness and one for high e-participation and high e-government effectiveness (United Nations, 2010). The e-government maturity/development index is also an e-government variable that measures the readiness and ability for a national government to use online services and telecommunication infrastructures to run bureaucratic functions (Amagoh, 2016; Elbahnasawy, 2014). The UN department of public administration develops and publishes the e-government maturity/development index on the scale between zero (most developed) and one (least developed) of over 191 nations (Elbahnasawy, 2014). Therefore, based on this discussion, we formulate the following proposition:

P9: The adoption of e-government measures and perception indexes strategy will reduce the perception of public sector corruption in the developing economies of sub-Saharan Africa.

Adoption of e-government systems

E-government systems have improved government services, such as “streamlining operational processes, transcribing information held by government agencies into electronic form, linking disparate databases, and improving ease of access to services for members of the public” (Singh et al., 2010, p. 256). Much of the literature reviewed within this context suggests that such improvements bring about the efficiency of IS-based dissemination of information and transactions between government and citizenry (G2C) (Amagoh, 2016; Oye, 2013), between government and businesses (G2B), and within or between governments (G2G) (Amagoh, 2016). When such systems are adopted (i.e., implemented and used) and integrated within an Internet-diffused environment by government, there was a reduction in corruption (Kim et al., 2009; Mistry & Jalal, 2012), as well as an improvement in bureaucratic processes in the public sector (Sheryazdanova & Butterfield, 2017). Typically, works of IS scholars (e.g., Brito et al., 2015; Neupane et al., 2012; Neupane et al., 2014; Vaidya & Neupane, 2014) have shown how e-government systems can serve as an anti-corruption strategy. Such studies also have found that the use of such systems has been effective in reducing the operational cost of running government (Sheryazdanova & Butterfield, 2017) and checkmating bureaucratic corruptions (Schopf, 2017). The online procedures’ enhancement for civil applications (OPEN), which was adopted by the Seoul Metropolitan Government in particular, has made a positive impact on enhancing administrative processes, transparency, and the reduction of corruption (Kim et al., 2009). Thus, the implementation of e-government systems can be effective, especially with strong leadership and political will, as in the case of several IS implementations reported in the literature (Neupane et al., 2012; Schopf, 2017;

Sheryazdanova & Butterfield, 2017; Vaidya & Neupane, 2014). We thus state the following proposition:

P10: The adoption of an e-government strategy will reduce the public sector corruption in the developing economies of sub-Saharan Africa.

The adoption of the various anti-corruption strategies in their individual capacities may not necessarily bring about the curbing of corruption in the developing economies of sub-Saharan Africa (Asorwoe, 2014; Linde & Karlsson, 2013). This probably is due to uncertainties and unpredictable “implementations of anti-corruption initiatives or due to significant gaps between dominant cultures and subcultures in government and society” (Kim, 2013, p. 2). Thus, studies (e.g., Martinez, 2012; Pathak et al., 2010; Saxena, 2017; Zhao et al., 2017) that harness the role of technologies on public sector corruption across different contexts have noted conflicting results. For example, Zhao et al. (2017) looked at the effects of e-government measures and perception indexes on curbing corruption perceptions. They found that the effect of e-government measures is greater in countries with lower levels of uncertainty avoidance and power distance cultures. In another view, not all investments in transparency and accountability efforts via the adoption of e-government systems could be effective in combating corruption (Basyal et al., 2018; Bhattacharjee & Shrivastava, 2018). For instance, the users of Digital India, an e-government system initiative in India, perceived that corruption remains despite the huge investment in the technology. This could be the result of government inefficiency, nepotism, favoritism, and opaqueness of the procurement process (Saxena, 2017). Thus, in order to strengthen the anti-corruption efforts of the government, researchers have advocated for the combined efforts of IT anti-corruption strategies alongside the existing traditional anti-corruption strategies (Garcia-Murillo, 2013; Kim, 2013; Kim et al., 2009; Shim & Eom, 2008, 2009; Zhao & Xu, 2015). Empirically, the mediating effects of political, governmental, economic, and socio-cultural anti-corruption strategies can shape e-government measures and perception indexes, the adoption of e-government systems, and use of social media technologies in a country (Krishnan & Teo, 2012a, 2012b). Such strategies may complement each other in shaping the maturity of e-government in a country toward reducing corruption (Krishnan et al., 2012). As the role of digitalization in government is strengthened with high ethical and professional bureaucrats, anti-corruption efforts might be more effective in curbing public sector corruption in the developing economies of the sub-Saharan Africa. Based on this discussion, we formulate the following proposition:

P11: Synergy arising from the complementarity effort of traditional anti-corruption strategies (i.e., political, governmental, economic, and socio-cultural), and IT anti-corruption strategies (adoption of e-government systems, social media technologies, Internet diffusion, and e-government measures and perception indexes) will be more effective in curbing the public sector corruption in the developing economies of sub-Saharan Africa.

IS researchers have cautioned, however, that the adoption of e-government systems alone may not be instrumental in curbing public sector corruption (Kim, 2013; Shrivastava & Bhattacharjee, 2015). This is because adoption of e-government systems can provide opportunities for corrupt bureaucrats to misuse such systems for personal gains (Hutchings & Jorna, 2015; Kim, 2013). Recently, IS researchers have provided evidence to show that the public sector e-government systems have been misused for corrupt practices (Heeks, 1998, 1999; Hutchings & Jorna, 2015; Inuwa, Ononiwu, Kah, & Quaye, 2019). Such a

misuse can take the shape of occupational fraud (e.g., Cappelli, Moore, & Trzeciak, 2012; Dhillon, 1999; ReSpa, 2013; Willison, Lowry, & Paternoster, 2018), deliberate misuse of IS resources, and criminal policy violations (D'Arcy & Hovav, 2009; Hu, Xu, Dinev, & Ling, 2011; Straub, 1990), as well as software piracy (e.g., D'Arcy & Hovav, 2007; Lowry, Zhang, & Wu, 2017; Peace, Galletta, & Thong, 2003). It also can take the shape of insertion of malicious codes (Hutchings & Jorna, 2015; Lee, Lee, & Yoo, 2004), purposeful leaking of confidential data (Hovav, 2017; Hu et al., 2011; Smith & Jorna, 2011; Willison et al., 2018), theft and embezzlement (Hutchings & Jorna, 2015; Shaw & Stock, 2011), and cover-up of mistakes in computer systems (Dhillon & Moores, 2001). Espionage (Shaw & Stock, 2011; Shropshire, 2009), sabotage (e.g., creating backdoor accounts to syphon money) (Shropshire, 2009), and committing intentional errors (e.g., Lowry, Posey, Bennett, & Roberts, 2015; Posey, Bennett, & Roberts, 2011) are also considered as misuse of e-government systems for corrupt practices. Thus, it is important to study the misuse of IS because such “criminal behaviors can be particularly [more] damaging to organizations with heavy consequences . . .” (Cappelli et al., 2012; Willison & Lowry, 2018, p. 93). Such damages manifest in the form of reputational damage, harm to individuals, and even threats to national security and economies (Cappelli et al., 2012). As such, there is a need for “greater focus in the literature” (Willison & Lowry, 2018, p. 93) in future research. We thus state the last proposition as follows:

P12: The adoption of an e-government strategy will give rise to the misuse of IS for corrupt practices in the public sector in the developing economies of sub-Saharan Africa.

A Framework for Investigating the Interaction of the Anti-Corruption Strategies and Public Sector Corruption

In pursuit of curbing corruption in the public sector, we create synergy among the various dimensions of anti-corruption strategies and public sector corruption. We identified four dimensions that capture the extent to which the public sector corruption can be mitigated; in addition, one dimension that captures IT as a vehicle that enhances corrupt practices in the public sector. Following Roberts et al. (2012), we arranged such dimensions into three thematic categories – traditional strategies, transparency and accountability strategies, and IT anti-corruption strategies, as shown in Figure 7.

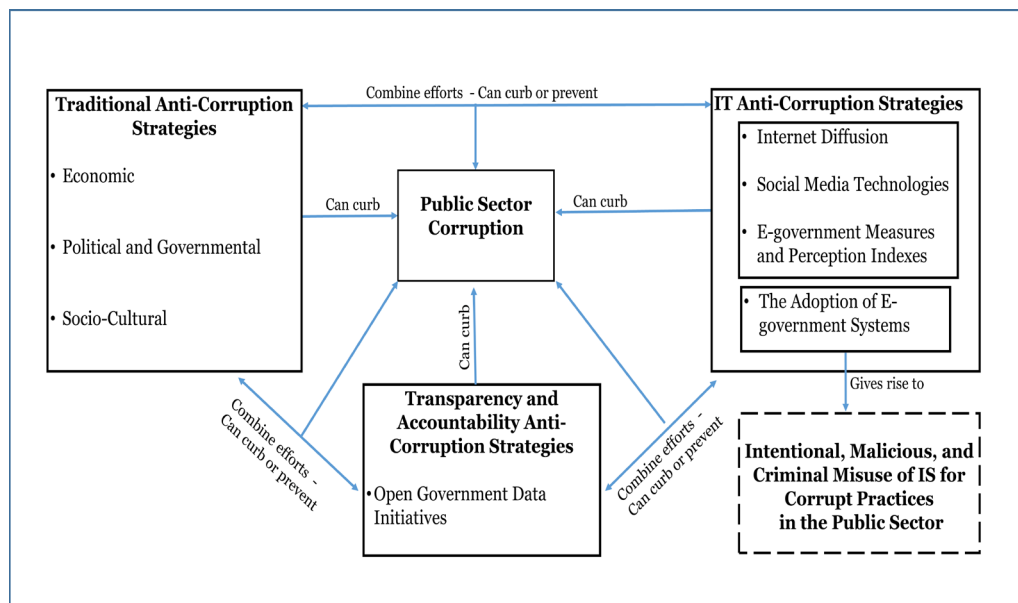


Figure 7. The Relationships between the Dimensions of Anti-Corruption Strategies and Public Sector Corruption

DISCUSSION

In this study, we posed the core research question of “*How do the traditional and IT anti-corruption strategies intertwine to curb public sector corruption?*” In response to the research question, we drew on a systematic literature review as guided by IS scholars (e.g., Mahdavi et al., 2013; Okoli & Schabram, 2010; Schryen, 2013). Following such a guideline, we developed three dimensional strategies for curbing corruptions in the public sector: (1) traditional anti-corruption, (2) IT anti-corruption, and, (3) transparency and accountability. Such dimensions encapsulate various strategies in their respective domains/categories theorized to curb public sector corruption. Following Roberts et al. (2012), we then arranged the dimensions into a theoretical framework, having seen their relations from the data patterns that were gleaned from literature. Thus, we theorized the relationships between the dimensions of anti-corruption strategies and their collective and individual effects on public sector corruption. Based on our theorization, we developed twelve propositions due to the synergistic effects seen to influence public sector corruption.

We reiterate the fact that the systematic literature review has assisted us in identifying the concepts around the various anti-corruption strategies that we know. However, despite the inconsistencies of our findings on anti-corruption strategies, when seen from an isolated point of view, the review suggested that interactions among the concepts could exist under each thematic dimension. Thus, we argued that such thematic dimensions and their relationships could explain how we can curb public sector corruption. The strength of our argument is derived from over 90 papers that we synthesized from literature that have been published in the past 10 years (2008-2018). Moreover, our methodology has demonstrated the rigor attached to the concept-centric approach of Webster and Watson (2002), when integrated with the thematic analysis of Braun and Clarke (2006). Based on our findings, the trend showed an undulating interest in research within the domain of anti-corruption strategies. Consequently, there is a considerable increase in research from one study in 2008 to sixteen studies in 2017 (highest peak). Since 2014, there has been a decreasing interest in studies, which resulted in only six studies in 2016. The results further showed that there were more published journal articles (more than two-thirds of all the reviewed studies) when compared with the published articles from conferences, reports, and books/book sections. With regard to the method used, the results showed that the number of studies that used the qualitative methods were slightly higher than those that used a quantitative method. Similarly, the distribution of the studies we analyzed across countries, which were guided by the overarching themes, revealed that over 50% of the studies used the panel data. Such data stemmed from the annual or quarterly reports of the transparency international (e.g., corruption perception index) and World Bank (e.g., world development indicator), among others, from different countries.

Our findings also suggest that there are things that require further investigation, especially in the case of IT anti-corruption strategies. Such strategies have been misused for corrupt purposes, especially in the context of e-government systems’ adoption in the public sectors and that has constituted a new stream of IS research worthy to be investigated further (Hutchings & Jorna, 2015; Inuwa et al., 2019; Smith & Jorna, 2011). Prior to this study, we have always known that IT or e-government systems were usually adopted (implementation and use) for anti-corruption purposes, due to the transparency and accountability affordance of IT/IS in the public sectors globally. However, the introduction of IT/IS anti-corruption initiatives via e-government systems, in the developing economies of sub-Saharan Africa and in developed countries, has given rise to another form of corruption—misuse of IS for corrupt practices in the public sector (Heeks, 1999, 2002, 2003; Hutchings & Jorna, 2015; Inuwa et al., 2019; Smith & Jorna, 2011). Bureaucrats leverage their technical expertise to foster corruption, using the adopted e-

government systems in the public sector (Hutchings & Jorna, 2015; Inuwa et al., 2019). There were other forms of IS misuse identified in the literature (Cappelli et al., 2012; Willison & Lowry, 2018), but our focus is on the internal, malicious, and criminal misuse of IS for corrupt practices in the public sector (Inuwa et al., 2019).

CONCLUSION

The aim of this study was to provide an understanding of how the traditional and IT anti-corruption strategies intertwine to curb public sector corruption. Our study fulfills this aim in two ways: (1) by conducting a systematic literature review and synthesis of the extant body of research on anti-corruption strategies; and (2) by developing a theoretical framework, which could be used to conjecture theories that could be tested in future research. Our literature review revealed that research in the area to date has focused on the traditional, IT, transparency, and accountability anti-corruption strategies in an isolated manner, but none has focused on the interactions of such strategies to curb public sector corruption. In addressing this major research gap, our synthesized theoretical framework provides an integrative view of how such anti-corruption strategies and their associated concepts could interact to curb public sector corruption. Besides, the framework addresses other important research gaps, such as how the adopted e-government systems, as part of IT anti-corruption strategy, can positively influence misuse of IS for corrupt practices. In addition to offering novel research opportunities within the IS field, we believe that our framework can also inspire future researchers to adopt the model in developing theory that could later be tested empirically in the context of public sector corruption in the developing economies of sub-Saharan Africa.

REFERENCES

- Abu-Shanab, E. A., Harb, Y. A., & Al-Zoubi, S. Y. (2013). E-government as an anti-corruption tool: Citizens perceptions. *International Journal of Electronic Governance*, 6(3), 232-248. <https://doi.org/10.1504/IJEG.2013.058410>
- Addo, A. (2018). Controlling government corruption through IT: An opportunity theory perspective. In *39th International Conference on Information Systems. (ICIS 2018)*. Association for Information Systems.
- Altayar, M. S. (2018). Motivations for open data adoption: An institutional theory perspective. *Government Information Quarterly*, 35(4), 633-643. <https://doi.org/10.1016/j.giq.2018.09.006>
- Amagoh, F. (2016). Determinants of e-government diffusion in Nigeria: An examination of theoretical models. *Information Development*, 32(4), 1137-1154. <https://doi.org/10.1177/0266666915593330>
- Andersen, T. B. (2009). E-government as an anti-corruption strategy. *Information Economics and Policy*, 21(3) 201-210. <https://doi.org/10.1016/j.infoecopol.2008.11.003>
- Andersen, T. B., Bentzen, J., Dalgaard, C.-J., & Selaya, P. (2011). Does the Internet reduce corruption? Evidence from US states and across countries. *The World Bank Economic Review*, 25(3) 387-417. <https://doi.org/10.1093/wber/lhr025>
- Angel, A., & Bates, B. (2014). Terministic screens of corruption: A cluster analysis of Colombian radio conversations. *The Journal of Kenneth Burke*, 10(1).
- Arpit, B. (2012). E-government and social media as openness and anti-corruption strategy. *Research Journal of Management Sciences*, 1(1), 48-52.
- Askari, H., Rehman, S. S., & Arfaa, N. (2010). Corruption and its manifestation in the Persian Gulf. Edward Elgar Publishing.
- Asogwa, B. E. (2013). Electronic government as a paradigm shift for efficient public services. *Electronic Government, an International Journal*, 31(1), 141-159. <https://doi.org/10.1108/07378831311303985>
- Asorwoe, E. (2014). Can e-government mitigate administrative corruption? An empirical study into the potential role of e-government in eradicating administrative corruption in sub-saharan Africa. *Global Journal of Interdisciplinary Social Sciences*, 3(4), 41-47.

- Basyal, D. K., Poudyal, N., & Seo, J.-W. (2018). Does E-government reduce corruption? Evidence from a heterogeneous panel data model. *Transforming Government: People, Process and Policy*, 12(2), 134-154. <https://doi.org/10.1108/TG-12-2017-0073>
- Beecham, S., Baddoo, N., Hall, T., Robinson, H., & Sharp, H. (2008). Motivation in Software Engineering: A systematic literature review. *Information and software technology*, 50(9-10), 860-878. <https://doi.org/10.1016/j.infsof.2007.09.004>
- Bekri, D., Dunn, B., Oguzertem, I., Su, Y., & Upreti, S. (2011). *Harnessing social media tools to fight corruption*. (Masters) Department of international development, London School of Economics.
- Belgrave, L. L., & Seide, K. (2019). Coding for Grounded Theory. In A. Bryant & K. Charmaz (Eds.), *The SAGE Handbook of Current Developments in Grounded Theory*, Thousand Oaks. <https://doi.org/10.4135/9781526485656.n10>
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010a). Crowd-sourcing transparency: ICTs, social media, and government transparency initiatives. *Proceedings of the Eleventh Annual International Conference on Digital Government Research* (pp. 51-58). ACM press.
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010b). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government Information Quarterly*, 27(3) 264-271. <https://doi.org/10.4135/9781526485656.n10>
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2012). Promoting transparency and accountability through ICTs, social media, and collaborative e-government. *Transforming Government: People, Process and Policy*, 6(1), 78-91. <https://doi.org/10.1108/17506161211214831>
- Bhattacharjee, A., & Shrivastava, U. (2018). The effects of ICT use and ICT Laws on corruption: A general deterrence theory perspective. *Government Information Quarterly*, 35(4), 703-712. <https://doi.org/10.1016/j.giq.2018.07.006>
- Bhuiyan, S. H. (2011). Modernizing Bangladesh public administration through e-governance: Benefits and challenges. *Government Information Quarterly*, 28(1), 54-65. <https://doi.org/10.1016/j.giq.2010.04.006>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Brito, d. S. K., Costa, M. A. d. S., Garcia, V. C., & Meira, S. R. d. L. (2015). Assessing the benefits of open government data: The case of Meu congresso nacional in Brazilian elections 2014. *Proceedings of the Sixteenth Annual International Conference on Digital Government Research* (pp. 89-96). ACM press.
- Cappelli, D. M., Moore, A. P., & Trzeciak, R. F. (2012). *The CERT guide to insider threats: How to prevent, detect, and respond to information technology crimes (Theft, Sabotage, Fraud)*. Addison-Wesley.
- Cecez-Kecmanovic, D., Galliers, R. D., Henfridsson, O., Newell, S., & Vidgen, R. (2014). The sociomateriality of information systems: Current status, future directions. *MIS Quarterly*, 38(3), 809-830. <https://doi.org/10.25300/MISQ/2014/38:3.3>
- Chatfield, A., & Brajawidagda, U. (2013). Political will and strategic use of YouTube to advancing government transparency: An analysis of Jakarta Government-Generated YouTube Videos. In M. A. Wimmer, M. Janssen, & H. J. Scholl (Eds.), *Proceedings of the Twelveth IFIP WG 8.5 International Conference* (pp. 26-37). Springer.
- Chêne, M. (2016). Literature review: The use of ICTs in the fight against corruption. <https://www.u4.no/publications/literature-review-the-use-of-icts-in-the-fight-against-corruption.pdf>
- Cordis, A. S., & Warren, P. L. (2014). Sunshine as disinfectant: The effect of state Freedom of Information Act laws on public corruption. *Journal of Public Economics*, 115, 18-36. <https://doi.org/10.1016/j.jpubeco.2014.03.010>
- Cox, M. (2014). Conundrums in benchmarking e-government capabilities? Perspectives on evaluating European usage and transparency. *Electronic Journal of e-Government*, 12(2), 169-177.
- D'Arcy, J., & Hovav, A. (2007). Deterring internal information systems misuse. *Communications of the ACM*, 50(10), 113-117. <https://doi.org/10.1145/1290958.1290971>
- D'Arcy, J., & Hovav, A. (2009). Does one size fit all? Examining the differential effects of IS security countermeasures. *Journal of Business Ethics*, 89(1), 59-71. <https://doi.org/10.1007/s10551-008-9909-7>
- Dhillon, G. (1999). Managing and controlling computer misuse. *Information Management & Computer Security*, 7(4), 171-175.

- Dhillon, G., & Moores, S. (2001). Computer crimes: Theorizing about the enemy within. *Computers & Security*, 20(8), 715-723. [https://doi.org/10.1016/S0167-4048\(01\)00813-6](https://doi.org/10.1016/S0167-4048(01)00813-6)
- Disch, A., Vigeland, E., Sundet, G., & Gibson, S. (2009). Anti-corruption approaches: A literature review. https://www.sida.se/contentassets/3f5c8afd51a6414d9f6c8f8425fb935b/anti-corruption-approaches-a-literature-review_3153.pdf
- Ear-Dupuy, H., & Serrat, O. (2014). Fighting corruption with ICT: Strengthening civil society's role. Asian Development Bank. <http://digitalcommons.ilr.cornell.edu/intl/408>
- Elbahnasawy, N. G. (2014). E-government, Internet adoption, and corruption: An empirical investigation. *World Development*, 57(xx), 114-126. <http://dx.doi.org/10.1016/j.worlddev.2013.12.005>
- Elbahnasawy, N. G., & Revier, C. F. (2012). The determinants of corruption: Cross country panel data analysis. *The Developing Economies*, 50(4), 311-333. <https://doi.org/10.1111/j.1746-1049.2012.00177.x>
- Enikolopov, R., Petrova, M., & Sonin, K. (2018). Social media and corruption. *American Economic Journal: Applied Economics*, 10(1), 150-174. <https://doi.org/10.1257/app.20160089>
- Essien, D. E. (2017). Navigating the nexus between social media, political scandal, and good governance in Nigeria: Its ethical implications. In D. Kamil & Ç.-D. Derya (Eds.), *Political scandal, corruption, and legitimacy in the age of social media*. IGI Global. <https://doi.org/10.4018/978-1-5225-2019-1.ch007>
- Ewi, M. (2018). Africa loses \$148 billion to corruption and \$2 trillion in money laundering a year: Time to end financial crime. <https://www.zambianobserver.com/africa-loses-148-billion-to-corruption-and-2-trillion-in-money-laundering-a-year-time-to-end-financial-crime/>
- Fabayo, J., Posu, S., & Obisanya, A. (2011). Corruption and the investment climate in Nigeria. *Journal of Economic and Sustainable Development*, 2(4), 10-16.
- Farzanegan, M. R., & Witthuhn, S. (2017). Corruption and political stability: Does the youth bulge matter? *European Journal of Political Economy*, 49, 47-70. <https://doi.org/10.1016/j.ejpoleco.2016.12.007>
- Fischer, G. S., Righi, R. D. R., Rodrigues, V. F., & Costa, C. A. D. (2019). A systematic literature review of data forecast and internet of things on the e-health landscape. *International Journal of Computational Medicine and Healthcare*, 1(1), 34-58. <https://doi.org/10.1504/IJCMH.2019.104359>
- Fjelde, H., & Hegre, H. (2014). Political corruption and institutional stability. *Studies in Comparative International Development*, 49(3), 267-299. <https://doi.org/10.1007/s12116-014-9155-1>
- Garcia-Murillo, M. (2009). The effect of Internet access on government corruption. *Electronic Government, an International Journal*, 7(1), 22-40.
- Garcia-Murillo, M. (2013). Does a government web presence reduce perceptions of corruption? *Information Technology for Development*, 19(2), 151-175. <https://doi.org/10.1080/02681102.2012.751574>
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15-31. <https://doi.org/10.1177/1094428112452151>
- Global Financial Integrity. (2017). *Illicit financial flows to and from developing countries: 2005-2014*. https://www.gfintegrity.org/wp-content/uploads/2017/05/GFI-IFF-Report-2017_final.pdf
- Goel, R. K., Nelson, M. A., & Naretta, M. A. (2012). The Internet as an indicator of corruption awareness. *European Journal of Political Economy*, 28(1), 64-75. <https://doi.org/10.1016/j.ejpoleco.2011.08.003>
- Gonzalez-Zapata, F., & Heeks, R. (2015). The multiple meanings of open government data: Understanding different stakeholders and their perspectives. *Government Information Quarterly*, 32(4), 441-452. <https://doi.org/10.1016/j.giq.2015.09.001>
- Granickas, K. (2014). *Open data as a tool to fight corruption*. https://www.europeandataportal.eu/sites/default/files/library/201404_open_data_as_a_tool_to_fight_corruption.pdf
- Grimmelikhuijsen, S. G. (2010). Transparency of public decision making: Towards trust in local government? *Policy & Internet*, 2(1), 5-35. <https://doi.org/10.2202/1944-2866.1024>
- Grönlund, Å. (2010). Using ICT to combat corruption: Tools, methods and results. In C. Strand (Ed.), *Increasing transparency and fighting corruption through ICT: Empowering people and communities, SPIDER ICT4D series no. 3* (pp. 7-27). Universitetsservice US-AB.

- Heacock, R., & Sasaki, D. (2010). ICT4 transparency in Sub-Saharan Africa. In C. Stand (Ed.), *Increasing transparency and fighting corruption through ICT: Empowering people and communities*, SPIDER ICT4D series no. 3 (pp. 33–43). Universitesservice US-AB.
- Heeks, R. (1998). Information technology and public sector corruption. In Institute for Development Policy and Management. University of Manchester. https://www.researchgate.net/profile/Richard_Heeks/publication/2419271_Information_Systems_for_Public_Sector_Management/links/00b4953cd3f5dcaacd000000.pdf
- Heeks, R. (1999). Information technology and the management of corruption. *Development in Practice*, 9(1/2), 184–189. <https://doi.org/10.1080/09614529953359>
- Heeks, R. (2002). Information systems and developing countries: Failure, success, and local improvisations. *The Information Society*, 18(2), 101–112. <https://doi.org/10.1080/01972240290075039>
- Heeks, R. (2003). Most e-government-for-development projects fail: How can risks be reduced? (Vol. 14), Institute for Development Policy and Management. University of Manchester. <https://doi.org/10.2139/ssrn.3540052>
- Hellström, J. (2010). Mobile Technology as a means to fight corruption in East Africa. In C. Strand (Ed.), *Increasing transparency and fighting corruption through ICT: Empowering people and communities*, SPIDER ICT4D Series no. 3. (pp. 47–66). Universitesservice US-AB
- Hoffmann, L. K., & Patel, R. N. (2017). Collective action on corruption in Nigeria: A social norms approach to connecting society and institutions. Chatham House.
- Hossain, E., Babar, M. A., & Paik, H.-y. (2009). Using scrum in global software development: A systematic literature review. *Proceedings of the Fourth IEEE International Conference on Global Software Engineering* (pp. 175–184). IEEE. <https://doi.org/10.1109/ICGSE.2009.25>
- Hossan, C., & Bartram, T. (2010). The battle against corruption and inefficiency with the help of eGovernment in Bangladesh. *Electronic Government, an International Journal*, 7(1), 89–100. <https://doi.org/10.1504/EG.2010.029893>
- Hovav, A. (2017). How espoused culture influences misuse intention: A micro-institutional theory perspective. In *The Proceedings of the Fiftieth Hawaii International Conference on System Sciences* (pp. 6031–6040). Association for Information Systems. <https://doi.org/10.24251/HICSS.2017.721>
- Hu, Q., Xu, Z., Dinev, T., & Ling, H. (2011). Does deterrence work in reducing information security policy abuse by employees? *Communications of the ACM*, 54(6), 54–60. <https://doi.org/10.1145/1953122.1953142>
- Hutchings, A., & Jorna, P. (2015). Misuse of information and communications technology within the public sector (470). Australian Institute of Criminology. <http://aic.gov.au>
- Inuwa, I., Ononiwu, C., Kah, M. M. O., & Quaye, A. K. M. (2019). Mechanisms fostering the misuse of information systems for corrupt practices in the Nigerian public sector. In P. Nielsen and H. C. Kimaro (Eds.), *ICT4D 2019, IFIP AICT 552* (pp. 122–134). Springer Nature. https://doi.org/10.1007/978-3-030-19115-3_11
- Jetzek, T., & Avital, M. (2013). The generative mechanisms of open government data. In *The Proceeding of the European Conference on Information Systems* (pp. 1–13). Association for Information Systems.
- Jetzek, T. H. (2015). The sustainable value of open government data: Uncovering the generative mechanisms of open data through a mixed methods approach (PhD Series, No. 24). Copenhagen Business School. <http://hdl.handle.net/10398/9183>
- Jha, C. K. (2017). Information control, transparency, and social media: Implications for corruption. In K. Demirhan & D. Çakır-Demirhan (Eds.), *Political scandal, corruption, and legitimacy in the age of social media* (pp. 51–75). IGI Global. <https://doi.org/10.4018/978-1-5225-2019-1.ch003>
- Jha, C. K., & Sarangi, S. (2017). Does social media reduce corruption? *Information Economics and Policy*, 39 60–71. <https://doi.org/10.1016/j.infoecopol.2017.04.001>
- Jin, S., & Cho, C. M. (2015). Is ICT a new essential for national economic growth in an information society? *Government Information Quarterly*, 32(3), 253–260. <https://doi.org/10.1016/j.giq.2015.04.007>
- Kanyam, D. A., Kostandini, G., & Ferreira, S. (2017). The mobile phone revolution: Have mobile phones and the Internet reduced corruption in Sub-Saharan Africa? *World Development*, 99, 271–284. <https://doi.org/10.1016/j.worlddev.2017.05.022>

- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). Governance matters VIII: Aggregate and individual governance indicators 1996-2008: The World Bank. <https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-4978>
<https://doi.org/10.1596/1813-9450-4978>
- Kazeem, Y. (2017). Africa is losing billions annually to illegal capital flight. <https://qz.com/africa/975528/africa-is-losing-billions-annually-to-illegal-capital-flight/>:
- Kim, C. K. (2013). Anti-corruption initiatives and e-government: A cross-national study. *Public Organization Review*, 14,(3), 385-396. <https://doi.org/10.1007/s11115-013-0223-1>
- Kim, S., Kim, H. J., & Lee, H. (2009). An institutional analysis of an e-government system for anti-corruption: The case of OPEN. *Government Information Quarterly*, 26,(1), 42-50. <https://doi.org/10.1016/j.giq.2008.09.002>
- Kock, N., & Gaskins, L. (2013). Internet diffusion and government corruption in latin America and sub-saharan Africa. In *Proceedings of the nineteenth Americas Conference on Information Systems* (pp. 1-8). Association for Information Systems.
- Kock, N., & Gaskins, L. (2014). The mediating role of voice and accountability in the relationship between Internet diffusion and government corruption in Latin America and sub-saharan Africa. *Information Technology for Development*, 20(1), 23-43. <https://doi.org/10.1080/02681102.2013.832129>
- Korkpoe, C. H. (2011). The effects of ICT pervasiveness on administrative corruption. In the *Proceedings of the 2011 Americas Conference on Information Systems* (pp. 1-23). Association for Information Systems.
http://aisel.aisnet.org/amcis2011_submissions/102
- Krishnan, S., & Teo, T. S. H. (2012a). Does governance matter? Investigating the impact of governance on e-government maturity. In the *Proceedings of the thirty-third International Conference on Information Systems* (pp. 1-20). Association for Information Systems.
- Krishnan, S., & Teo, T. S. H. (2012b). Moderating effects of governance on information infrastructure and e-government development. *Journal of the American Society for Information Science & Technology*, 63(10), 1929-1946.
<https://doi.org/10.1002/asi.22660>
- Krishnan, S., Teo, T. S. H., & Lim, V. K. G. (2012). E-government maturity, corruption, and eco-efficiency. In *The Proceedings of the Pacific Asia Conference on Information Systems* (pp. 1-18). Association for Information Systems. <http://aisel.aisnet.org/pacis2012/49>
- Lee, M.-H., & Lio, M.-C. (2016). The impact of information and communication technology on public governance and corruption in China. *Information Development*, 32(2), 127-141. <https://doi.org/10.1177/0266666914529293>
- Lee, S. M., Lee, S.-G., & Yoo, S. (2004). An integrative model of computer abuse based on social control and general deterrence theories. *Information & Management*, 41(6), 707-718. <https://doi.org/10.1016/j.im.2003.08.008>
- Leidner, D. E., & Kayworth, T. (2006). A review of culture in information systems research: Toward a theory of information technology culture conflict. *MIS quarterly*, 30(2), 357-399. <https://doi.org/10.2307/25148735>
- Liedong, T. A. (2017). Combating corruption in Africa through institutional entrepreneurship: Peering in from business-government relations. *Africa Journal of Management*, 3(3-4), 310-327.
<https://doi.org/10.1080/23322373.2017.1379825>
- Linde, J., & Karlsson, M. (2013). The dictator's new clothes: The relationship between e-participation and quality of government in non-democratic regimes. *International Journal of Public Administration*, 36(4), 269-281.
<https://doi.org/10.1080/01900692.2012.757619>
- Linhartová, V. (2017). The role of e-government in mitigating corruption. Scientific papers of the University of Pardubice, (120). <http://hdl.handle.net/10195/67932>
- Lio, M.-C., Liu, M.-C., & Ou, Y.-P. (2011). Can the Internet reduce corruption? A cross-country study based on dynamic panel data models. *Government Information Quarterly*, 28(1), 47-53. <https://doi.org/10.1016/j.giq.2010.01.005>
- Lowry, P. B., Posey, C., Bennett, R. J., & Roberts, T. L. (2015). Leveraging fairness and reactance theories to deter reactive computer abuse following enhanced organisational information security policies: An empirical study of the influence of counterfactual reasoning and organisational trust: Using fairness and reactance theories to decrease reactive computer abuse. *Information Systems Journal*, 25(3), 193-273. <https://doi.org/10.1016/j.chb.2016.11.015>
- Lowry, P. B., Zhang, J., & Wu, T. (2017). Nature or nurture? A meta-analysis of the factors that maximize the prediction of digital piracy by using social cognitive theory as a framework. *Computers in Human Behavior*, 68, 104-120.
<https://doi.org/10.1016/j.chb.2016.11.015>

- Lumumba, P. L. O. (2014). Corruption: The bane of Africa. In E. Nduku & J. Tenamwenye (Eds.), *Corruption in Africa: A threat to justice and sustainable peace*. Globethics.net.
- Ma, L. (2017). Government website, social media, and citizens' perceptions of corruption: Evidence from Chinese cities. In K. Demirhan & D. Çakır-Demirhan (Eds.), *Political scandal, corruption, and legitimacy in the age of social media* (pp.185-204). IGI Global. <https://doi.org/10.4018/978-1-5225-2019-1.ch008>
- Máchová, R. (2017). Measuring the effects of open data on the level of corruption. In *Proceedings of the Twenty-first International Conference Current Trends in Public Sector Research*. https://www.researchgate.net/publication/312918292_Measuring_the_Effects_of_Open_Data_on_the_Level_of_Corruption
- Máchová, R., Volejnikova, J., & Lnenicka, M. (2018). Impact of e-government development on the level of corruption: Measuring the effects of related indices in time and dimensions. *Review of Economic Perspectives*, 18(2), 99-121. <https://doi.org/10.2478/revecp-2018-0006>
- Mahdavi, H. S., Galster, M., & Avgeriou, P. (2013). Variability in quality attributes of service-based software systems: A systematic literature review. *Information and Software Technology*, 55(2), 320-343. <https://doi.org/10.1016/j.infsof.2012.08.010>
- Manrique, C. G., & Manrique, G. G. (2017). Social media's role in alleviating political corruption and scandals: The Philippines during and after the Marcos regime. In K. Demirhan & D. Çakır-Demirhan (Eds.), *Political scandal, corruption, and legitimacy in the age of social media* (pp. 205-222). IGI Global. <https://doi.org/10.4018/978-1-5225-2019-1.ch009>
- Martinez, T. M. (2012). The dynamics between transparency, accountability, and e-governance: A case study of Brazil (MSc). London School of Economics and Political Science.
- Martinez, T. M. (2014). Combating corruption through transparency: How have e-government investments affected levels of accountability in Brazil?. In *The Proceedings of the Eighth International Conference on Theory and Practice of Electronic Governance* (pp. 528-531). ACM Press. <https://doi.org/10.1145/2691195.2691271>
- Martins, J., Fernandes, B., Rohman, I., & Veiga, L. (2018). The war on corruption: The role of electronic government. In P. Parycek et al. (Eds.), *Proceedings of the Seventeenth IFIP WG 8.5 International Conference, Electronic Government* (pp. 98-109). Springer Nature. https://doi.org/10.1007/978-3-319-98690-6_9
- Mimbi, L., & Bankole, F. O. (2016). Factors influencing ICT service efficiency in curbing corruption in Africa: A bootstrap approach. In *The Proceedings of the South African Institute of Computer Scientists and Information Technologists* (pp. 1-10). ACM Press. <https://doi.org/10.1145/2987491.2987504>
- Mistry, J. J., & Jalal, A. (2012). An empirical analysis of the relationship between e-government and corruption. *The International Journal of Digital Accounting Research*, 12(6), 145–176. https://doi.org/10.4192/1577-8517-v12_6
- Mungai, P. W. (2018). Causal mechanisms and institutionalisation of open government data in Kenya. *The Electronic Journal of Information Systems in Developing Countries*, 84(6). <https://doi.org/10.1002/isd2.12056>
- Nam, T. (2018). Examining the anti-corruption effect of e-government and the moderating effect of national culture: A cross-country study. *Government Information Quarterly*, 35(2), 273-282. <https://doi.org/10.1016/j.giq.2018.01.005>
- Neupane, A., Soar, J., & Vaidya, K. (2012). Evaluating the anti-corruption capabilities of public e-procurement in developing countries. *The Electronic Journal of Information Systems in Developing Countries*, 55(2), 1-17. <https://doi.org/10.1002/j.1681-4835.2012.tb00390.x> <https://doi.org/10.1108/TG-03-2014-0007>
- Neupane, A., Soar, J., Vaidya, K., & Yong, J. (2014). Willingness to adopt e-procurement to reduce corruption: Results of the PLS Path modeling. *Transforming Government: People, Process and Policy*, 8(4), 500-520. <https://doi.org/10.1108/TG-03-2014-0007>
- OECD. (2016). *Putting an end to corruption*. <https://www.oecd.org/corruption/putting-an-end-to-corruption.pdf>
- OEDC. (2007). *Political corruption*. <https://stats.oecd.org/glossary/detail.asp?ID=7290>
- Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, 37(43), 879-910. <https://doi.org/10.17705/1CAIS.03743>
- Okoli, C., Schabram, K. (2010). A Guide to conducting a systematic literature review of information systems research. *Sprouts: Working Papers on Information Systems*, 10(26). <http://sprouts.aisnet.org/10-26>. <https://doi.org/10.2139/ssrn.1954824>

- Oye, N. D. (2013). Reducing corruption in African developing countries: The relevance of e-governance. *Greener Journal of Social Sciences*, 3(1), 6-13. <https://doi.org/10.15580/GJSS.2013.1.103112183>
- Palvia, S., Anand, A. B., Seetharaman, P., & Verma, S. (2017). Imperatives and challenges in using e-government to combat corruption: A systematic review of literature and a holistic model. In *The Proceedings of the twenty-third Americas Conference on Information Systems* (pp.1-10). Association for Information Systems.
- Parung, G. A., Hidayanto, A. N., Sandhyaduhita, P. I., Ulo, K. L. M., & Phusavat, K. (2018). Barriers and strategies of open government data adoption using fuzzy AHP-TOPSIS. *Transforming Government: People, Process and Policy*, 12(3/4), 210-243. <https://doi.org/10.1108/TG-09-2017-0055>
- Pathak, R. D., Belwal, R., Singh, G., Naz, R., Smith, R. F. I., & Al-Zoubi, K. (2010). Citizens' perceptions of corruption and e-governance in Jordan, Ethiopia and Fiji—the need for a marketing approach. *Electronic Government, an International Journal*, 9(3), 309. <https://doi.org/10.1504/EG.2012.048005>
- Peace, A. G., Galletta, D. F., & Thong, J. Y. L. (2003). Software Piracy in the Workplace: A model and empirical test. *Journal of Management Information Systems*, 20(1), 153-177. <https://doi.org/10.1080/07421222.2003.11045759>
- Posey, C., Bennett, R. J., & Roberts, T. L. (2011). Understanding the mindset of the abusive insider: An examination of insiders' causal reasoning following internal security changes. *Computers & Security*, 30(6-7), 486-497. <https://doi.org/10.1016/j.cose.2011.05.002>
- Ravasi, D., & Phillips, N. (2011). Strategies of alignment: Organizational identity management and strategic change at Bang & Olufsen. *Strategic Organization*, 9(2), 103-135. <https://doi.org/10.1177/1476127011403453>
- ReSpa. (2013). *Abuse of information technology (IT) for corruption*. Montenegro Regional School of Public Administration. <http://www.respawed.eu>
- Roberts, N., Galluch, P. S., Dinger, M., & Grover, V. (2012). Absorptive capacity and information systems research: Review, synthesis, and directions for future research. *MIS Quarterly*, 36(2), 625-648. <https://doi.org/10.2307/41703470>
- Rowe, F. (2014). What literature review is not: Diversity, boundaries and recommendations. *European Journal of Information Systems*, 23(3), 241-255. <https://doi.org/10.1057/ejis.2014.7>
- Saxena, S. (2017). Factors influencing perceptions on corruption in public service delivery via e-government platform. *Foresight*, 19(6), 628-646. <https://doi.org/10.1108/FS-05-2017-0013>
- Saxena, S. (2018). Perception of corruption in e-government services post-launch of "Digital India": Role of demographic variables. *Digital Policy Regulation and Governance*, 20(2), 163-177. <https://doi.org/10.1108/DPRG-02-2017-0007>
- Schopf, J. C. (2017). The governance effects of Korea's leading e-Government websites. *Journal of Cases on Information Technology*, 19(2), 1-16. <https://doi.org/10.4018/JCIT.2017040101>
- Schryen, G. (2013). Revisiting IS business value research: What we already know, what we still need to know, and how we can get there. *European Journal of Information Systems*, 22(2), 139-169. <https://doi.org/10.1057/ejis.2012.45>
- Schryen, G., Benlian, A., Rowe, F., Shirley, G., Larsen, K., Petter, S., . . . Yasasin, E. (2017). Literature reviews in IS research: What can be learnt from the past and other fields? *Communications of the Association for Information Systems*, 40(1), 759-774. <https://doi.org/10.17705/1CAIS.04130>
- Schumacher, I. (2013). Political stability, corruption, and trust in politicians *Economic Modelling*, 31, 359-369. <https://doi.org/10.1016/j.econmod.2012.11.047>
- Seo, J. W., & Mehedi, H. M. G. (2016). E-government efforts against corruption in Bangladesh: What we have done and what we have to do. *International Journal of Political Science & Diplomacy*, 2(107), 1-6. <http://dx.doi.org/10.15344/ijpsd/2016/107>
- Shaw, E. D., & Stock, H. V. (2011). *Behavioral risk indicators of malicious insider theft of intellectual property: Misreading the writing on the wall* (White paper). Symantec Corporation. https://zadereyko.info/downloads/Malicious_Insider.pdf
- Sheryazdanova, G., & Butterfield, J. (2017). E-government as an anti-corruption strategy in Kazakhstan. *Journal of Information Technology & Politics*, 14(1), 83-94. <https://doi.org/10.1080/19331681.2016.1275998>
- Shim, D. C., & Eom, T. H. (2008). E-Government and anti-corruption: Empirical analysis of international data. *International Journal of Public Administration*, 31(3), 298-316. <https://doi.org/10.1080/01900690701590553>
- Shim, D. C., & Eom, T. H. (2009). Anticorruption effects of information communication and technology (ICT) and social capital. *International Review of Administrative Sciences*, 75(1), 99-116. <https://doi.org/10.1177/0020852308099508>

- Shrivastava, U., & Bhattacharjee, A. (2015). ICT as a corruption deterrent: A research note. In *The Proceedings of the International Conference on Information and Communication Technologies and Development* (pp. 1-5). ACM press. <https://doi.org/10.1145/2737856.2737864>
- Shropshire, J. (2009). A canonical analysis of intentional information security breaches by insiders. *Information Management & Computer Security*, 17(4), 296-310. <https://doi.org/10.1108/09685220910993962>
- Singh, G., Pathak, R. D., Naz, R., & Belwal, R. (2010). E-governance for improved public sector service delivery in India, Ethiopia and Fiji. *International Journal of Public Sector Management*, 23(3), 254-275. <https://doi.org/10.1108/09513551011032473>
- Smith, R. G., & Jorna, P. (2011). Corrupt misuse of information and communication technologies. In A. Graycar & R. G. Smith (Eds.), *Handbook of global research and practice in corruption* (pp. 255-281). Edward Elgar Publishing Limited.
- Sola, O. (2017). Government adoption in Nigeria and the journey so far: The end of corruption? In S. Saqib, A. B. Yasser, T. Ramayah, & I. Sardar Zafar (Eds.), *Design solutions for user-centric information systems* (pp. 44-62). IGI Global. <https://doi.org/10.4018/978-1-5225-1944-7.ch003>
- Srivastava, S. C., Teo, T. S. H., & Devaraj, S. (2016). You can't bribe a computer: Dealing with the societal challenge of corruption through ICT. *MIS Quarterly*, 40(2), 511-526. <https://doi.org/10.25300/MISQ/2016/40.2.14>
- Stamati, T., Papadopoulos, T., & Anagnostopoulos, D. (2015). Social media for openness and accountability in the public sector: Cases in the Greek context. *Government Information Quarterly*, 32(1), 12-29. <https://doi.org/10.1016/j.giq.2014.11.004>
- Strand, C. (2010). Introduction. In C. Strand (Ed.), *Increasing transparency and fighting corruption through ICT: Empowering people and communities* (pp. 1-2). Universitetservice US-AB.
- Straub, D. W. (1990). Effective IS security: An empirical study. *Information Systems Research*, 1(3), 255-276. <https://doi.org/10.1287/isre.1.3.255>
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research techniques*. Sage Publications.
- Templier, M., & Paré, G. (2017). Transparency in literature reviews: An assessment of reporting practices across review types and genres in top IS journals. *European Journal of Information Systems*, 27(5), 503-550. <https://doi.org/10.1080/0960085X.2017.1398880>
- Trindade, E. P., Hinnig, M. P. F., Moreira da Costa, E., Marques, J. S., Bastos, R. C., & Yigitcanlar, T. (2017). Sustainable development of smart cities: A systematic review of the literature. *Journal of Open Innovation: Technology, Market, and Complexity*, 3(3), 11. <https://doi.org/10.1186/s40852-017-0063-2>
- Ubaldi, B. (2013). *Open government data: Towards empirical analysis of open government data initiatives* (OECD Working Papers on Public Governance No. 22). <http://dx.doi.org/10.1787/5k46bj4f03s7-en> <https://doi.org/10.1787/5k46bj4f03s7-en>
- Uneke, O. (2010). Corruption in Africa south of the Sahara: Bureaucratic facilitator or handicap to development? *Journal of Pan African Studies*, 3(6), 111-128.
- United Nations. (2004). *United nations convention against corruption*. https://www.unodc.org/documents/brussels/UN_Convention_Against_Corruption.pdf
- United Nations. (2010). *United Nations e-government survey: Leveraging e-government at a time of financial and economic crisis*. UN Department of Economic and Social Affairs.
- Vaidya, K., & Neupane, A. (2014). Can electronic procurement and other ICT tools combat corruption in public procurement in Nepal? Skill, Knowledge, and Innovation Transfer Workshop (Sydney, Australia). https://nrm.org.au/uploads/pdfs/SKI_Australia_Proceedings_2014.pdf#page=47
- Valle-Cruz, D., Sandoval-Almazan, R., & Gil-Garcia, J. R. (2015). The effects of technology use on efficiency, transparency, and corruption in municipal governments: Preliminary results from a citizen perspective. In *The Proceedings of the Sixteenth Annual International Conference on Digital Government Research* (pp. 1-7). ACM Press. <https://doi.org/10.1145/2757401.2757412>

- Valle-Cruz, D., Sandoval-Almazan, R., & Gil-Garcia, J. R. (2016). Citizens' perceptions of the impact of information technology use on transparency, efficiency and corruption in local governments. *Information Polity*, 21(3), 321-334. <https://doi.org/10.3233/IP-160393>
- Walle, Y. M., Janowski, T., & Estevez, E. (2018). Fighting administrative corruption with digital government in Sub-Saharan Africa. In *The Proceedings of the Eighteenth European Conference on Digital Government (ECDG 18)*. Association for Information Systems.
- Waller, L. G. (2017). There is an app for that too: Citizen-centric approach to combating corruption in the digital age through the use of ICTs. In *Political scandal, corruption, and legitimacy in the age of social media* (pp. 76-100). IGI Global. <https://doi.org/10.4018/978-1-5225-2019-1.ch004>
- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, 26(2), xiii-xxiii.
- Wickberg, S. (2013). *Technological innovations to identify and reduce corruption*. Transparency International. <https://www.u4.no/publications/technological-innovations-to-identify-and-reduce-corruption>
- Wiener, M., Mähring, M., Remus, U., & Saunders, C. S. (2016). Control configuration and control enactment in information systems projects: Review and expanded theoretical framework. *MIS Quarterly*, 40(3), 741-774.
- Willison, R., & Lowry, P. B. (2018). Disentangling the motivations for organizational insider computer abuse through the rational choice and life course perspectives. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, 49(SI), 81-102.
- Willison, R., Lowry, P. B., & Paternoster, R. (2018). A tale of two deterrents: Considering the role of absolute and restrictive deterrence to inspire new directions in behavioral and organizational security research. *Journal of the Association for Information Systems*, 19(12), 1187-1216. <https://doi.org/10.17705/1jais.00524>
- Zhao, H., Ahn, M. J., & Manoharan, A. P. (2017). E-government, corruption reduction and culture: A study based on panel data of 57 countries. In *The Proceedings of the Eighteenth Annual International Conference on Digital Government Research* (pp. 1-10). ACM Press. <https://dx.doi.org/10.1145/3085228.3085292>
- Zhao, X., & Xu, H. D. (2015). E-government and corruption: A longitudinal analysis of countries. *International Journal of Public Administration*, 38(6), 410-421. <http://dx.doi.org/10.1080/01900692.2014.942736>
- Zuiderwijk, A., & Janssen, M. (2014). The negative effects of open government data: Investigating the dark side of open data. In *The Proceedings of the fifteenth Annual International Conference on Digital Government Research* (pp. 147-152). ACM Press.