



Full length article

The role of e-government in sustainable public procurement in developing countries: A systematic literature review



Peter Adjei-Bamfo*, Theophilus Maloreh-Nyamekye, Albert Ahenkan

Department of Public Administration and Health Services Management, University of Ghana Business School, P.O. Box LG. 78, Legon, Accra, Ghana

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ABSTRACT

Despite their relatively lower national income, studies suggest that developing countries have consistently advanced their e-government structures. However, there is little knowledge on how governments' deployment of electronic and internet technologies may be leveraged to stimulate sustainable supply chain management, particularly Sustainable Public Procurement (SPP) practices. From a Systematic Literature Review (SLR), this paper affirms such allusions by scholars and reports that government deployment of electronic and internet tools indeed promotes SPP towards the bigger agenda of sustainable development (SDG 12.7). In this paper, 68 articles of heterogeneous research methods published in peer-review journals since 2001–2017 are systematically reviewed. This paper concludes that efforts in building a robust ICT infrastructure, online portals, and human capacity to use ICT offer developing countries *inter alia* an informative platform for sharing and communicating SPP requirements. E-government also facilitates a wider sample for market readiness assessment and an integrated e-procurement system towards effective SPP monitoring and evaluation. This study has significant implications for promoting sustainability in the downstream supply chain practices in public sector organizations in the developing country context.

1. Introduction

“...meeting multi-faceted sustainability challenges, governments are ... increasingly using open data and data analytics to improve accuracy in forecasting citizens' demand of public utilities or to screen for irregularities in public procurement to lower its risks” [United Nations Department of Economic and Social Affairs (UNDESA), 2014, p. 14].

As part of global efforts to promote sustainable development, public procurement practices are being reviewed in line with the United Nations sustainable development outcomes such as promoting social justice, environmental sustainability and minimising economic inequalities. Particularly in the case of business production and consumption behaviours, governments use public procurement policy to ensure that operations of suppliers are environmentally and socially friendly whilst promoting sound economic wellbeing (Kusi-Sarpong and Sarkis, 2017). This is enforced through national Sustainable Public Procurement (SPP) policies and strategies developed in accordance with national priorities. Whilst there are some prior studies on the topics, available knowledge appears fragmented.

Earlier studies (Thai, 2001; World Bank, 2012) emphasize public

procurement as major economic activities of governments, as it constitutes about 15%–20% of national revenues globally. However, these figures range 20%–70% among developing economies (World Bank, 2012). It is through this that, governments provide for their citizens several varieties of public services and goods towards national development. Notwithstanding, most governments often fail to do due diligence in the process leading to inefficiencies and risks such as hash environmental and socio-economic impacts (Walker and Brammer, 2012; Preuss, 2009), corruption (Myint, 2000; Lio et al., 2011) and legal losses. These irregularities culminate to loss of value to the citizens and impede national development. Hence, the numerous reforms observed in government purchasing practice globally.

Contemporary public procurement is used as a tool for promoting the quality of public service, good governance and sustainable development (Preuss, 2009; Osei-Kojo, 2017). International reports including that of the World Bank argues “...public procurement reform can contribute directly to improving a country's business, investment, and social environments” (World Bank, 2012, p. 6). Reports on e-government also suggest that information and communication technology (ICT) may be used to forecast demand for public utilities and to control irregularities, risks, and challenges involved in the process (United Nations Department of Economic and Social Affairs (UNDESA), 2014). Hence,

* Corresponding author.

E-mail addresses: bamfopeter@gmail.com (P. Adjei-Bamfo), tmnyamekye@ug.edu.gh (T. Maloreh-Nyamekye), aahenkan@ug.edu.gh (A. Ahenkan).

the main research question:

RQ 1. What role has e-government in promoting sustainable procurement in the public sector of developing countries?

Governments' use of ICT and the integration of environmental and socio-economic criteria into procurement practices continue to attract attention in the literature (Walker and Brammer, 2012; Hall and Purchase, 2006; Shakya, 2012; Preuss, 2009). For instance, Walker and Brammer (2012) argue that both practices have a tendency of promoting sustainable development, which has manifested in Switzerland and the United Kingdom (UK) among other developed regions (see also Kopp, 2011). However, there is a paucity of knowledge on how ICT facilitates sustainable purchasing and Supply Chain Management (SCM) practices in public sector organizations, particularly, from the developing country context (see Kusi-Sarpong and Sarkis, 2017; Walker and Brammer, 2012; Bai et al., 2017; Walker et al., 2012). This study contributes to the Virtual Special Issue on sustainable supply chains and emerging economies published in *Resources, Conservation and Recycling*. Filtering from the overarching research question, this paper addresses two other sub-questions:

RQ 2. What are the drivers of SPP in developing countries?

RQ 3. What is the state of e-government in developing countries?

Whilst question 2 examines the factors informing the adoption of SPP practices, question 3 explore the current state of the e-government literature and how its adoption has enhanced sustainable development in developing countries. This study argues that government adoption of electronic services can contribute significantly to promoting the SPP practice. A Systematic Literature Review (SLR) approach is employed to answer the above research questions. This study reviews relevant journal articles from 2001 to 2017 that focus on developing countries towards building an original and larger body of evidence (Rousseau et al., 2008; Seuring and Gold, 2012; Seuring et al., 2005).

The rest of the paper is presented as follows. Constructs of the study are foremost defined. The next section outlines the SLR methodology used to answer the research questions of this study. A nuanced report and the discussion of findings from the exhaustive SLR follows. Conclusions and implications for research and practice from the review are subsequently discussed. The last section offers directions for future research.

2. Definition of constructs and terminologies

2.1. Electronic governance

Electronic governance aims at improving information and service delivery of public sector institutions. E-governance refers to “the use of ICTs, and particularly the internet, as a tool to achieve better government” (Organization for Economic Co-operation and Development, 2003 cited in Bonsón et al., 2012, p. 123). It simply involves the use of online or several digital mediums for public services delivery and information sharing to citizens, businesses, and among its agencies. In a broader sense, Gartner (2000) defines the e-governance as a “continuous optimization of service delivery, constituency participation, and governance by transforming internal and external relationships through technology, the internet and new media” (cited in Fang, 2002, p. 3). E-governance presents an era of modernity, innovation, and flexibility towards efficient and quality public service delivery (Dunleavy et al., 2006; Osei-Kojo, 2017).

Scholars from both developed and developing economies argue that e-governance hones citizen involvement in the decision-making process and make governments more transparent, accountable and effective while enhancing the quality of service delivery (Boateng, 2013; Osei-Kojo, 2017). Similarly, Basu (2004) and Asogwa (2013) suggest that e-government offer momentous opportunities for public sector

reforms in emerging economies. Specifically, e-government may help to control public procurement risks, irregularities, and to promote favourable environmental and social outcomes termed sustainable public procurement (United Nations Department of Economic and Social Affairs (UNDESA), 2014).

2.2. Sustainable public procurement (SPP)

Since the launch of the global 10-year framework for action on sustainable consumption and production by the Johannesburg implementation plan in 2002, there has been clarion calls to consider long-term economic, social and environmental impacts of governments' procurement practices (Preuss, 2009; Walker and Brammer, 2012). These calls, which seek to promote public procurement practices that are sustainable also emphasizes the world's effort to achieving goal 12 and target 7 of the Sustainable Development Goals (SDGs) of encouraging SPP practices that are consistent with national priorities. SPP is defined as “... the act of integrating a concern for broader social and environmental impacts within procurement undertaken by government or public sector bodies” (Brammer & Walker, 2011, p.455). SPP promotes government procurement that optimizes the welfare of citizens and minimises the use of exhaustible resources in general (Witjes and Lozano, 2016). The environmental aspect of SPP is sometimes termed green procurement (see Ho et al., 2010).

This practice has become popular in the light of the major adjustments in the global corporate social responsibility (CSR) and supply chain debates (Warner and Ryall, 2001; Witjes and Lozano, 2016; Preuss, 2009). Lund-Thomsen and Costa (2011, p. 56) claim that while most public sector organizations have facilitated private sector engagement in CSR initiatives, they are now themselves examining whether “...they are abiding by socially and environmentally responsible purchasing principles in their own supply chains”. This SLR attempts to establish the role of e-government in promoting SPP in developing countries by examining prior studies.

3. Material and methods

3.1. Design

A systematic literature review approach was adopted to synthesize the existing literature to answer the research questions of this study. Thus, the study conducts an analysis of prior theoretical and empirical evidence drawn from articles published in credible peer-review journals (based on Durach et al., 2017; Seuring et al., 2005). Although exhausting, this method is also exhaustive as it provides large evidence on a phenomenon across wide settings and empirical methods whilst reducing literature biases (Denyer and Tranfield, 2009; Durach et al., 2017).

3.2. Search method

From the research questions, researchers were assisted by two institutional librarians to develop six phrases which were also reframed into questions and searched in ten popular databases: Oxford Academic, Emerald Insight, ScienceDirect, Springer, Sage, Elsevier, Taylor and Francis, Wiley Online Library, JSTOR, and Google Scholar. These phrases include ‘e-government in developing countries’, ‘e-government and sustainable public procurement’, ‘sustainable public procurement in developing countries’, ‘e-procurement and public sector in developing countries’, ‘green procurement in developing country’, and ‘e-government and sustainable development’.

3.3. Search outcomes

The initial search generated a total of 614 articles, which were further screened using the inclusion criteria in Table 1. The titles and

Table 1
Inclusion criteria for e-government – SPP systematic review.

Inclusion criteria	Rationale
Articles published from 2001 to 2017	2001 was selected because this was when the UN EGDI was first published. The SPP literature also began budding this same year (see Walker and Brammer, 2012).
Published in peer-reviewed journals	Articles published in peer-reviewed journals are of high quality than non-peer-reviewed articles.
Publications in the English language	The English language dominates the field of purchasing and SCM research. English is also the common language of these researchers.
Focus on developing countries based on UN (2017) classification ^a . But also consider articles that compare evidence from developing countries with those from developed countries.	Developing countries are the unit of analysis. These resource constraint economies have high levels of inequalities and vulnerability to climate change. SPP is most desired in these regions.
E-government articles that discuss areas e-procurement and human capacity, legal and telecommunication infrastructure issues related to the use of government online and e-services. E-government articles with social and green focus are also selected.	This aim to gather relevant evidence that reflects the relationships between constructs of the framework to facilitate the SLR in gathering evidence on the role of e-government in implementing SPP.
SPP articles should discuss economic, green or social procurement issues and/or ICT.	This helps to draw on the relevant themes to establish the link between e-government and SPP variables.
Public sector sustainable procurement and e-procurement practice	The public sector is the unit of analysis of this study.
Consider articles of different methods: empirical (qualitative and quantitative), theoretical, among others	This SLR minimises literature biases by synthesising various studies of different methods.

^a United Nations (2017). World Economic Situation and Prospects 2017. ISBN: 978-92-1-109175-5.

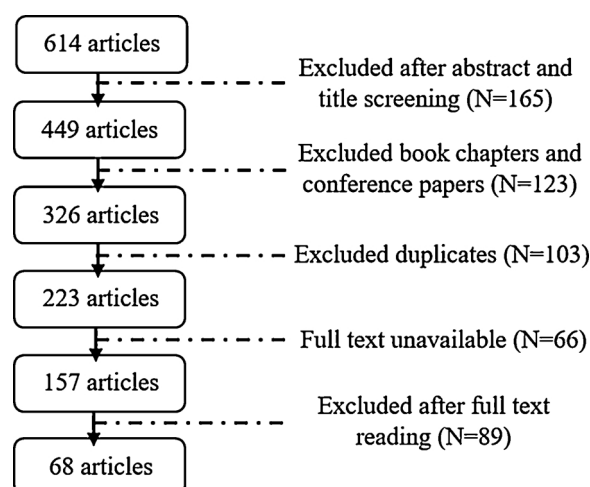


Fig. 1. Flow diagram of the screening process.

abstracts were initially screened for relevance. Duplicate articles were subsequently deleted. Full text of the remaining articles was screened to ensure that each of the synthesis sample meets all the inclusion criteria. A total of 68 relevant articles were finally reviewed (see Fig. 1).

3.4. Validity and inclusion criteria

To enhance validity, reliability, robustness and minimise biases in this study, synthesized articles were searched, selected and analysed based on Durach et al. (2017). Inclusion criteria in Table 1 was used to select the synthesis sample. Data from selected articles were triangulated with each other and then with articles from other sources (Yin, 2003): published peer-reviewed articles, unpublished articles and institutional publications comprising policy documents and evaluation reports relevant to the study.

3.5. Data extraction

Two researchers independently extracted data from the synthesis sample using standardized data extraction forms based on Durach et al. (2017) and Tranfield et al. (2003) for purposes of consistency. The forms captured of basic characteristics: specific and general information from the synthesis sample for coding. Whilst the general information comprised title, publication date, and author (s) details, the specific information covered research objectives and findings, the method used,

context/setting, and journal of the articles (see Appendix A). The forms were developed in excel to ease the analysis of data and the production of results presented in figures and tables.

3.6. Synthesis

The analysis keenly centered on e-government as a tool for enhancing SPP in developing countries and how e-government could facilitate enforcement and compliance with SPP in these resource constraint economies. Hence, e-government is conceptualized into three independent variables based on the United Nations E-Government Development Index (EGDI): government online services (OSI), national telecommunication infrastructure (TII), and human capacity to use ICT (HCI) (United Nations Department of Economic and Social Affairs (UNDESA), 2014) along the Marrakech Task Force (MTF) framework for implementing SPP (see Fig. 2).

Emerging themes from the 68 studies of heterogeneous methods and of different national focus were independently identified by two researchers and integrated to enhance the evidence base of this review (Rousseau et al., 2008).

4. Descriptive analysis of the E-government and SPP literature

4.1. Publication year

The SLR reveals that there are more studies on e-government from developing countries than SPP. Although e-government practice in

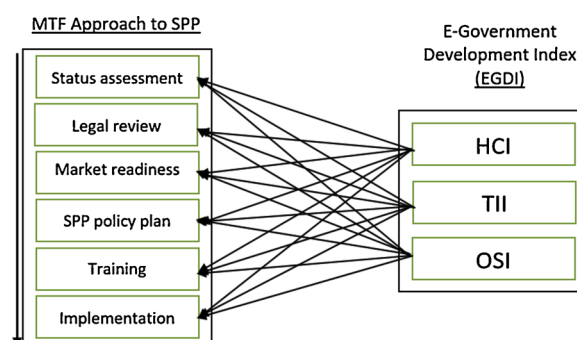


Fig. 2. A conceptual framework of the role of E-Government for SPP. Source: Adapted from United Nations Environmental Programme (UNEP) (2011, p. 51) and United Nations Department of Economic and Social Affairs (UNDESA) (2014, p. 14)

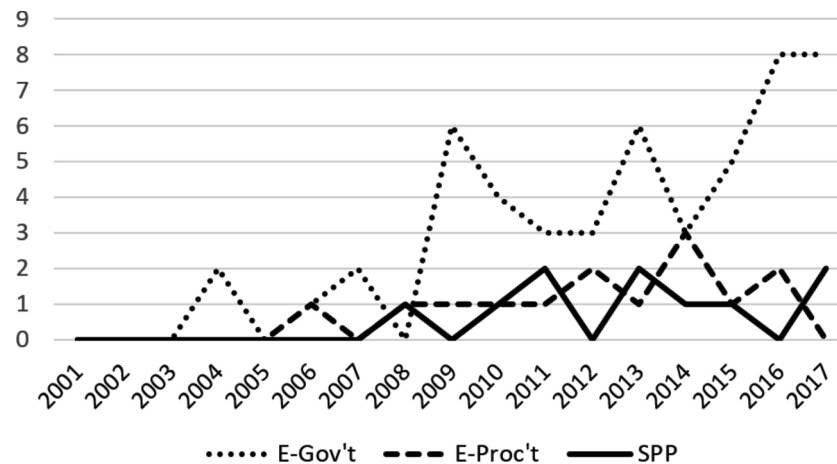


Fig. 3. Publication year of synthesized articles based on focus from 2001 to 2017.

developing countries gained scholarly attention in 2003, this attention has increased significantly since 2008 (see Fig. 3). However, very few of these studies focus specifically on e-procurement. Fig. 3 shows that SPP and e-procurement are not frequently studied. The review further indicates that no article from the developing country context has examined the role of e-government in promoting SPP. Only Walker and Brammer (2012) from the developed country context explore this relationship.

4.2. Research methods

Regarding research methodology, about 39% of the synthesized articles used the conceptual approach (see Figs. 4 and 5). This is informed by the large number of descriptive, theoretical, and review studies on the complexities of e-government adoption, prospects, success factors and challenges in developing countries (see Alshawi and Alalwany, 2009; Basu, 2004; Gao et al., 2013; Elsheikh et al., 2008; Zarei et al., 2008). Fig. 4 shows that about 12% of these studies adopted qualitative case studies and 29% used quantitative surveys to analyse public officials and citizens' perceptions and intentions to use e-government services. Whilst other 15% relied on the strength of both methods, about 5% of the e-government studies employed the content analysis approach to analyse the quality of government websites. In the case of SPP, however, over 60% of the articles used the qualitative and quantitative approaches mostly in the form of case studies whilst 30% employed the conceptual approach (see Fig. 5).

4.3. Theoretical foundation

Explaining their findings, the synthesized studies employed various

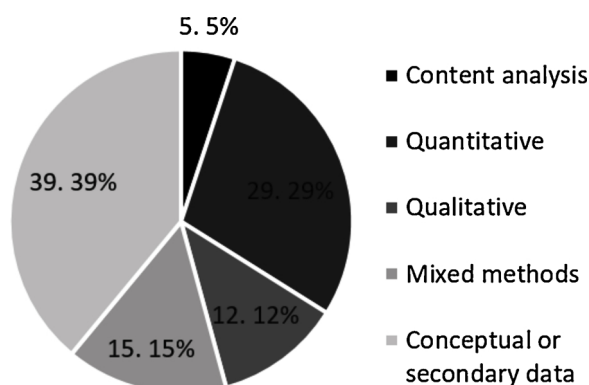


Fig. 4. Proportion of methods used for E-Gov't literature on DCs from 2001 to 2017.

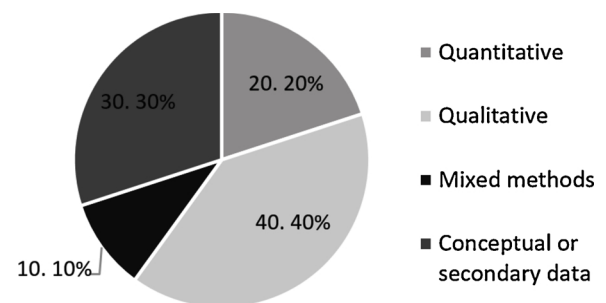


Fig. 5. Proportion of methods used for SPP literature on DCs from 2001 to 2017.

theories and frameworks originating from different disciplines. Some of such theories include the rent-seeking framework (Schwerin and Prier, 2013), unified theory of acceptance and use of technology (UTAUT) model (Ahmad et al., 2013), technology acceptance model and principal-agent theory (Neupane et al., 2012a,b), theory of planned behaviour (Waheduzzaman and Miah, 2015; Aboelmaged, 2010), and the inducement contribution theory (Neupane et al., 2014a,b) among others. This implies that no particular set of theories can conclusively explain the intricate, dynamic and multi-disciplinary nature of purchasing and SCM in the private and public sectors. According to Durach et al. (2017), this situation, however, poses a major challenge to knowledge development in the field as different theoretical lenses influence interpretation of findings of a phenomenon.

4.4. Journals of the synthesis sample

Forty-two journals mainly from the fields of information systems (IS), public administration and SCM published the 68 articles. Whilst 34 journals published the e-government articles, eight published the SPP articles. Of the 68 articles, ten journals published more than one article. *Transforming Government: People, Process and Policy* published majority (9) of the e-government articles and *Government Information Quarterly* published eight articles. Both journals account for about 30% of the e-government publications. *Journal of Purchasing and Supply Management* and *Journal of Environmental Management* also published about 40% of the reviewed SPP articles (see Figs. 6 and 7).

4.5. Geographic focus

The SLR reveals that e-government has presence in several developing countries. The reviewed articles highlighted 37 countries from 13 sub-regions. However, Fig. 8 shows that whilst some of the synthesis sample focused on specific developing countries within a sub-region,

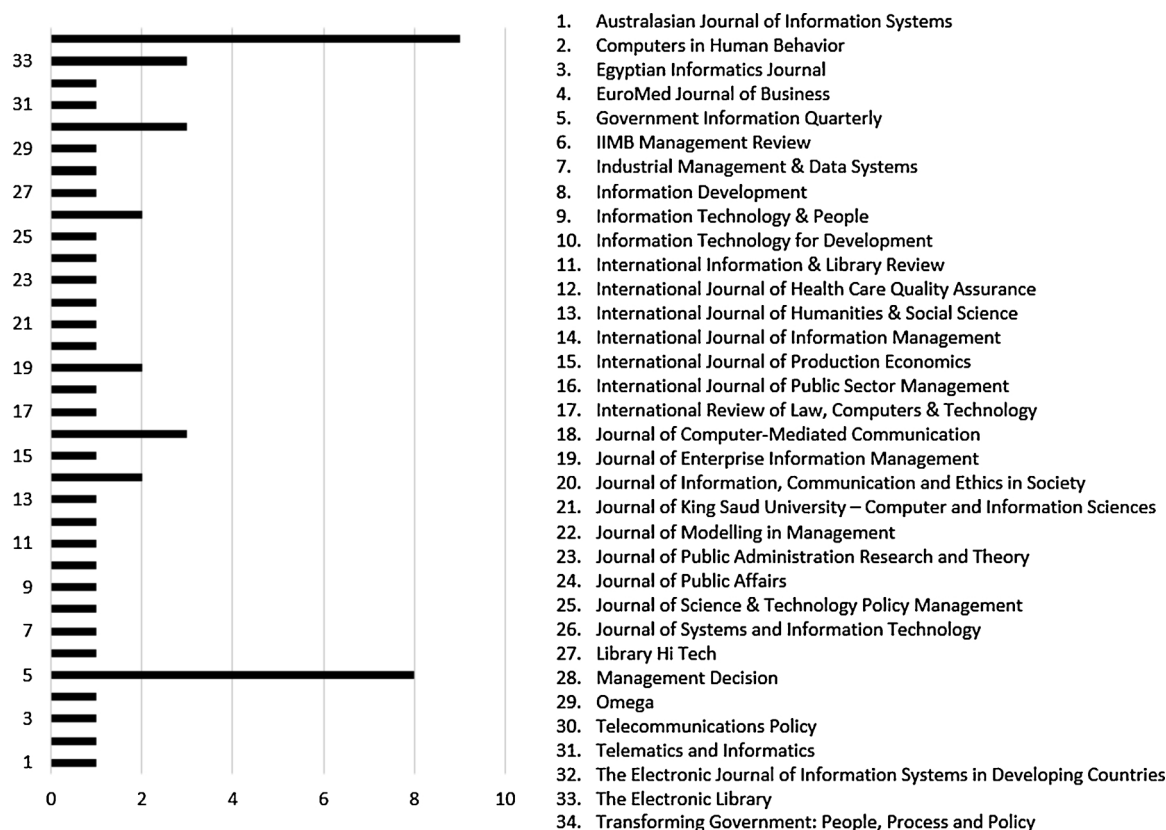


Fig. 6. Statistics of journal publication on E-Gov't in DCs.

others compared e-government services or SPP practices within and across regions. Asian countries like China, India and Malaysia recorded the majority (70%) of SPP articles followed by Brazil and South Africa in Southern America and Africa respectively. In the case of e-government, countries from the Middle East and South Asia tops the list accounting for about 34% of e-government articles.

4.6. Level and unit of analysis

Table 2 shows that these articles also analysed the adoption of these digital services and sustainability practices at various levels: international, national, central and local government levels with diverse units of analysis. However, the synthesis sample largely concentrated on the national and central government levels accounting for 81% of the total articles. They mostly analysed the responses of public officials (34%) from the selected central government agencies and across the country. 30% of the articles also analysed policies and practices with other 32% examining citizens' and suppliers' perception and willingness to conform to these practices. Only 4% analysed websites. However, nine out of the 68 article had multiple units of analysis.

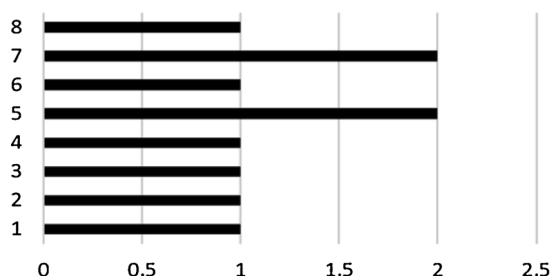


Fig. 7. Statistics of journal publication on SPP in DCs.

5. Content analysis of the e-government and SPP literature

Using the constructivist and interpretivist techniques, the thematic content analysis of the synthesis sample included in the portfolio focused on the state of e-government adoption and the SPP practice in developing countries, the nature of e-procurement service used in the public sector and the role of e-government in mainstreaming the SPP practice in developing countries.

5.1. The state of e-government in developing countries

The SLR affirms United Nations Department of Economic and Social Affairs (UNDESA), (2014) that despite the relatively lower national income, some developing countries have seen the digital era as a window of opportunity in pursuit of a service-sector driven economy (see Fig. 9). The review suggests that e-government has proven potent in improving public services in developing countries (Asogwa, 2013; Bwalya and Mutula, 2016; Lim & Tang, 2008; Osei-Kojo, 2017; Nkwe, 2012). Digitization of public services has undeniably enhanced governments' interaction with its stakeholders through numerous mediums: Government-to-Citizen (G2C), Government-to-Employee (G2E),

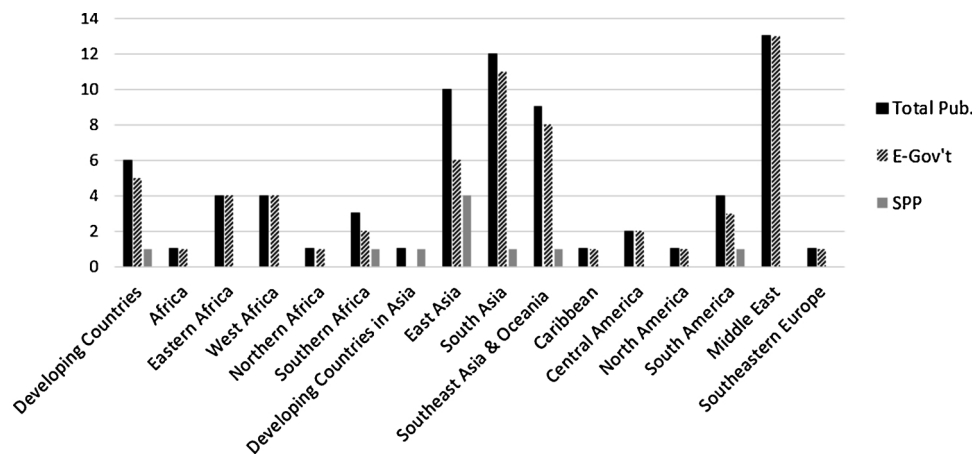


Fig. 8. Cross-tab analysis between focus and region of synthesis sample from 2001 to 2017.

Government-to-Business (G2B), Government-to-Non-Profit (G2N), and Government-to-Government (G2G) (Basu, 2004; Ray and Mukherjee, 2007; Zarei and Ghapanchi, 2008).

The review also indicates that these forms of interaction have informed various types of system applications ranging e-health (Ray and Mukherjee, 2007), e-procurement (Neupane et al., 2014a,b; Gunasekarana and Ngai, 2008), e-education and e-library (Mutula and Mostert, 2010), e-parliament, e-justice, e-immigration and e-policing (Zhou, 2004) inter alia. Among these systems, e-procurement was noted as exceptional Government-to-Business (G2B) platform for improving effectiveness, transparency, and accountability in contracting and procurement processes (Neupane et al., 2012a,b; Vaidya et al., 2006).

5.2. Public sector e-procurement

From the SLR, specific studies on public e-procurement from developing countries were largely published in *Transforming Government: People, Process and Policy* and other IS and public administration journals than active journals in the purchasing and SCM field such as *Journal of Public Procurement* and *Journal of Purchasing and Supply Management*. This implies that public sector e-procurement practices in developing countries are yet to gain the attention of core SCM scholars.

Vaidya et al. (2006) for instance, define electronic procurement as a procurement act that relies on internet-based technologies that integrate and automate the acquisition process from upstream suppliers in the supply chain. In the public sector, however, it is the “...end-to-end digitization of public procurement processes, from the sourcing phase (pre-award: before the supplier is selected) to the purchases phase (post-award: after the supplier is selected)” (Cattaneo, 2012, p. 2). It involves governments’ use of electronic processing when tendering public work or acquiring goods and services. E-procurement involves e-auction, e-tendering, e-catalog, e-ordering and electronic invoicing among others (Rotchanakitumnuai, 2013; Vaidya et al., 2006). According to Neupane et al., 2012a,b, e-procurement improves efficiency, quality, and transparency in government procurement. The

technology responds to the inefficiencies associated with the manual process of supply chain and procurement management such as delays, lack of transparency and corruption (Myint, 2000; Lio et al., 2011; Neupane et al., 2014a,b).

5.3. E-government and e-procurement benefits

Analysis of the themes reveals that government’s use of ICT in public service delivery increases efficiency, reduces cost of operation (Asogwa, 2013), enhances accountability and transparency (Basu, 2004), provides adequate information and reduces corruption (Myint, 2000; Lio et al., 2011; Shaky, 2012; Neupane et al., 2014a,b). Digital services also enhance access to services and customer satisfaction (Bwalya and Mutula, 2016; Osei-Kojo, 2017).

5.3.1. Service quality and customer satisfaction

ICT used for public service delivery promote service quality and customer satisfaction (Sharma et al., 2015; Osei-Kojo, 2017). Osei-Kojo, (2017) found in his analysis of interview responses gathered from selected public sector organizations in Ghana that e-government has significantly reduced the time and procedures involved in clearing goods from the port and aviation among other sectors. In Pakistan, Ahmad et al. (2013) also explore factors that influence citizens’ use of e-services. From an online survey of 115 responses, a statistical descriptive analysis using the UTAUT model found that effort expectancy, performance expectancy, and social influence inform citizens’ willingness to use e-government services.

5.3.2. Transparency in public procurement

The use of e-procurement in the public sector improves transparency and openness in public procurement (Basu, 2004; Neupane et al., 2014a,b; Rotchanakitumnuai, 2013). With this system, there is increased spend visibility. Adequate information regarding public procurement such as tender adverts, evaluation and selection results are available to stakeholders. Such visibility and openness enhance

Table 2
Frequency of level and unit of analysis.

Level	Frequency	Percentage	Unit	Frequency	Percentage
International	8	12	Public officials/agencies	26	34
National	27	40	Business/suppliers	11	14
Central government	28	41	Citizens	14	18
Local government	5	7	Policies & practices	23	30
			Websites	3	4
Total	68	100	Total	77	100

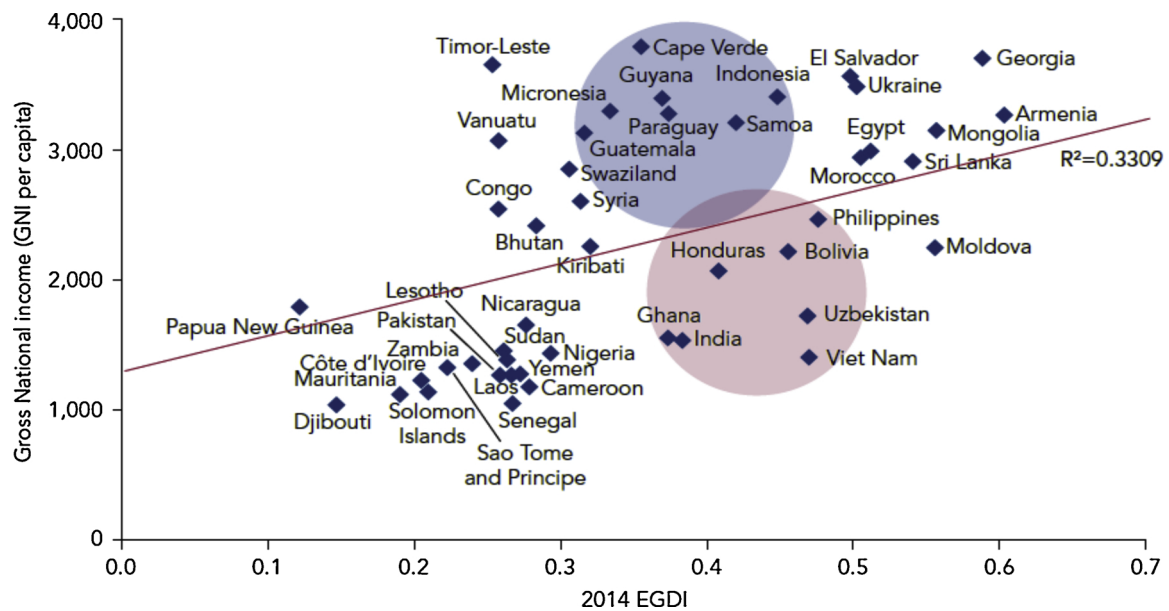


Fig. 9. EGDI and National Income (GNI per capita), Lower Middle-Income Countries.
Source: United Nations Department of Economic and Social Affairs (UNDESA) (2014, p. 20).

accountability in procurement management and deter potential collusion and opportunism by government officials and bidders (Neupane et al., 2014a,b).

5.3.3. Reducing procurement corruption

Neupane et al., (2014a,b) found that public sector e-procurement removes the human interaction in administering public procurement, which often would serve as the basis for corruption in Nepal. Through the internet, prospective tenderers are able to access all terms and conditions including deadlines and application procedures without physically contacting procurement entities. According to Gunasekarana and Ngai (2008) and Bhuiyan (2011), these e-services reduce personal interaction with public entities and make it impossible to offer bribes to both procurement and evaluation officers prior to evaluation and selection processes.

5.3.4. Reduced transaction cost

E-government and e-procurement reduce transaction cost often incurred in the procurement process (Asogwa, 2013). E-procurement saves huge government budget which was previously used to advertise calls for participation and tenders in print media including other mediums like the television and radio platforms (Asogwa, 2013; Basu, 2004).

5.3.5. Increased tender participation

Information concerning tender advertisement also reaches a wider scope including small or local enterprises as well as the global market. Information asymmetries are minimised and promote competition by eliminating the possibility of discrimination (Shakya, 2012; Ghosh Roy and Upadhyay, 2017). Barahona and Elizondo (2014) and Karjalainen and Kempainen (2008) suggest that countries that have properly implemented this system have observed a higher involvement of local small-scale enterprises (SMEs) because of the enhanced access to market and consequent fall in marketing costs.

5.4. Implementation challenges

Notwithstanding the potential benefits of e-government, a significant proportion of the reviewed articles suggest that e-government adoption is affected by infrastructural challenges, unfavorable user-interface and high cost of internet user fee among others (see Bwalya and

Mutula, 2016; Mutula and Mostert, 2010; Ahmad et al., 2013; Sharma et al., 2015; Asogwa, 2013; Elsheikh et al., 2008). These frustrate public administration. Hence, the curiosity of scholars and practitioners to find plausible measures to address obstacles and to promote smooth implementation of e-services.

Asogwa (2013), for instance, revealed in Nigeria that although e-government has lowered the cost of administering public services, the technology has largely failed to achieve its intended outcome of enhancing public services. According to Alshawi and Alalwany (2009) and Nkwe (2012) the situation is due to some critical factors like infrastructural constraints, weak security and privacy management systems, lack of collaboration and partnership, resistance to change to e-systems, lack of strategic plans and low knowledge about the e-government projects (see also Bwalya and Mutula, 2016). Other studies (Aladwani, 2016) also argue that the excessive corruption in the region stifles administrative systems leading to e-government failure. In Oman, Sarayrih and Sriram (2015) also add that the success of e-government is hampered by limited awareness coupled with lack of capacity to use available e-services.

5.5. E-Government readiness and maturity models

To better assess the extent of e-government adoption, some of the synthesis sample propose various maturity models (Zarei et al., 2008; Sangki, 2017) and success factors (Gunasekarana and Ngai, 2008; Al Nagi and Hamdan, 2009; Waheduzzaman and Miah, 2015; Mnjama and Wamukoya, 2007) for assessing e-government readiness. Although these studies played a major role in developing unique methodologies to promote e-government adoption, Zarei et al. (2008) and Basu (2004) argue that these models are incomplete, as government provision of e-service cannot solely depend on the number, functionalities and quality of online services. Hence, Zarei et al. (2008) proposed a nine-stage model consistent with the United Nation's EGDI for the Iranian context. The model extends beyond online services to infrastructural, institutional and socio-cultural elements, which stimulate citizen interaction. Similarly, Waheduzzaman and Miah (2015) discuss how important social-cultural factors like the capacity to use ICT, trust, social networks and the attitudes of public officials administering these e-services affect successful outcomes. According to them, these elements play a critical role in determining readiness for the new digital governance (Waheduzzaman and Miah, 2015).

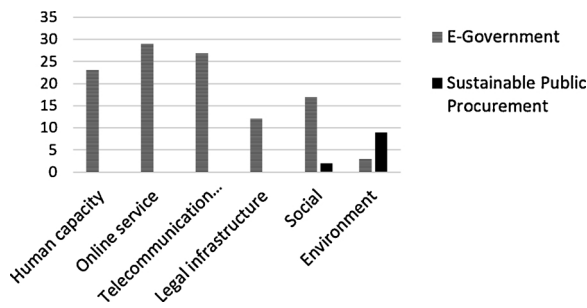


Fig. 10. Cross-tab analysis between research focus and issue of orientation.

5.6. Issues of orientation

Therefore, based on the conceptual framework proposed by this study, the synthesis sample was assessed for their orientation to issues of social, environmental, human capacity, telecommunication and legal infrastructure and online services. About 24% majority of the articles concentrated on government online services (OSI) whilst 22% and 19% focused on telecommunication infrastructure (TII) and human capacity (HCI) issues respectively (see Fig. 10). 82% of the SPP articles were limited to environmental issues and the rest on social issues (see Jones, 2011). Among the e-government articles, only 2.7% explored environmental issues whilst 15% were oriented at social issues.

Although the review suggests that investment in ICT infrastructure in developing countries has increased in recent years leading to several government websites and online services, Bwalya and Mutula (2016) observe that most government websites in Botswana neither are integrated nor allow interaction with citizens. Nurmandi and Kim (2015) also explore the implementation of e-procurement in local government administration in Indonesia. With a mixed method approach, their study argues that human resource is a critical factor that determines the performance of e-procurement in three cities of Indonesia (Nurmandi and Kim, 2015).

This SLR also indicate that e-government growth has helped to address some other social issues like corruption and increased stakeholder participation in public policy processes (Gao et al., 2013; Waheduzzaman and Miah, 2015). The synthesis sample highlights how some socio-cultural factors affect e-government implementation. However, only Lim and Tang (2007) and Soni et al. (2017) assessed how e-government influence environmental management practices. Thus, Lim and Tang (2008) employ the content analysis approach to examine the impact of e-government on the perceived performance of environmental decision-making. They found that IT leadership of senior management, decision intelligence, website quality and speed are key factors that engender performance in environmental decision-making (Lim & Tang, 2008). Soni et al. (2017) therefore used the Grey System Theory to recommend that e-government should also be extended to the climate change and environmental sectors.

5.7. The state of SPP in developing countries

This SLR identified only 10 articles on SPP, the majority of which are of environment orientation (commonly known as green procurement) and largely on countries from Asia (see Fig. 8). From this review, the term SPP is referred to the act of spending taxpayers' monies on products, services, and events that uphold the tenets of sustainable development (Schwerin and Prier, 2013; McMurray et al., 2014). Hence, prior studies focused on environmental or green procurement

and the social objectives of public procurement. For example, in his article titled "Using public procurement to achieve social outcomes", McCrudden (2004) maps the history and the present use of public procurement for social purposes. With examples drawn from both developed and the developing countries, he identify human rights, ethnic, racial and gender equality as the main social outcomes promoted by public procurement. In addition, Mansi (2015) suggests that through SPP, governments respond to matters of waste reduction, efficient use of renewable resources, competition and effective participation of SMEs. Although the global SPP literature suggests several positive impacts, prior studies have largely focused on developed countries (Walker and Brammer, 2012), while studies with specific focus on developing country context appear limited (Geng and Doberstein, 2008; Lund-Thomsen and Costa, 2011; Schwerin and Prier, 2013). More empirical testing of postulated impacts of SPP in the developing country contexts is recommended.

5.8. SPP drivers in developing countries

In the developing country context, Geng and Doberstein (2008) and Zhu et al. (2013) investigate green public procurement (GPP) practices. Whilst Geng and Doberstein (2008) found that reforming environmental laws and training suppliers helps to build capacity to produce and supply green products and services, Zhu et al (2013) underscore regulations, rewards and stakeholder pressure as drivers for SPP adoption. Although GPP laws are available in South Africa, they are limited and scattered in stand-alone documents (Agyepong and Nhamo, 2017). McMurray et al. (2014) also examine the extent of SPP practices amongst procurement managers in the public and private sectors of Malaysia. Combining the focus group discussion method with a survey of procurement directors from public and private organizations, McMurray et al. (2014) found a wide variation of SPP adoption across sectors with the private sector in the lead. Improved working conditions, SPP disclosure, religion and sense of humanity of employees, organizational image, organizational efficiency and transparency also inform SPP (Mansi, 2015; McMurray et al., 2014).

In these economies, more weight is however placed on the environmental aspect than social issues in the SPP agenda (Geng and Doberstein, 2008; Bai et al., 2017). McCrudden (2004) alludes the situation to lack of standardization of social procurement criteria. For example, while the environmental aspect demands that organizations assess the environmental effect of goods and services through the whole lifecycle in the procurement process (Schwerin and Prier, 2013; Ho et al., 2010), SPP also concerns social issues such as creating opportunity for small and local firm and promoting employees' work and safety (Jones, 2011; McMurray et al., 2014). This SLR examines the link between e-government and SPP in developing countries.

5.9. The role of e-government in promoting SPP

Despite the numerous studies on e-government in developing countries, the review found no study on the role of e-government in promoting SPP. Only Walker and Brammer (2012) attempted to explore this link but with a survey from 20 developed countries. However, this SLR offers evidence on how developing countries may use ICT to bolster SPP implementation among resource constraint economies who face a high level of inequality and vulnerability to climate change. Thus, while the MTF framework serves as an implementation plan for SPP, the EGDI of the United Nations Department of Economic and Social Affairs (UNDESA), (2014) echoes the strength and weaknesses of e-government development in a country (see in Fig. 2).

5.9.1. Assessing sustainability status in current procurement practice

From Fig. 2, the MTF framework requires an initial assessment of existing sustainability requirements in public procurement along the economic, social and environmental dimensions and analysis of market readiness. Assessing SPP status helps to identify areas of success and to set national priorities for further sustainability procurement prioritizations. Kjölleström (2008) suggests that providing online assessment tools through government online services (OSI) is essential as part of the task force's operational plan to assist stakeholders with an easy start towards a successful assessment. Such online assessment tools may include online questionnaires for assessing the presence of the three dimensions of sustainability. Therefore, economies with high telecommunication infrastructure (TII) and OSI can make these questionnaires accessible online with access at all levels (Kopp, 2011) and sectors of government. This will, however, require improving HCI such that procurement officers and other stakeholders of public organizations may understand the SPP assessment.

According to Asogwa, (2013), employing the e-government tool for the assessment and analysis of responses makes the process easy, faster and less costly to the government compared to managing printed questionnaires. Further, OSI will help increase the sample size of procurement practitioners needed to participate in credible, reliable and conclusive findings of the SPP status assessment. Such credible conclusions are therefore essential to inform aspects of national procurement regime and policy review processes.

Notwithstanding, Bwalya and Mutula (2016) and Nkwe (2012) observe that internet access in most developing economies is hampered by high user charges. In Zambia for instance, Bwalya and Mutula (2016) found that although over 50% of a sample of 408 respondents had access to the internet, constraints such as expensive user fees, limited ICT infrastructure and absence of native language options challenged universal access. The high cost of internet user-fee was also established in Botswana as an impediment to the demand for e-government services (Nkwe, 2012). Hence, the need to address these hindrances to ensure success in SPP assessment.

5.9.2. Reviewing procurement regimes

During the review stage, stakeholders of public procurement including buyers at the various public agencies, suppliers and the legislature are guided by experts to scrutinize and evaluate existing procurement regimes. Here, legal and regulatory frameworks are reviewed to determine whether they support and how SPP principles may be integrated. This is to establish the extent to which the various existing laws describe social and environmental issues which are relevant for governments procurement activities. Bonsón et al. (2012) and Fang (2002) assert that a universal and robust TII is critical for facilitating the review process by collating views and comments from a wide group of stakeholders and among government agencies through diverse digital platforms, such as social media and institutional websites among other interactive systems. The Government-to-Government (G2G) model of e-government may greatly facilitate this (Ray and Mukherjee, 2007; Zarei and Ghapanchi, 2008). Governments of similar procurement sustainability focus may collaborate and share best practices through OSI and an improved human capacity to use ICT (HCI), which in the end limits unnecessary expenditures that would otherwise be incurred in international travels and capacity building programs.

This relationship may exist among sovereign states of common trade agreements, common foreign policies, or with mutual social and economic agenda. All procurement stakeholders may easily submit their inputs for consolidation by a designated authority. According to the

United Nations Environmental Programme (UNEP) (2011) only a few developing countries of the Marrakech Task Force for SPP have either completed or in the process of completing this stage.

5.9.3. Analysing market readiness

After reviewing existing legal documents, the framework requires an assessment of the market readiness to respond to demands for SPP products and services. Governments can take advantage of the digital era by undertaking simulation exercises. This exercise may advertise and invite suppliers to tender for common products and services or works that contain SPP requirements using OSI and major public procurement websites. In their global survey sampling 280 procurement practitioners from 20 countries, Walker and Brammer (2012) argue that greater communication between buyers and suppliers regarding desired SPP requirement enhances SPP implementation. With a multiple regression, they found a strong relationship between public sector use of e-procurement and SPP – particularly with labour health and safety and environmental but a weaker link with the participation of SMEs who are limited by e-resources (Walker and Brammer, 2012).

With the traditional paper process, there are often information gaps in distributing and sharing procurement information to suppliers. This situation leads to information asymmetry, giving rise to public procurement corruption. In addition, information gaps on SPP may thwart the tenets of public procurement: competition, transparency, and value for money (Neupane et al., 2014a,b). However, public sector organizations can publish tender adverts with SPP requirements across the country using e-government tools like a dedicated e-procurement website to ensure equal access to procurement information irrespective of the geographic location of suppliers.

A sufficient and affordable TII is necessary for encouraging and monitoring the participation of smaller indigenous firms that are not e-enabled is crucial (Walker and Brammer, 2012). Understanding how indigenous suppliers - both larger and small-scale enterprises respond to likely calls for SPP tenders, as well as their ability to meet the present and future trends of SPP requirements, will help provide the needed support to boost their participation in SPP.

5.9.4. Planning the SPP policy

An SPP implementation plan is subsequently drafted based on the outcome of the first three activities of the framework. This plan provides a mandate and a clear direction for the SPP policy. This stage involves harmonization of the respective responsibilities and commitment of politicians, legislatures and other stakeholders like officials of public procurement entities, evaluation boards, and standardization authorities. In this light, Mansi (2015) and Geng and Doberstein (2008) view that SPP presents government with a complex decision-making process of developing new metrics for enforcing SPP and assessing the impacts of its products and production behaviours of suppliers. This often attracts additional administrative cost to the purchaser, which explains their resistance (Walker and Brammer, 2012). An SPP policy also requires redesigning of business models (Witjes and Lozano, 2016), which has implications on value and affects the relationship between suppliers and procurers.

Witjes and Lozano (2016) classify the redesign process into three elements: technological (improved material and energy efficiency and the use of renewable resources); social (adopting a stewardship role in service delivery); and organizational (focus on society and environment and maximizing outcomes). The government may however, leverage OSI, TII and HCI to control the potential cost of developing and administering these SPP metrics (Lim & Tang, 2008; Geng and Doberstein, 2008; Asogwa, 2013).

For instance, HCI helps stakeholders to synthesize several similar policies of other countries with similar market characteristics and also receive inputs which are in line with national priorities from citizens. An interoperable and integrated system hinged on a strong TII may be used to forecast citizens' demand and provide the relevant data for analysing the progress of the SPP implementation. In this vein, Zarei et al. (2008) strongly highlighted infrastructural development and stimulation of institutional and citizen interaction inter alia in their nine-stage model of e-government proposed for the Iranian context.

5.9.5. Training and sensitization on SPP

The framework also requires the development of a training programme which ensures that important stakeholders such as policy-makers, suppliers and procurement officers are familiar with the implementation of SPP and with the requisite capacity to train others. Kopp (2011) emphasizes that e-learning elements can be used to complement face-to-face and written documents in this process. According to Walker and Brammer (2012), such tools will ensure equitable distribution of information at all levels either to train public procurement decision makers to develop and enforce SPP criteria or sensitize suppliers about desired criteria.

Some of these e-learning elements may include training resources, smart tools for calculating Life-Cycle-Cost (LCC), help menus on government websites and an integrated national e-procurement system (Neupane et al., 2014a,b). Although most government websites in developing economies are merely informative and offer low interactive features (Boateng, 2013), the high HCI of these economies is the outcome of increased national investments in human capital for ICT and high social media presence. It is therefore plausible to suggest that this process augment government's effort of providing formal ICT training particularly to its staff and local businesses.

To facilitate SPP training, relevant information should be provided via new media to educate all stakeholders and the public (Fang, 2002). Such social media handles may include Facebook, YouTube, WhatsApp, Twitter among others. In these economies, however, Nkwe (2012) establish a gap between ICT knowledge and citizens' acceptance of e-government services. Davis (1989) explains this situation with the 'perceived ease of use' (PEOU) and 'perceived usefulness' (PU) of such services. In addition, Bwalya and Mutula (2016) used the Technology Acceptance Model (TAM) in Zambia and established that there is lack of awareness campaigns to educate users on expected benefits of the respective e-government projects. The social media may mitigate this.

5.9.6. Implementing SPP

Today, most business processes are accomplished with internet or digitally enabled intra- and inter-organizational information technology (Zarei et al., 2008; Walker and Brammer, 2012). These processes involve building information systems that link suppliers, buyers, manufacturers and other functions of business together to enable organizational value in addition to physical assets. The government through its strong TII may acquire an integrated e-procurement system also known as Enterprise Resource Plan (ERP) software to implement SPP. However, Walker and Brammer (2012) note that government use of the e-procurement service in facilitating SPP requirements hinder buying from local SMEs that are not e-enabled. In this light, several efforts are made to improve the participation of indigenous firms in public procurement. For example, while some developing countries like India assign a quota of public contracts to local firms, Community Information Center (CICs) with free access are being built (National Information Technology Agency (NITA), 2016). At a reduced cost, these CICs will promote equal participation and capacity of SMEs with limited e-

resources to respond to SPP tenders through e-procurement (Karjalainen and Kempainen, 2008; Walker and Brammer, 2012).

With an e-procurement system, all activities pertaining to public procurement are integrated and automated. Basu (2004) argues in his overview of e-government in developing countries that such integration is relevant for collaboration of the wider group of SPP stakeholders and government departments to prevent duplication of efforts and to provide the public with G2C and G2B interactive models at a single counter. Functions may be completed with minimal time (Vaidya et al., 2006), limited personnel interaction with suppliers, and at low cost. This reduces procurement corruption (Neupane et al., 2014a,b) and promotes transparency and efficiency in the process.

The automated platform will help communicate standard SPP criteria for common products (Bai et al., 2017), advertise SPP tenders, access tender documents, submit bids, receive tenders, evaluate tenders base on SPP criteria, announce results and award contracts, and pay contractors all via the digital system (Walker and Brammer, 2012). Particularly, LCC assessment is easy. The e-procurement system will calculate for relevant products and services based on information provided by suppliers (Walker and Brammer, 2012). This ensures that products and services of minimal long-term economic cost, low environmental and social impacts are purchased with public funds at low risk to suppliers and public sector agencies alike.

6. Discussion

This paper has taken stock of the existing literature on e-government and SPP, and how e-government could facilitate the SPP practice. Through an SLR, we have analysed the evolution and state of the literature on these topics. In this section, we discuss the findings as per the research questions of this study.

In addressing the first research question, our analysis of prior literature found that e-government may hone the implementation of SPP in varied ways, in line with Fig. 2. Based on the evidence presented in the descriptive and content analysis, e-government provides online assessment tools for examining existing SPP elements as well as determining SPP market readiness (Kjöllerström, 2008). E-government makes the SPP readiness assessment process easy, faster and less costly to the government (Asogwa, 2013). This SLR also found that e-government infrastructure is critical in reviewing procurement regimes towards SPP. The evidence suggests that e-government facilitates the review process by collating the views of wider stakeholder groups including government agencies, through diverse digital platforms (Ray and Mukherjee, 2007; Bonsón et al., 2012; Fang, 2002). E-government also helps policymakers to strategically develop SPP policy. Although SPP presents government with a complex decision-making process of developing SPP standards, enforcing SPP, and assessing its impacts (Mansi, 2015; Geng and Doberstein, 2008), efforts of stakeholders are coordinated and made easier with e-government tools. Regarding SPP training, e-learning components of e-government systems complement face-to-face and printed manuals. Therefore, a fully functioning government e-procurement system is essential to automate and communicate SPP standards for common products (Zarei et al., 2008; Bai et al., 2017).

Regarding the second research question, we explore the drivers of SPP in developing countries. The SLR found that although the SPP literature on developing countries only gained scholarly attention since the last decade, studies from these economies are still nascent. From the available studies, SPP is driven by the presence of effective social and environmental laws, SPP training for stakeholders, stakeholder pressure, and rewards and recognition associated with compliance (Geng

and Doberstein, 2008; Zhu et al., 2013; McMurray et al., 2014; Mansi, 2015). For instance, SPP training helps to build suppliers' capacity and sensitize them towards environmental protection and social equity in their production processes. In highly religious countries, sense of humanity of employees and organizational reputation in addition to SPP disclosure, organizational efficiency, and transparency inform SPP (Mansi, 2015; McMurray et al., 2014). However, the SLR revealed that the environmental aspect of SPP is more emphasized than social issues due to limited standardization of social procurement criteria in developing countries (McCrudden, 2004).

Our third research question relates to the state of e-government in developing countries. The review suggests that ICT remains a central force in transforming contemporary public administration in developing countries. Hence, the numerous forms of service applications including e-procurement (Choi et al., 2016; Choudrie et al., 2017). Existing literature indicate that e-government is widely practiced. These studies agree that e-government increases the efficiency of public service delivery, reduces cost of administration, enhances transparency and accountability, provides adequate procurement information and reduces public sector corruption (Asogwa, 2013; Basu, 2004; Myint, 2000; Lio et al., 2011; Shakya, 2012; Neupane et al., 2014a,b). However, some challenges were also noted. High user charges, lack of integration and collaboration among state agencies, resistance to change to e-systems, limited awareness of e-services and lack of e-strategic plans hampered e-government success in developing economies (Bwalya and Mutula, 2016; Nkwe, 2012; Sarayrih and Sriram, 2015). The excessive corruption in these economies also stifles administrative systems leading to e-government failure (Aladwani, 2016). Considering the significant prospects of e-government, there is, therefore, the need to identify more sustainable ways of addressing these challenges toward e-government success and to mainstream SPP in developing countries.

7. Conclusion and implications for research and practice

In a nutshell, the concept e-government offers various opportunities to improve public service delivery including SPP. The study concludes that public sector agencies could complement traditional forms of training techniques with online assessment tools and training materials towards enhancing SPP capacity of stakeholders and enforcement of SPP criteria in developing countries, albeit in a convenient manner. This study contributes to the limited public sector purchasing and supply chain management literature in the context of sustainability in developing countries by stressing the overarching role of e-government in stimulating SPP practice towards the current global development agenda (SDG goal 12.7). This SLR highlights the significance of socio-cultural elements in e-government adoption as they influence the attitudes and behaviour of suppliers and procurement officials. It also contributes to the MTF framework by revealing the complex political and socio-culturally unrestrained elements within the administrative systems of developing countries in e-government and SPP implementation. Significant implications for research and practice are discussed.

The study further reveals that e-government has a significant role in SPP mainstreaming especially in developing countries. First, the proliferated government online portals and high investment into ICT infrastructure and human capacity offer a platform for a wide variety of SPP information including standardizing SPP requirements for common products and services purchased by the government. Secondly, e-

government has the potential to facilitate the mainstreaming of SPP at various levels of public sector institutions. Procurement managers and policymakers may employ this as a tool to complement other traditional forms of training materials to sensitize suppliers and procurement officers about the SPP practice. Lastly, the SLR revealed several challenges of e-government services mainly constituting technological, social and institutional complexities defining public administration systems in developing countries. These findings have significant implications for shaping the process-oriented management of e-government and e-procurement projects to promote SPP outcomes.

The main research contribution of this study is the analysis of the relationship between e-government and SPP using an SLR towards conceptual clarity. We examined and synthesized existing literature on e-government and e-procurement and their linkages with SPP in developing countries. The study presents a number of research implications regarding the state of existing literature on the topic. First, our SLR synthesis found that various models have been used to analyse the state of e-government adoption in developing countries. However, these models were largely focused on website and online service functionalities. These models present a narrow view of assessing the state of e-government adoption. Our SLR suggests that other important variables such as national ICT infrastructure and human capacity cannot be overlooked. Secondly, e-government studies dedicated to e-procurement is also limited in the context of developing economies. Lastly, the review indicates that there is little knowledge of SPP among developing countries as a result of limited peer-review contributions to the SPP literature. Thus, their empirical benefits, success factors, challenges and social criteria are unknown. This study stimulates the discourse on the role of e-government in SPP implementation in the sustainability purchasing and supply literature.

8. Limitations and future research agenda

Notwithstanding the rigorous SLR approach used by this study, its findings and implications discussed above, a number of limitations confronted it. First, the study was limited to publications within a 17-year period gathered from 10 databases. Secondly, the synthesized articles were restricted to only articles published in peer-review journals although references were made to evidence from other sources to reduced bias. Lastly, the review strictly focused on e-government and its role in facilitating SPP implementation in developing countries. However, the value of this study lies within its robust and exhaustive methodology of synthesizing a large body of evidence from prior studies on the topic for easy comprehension (Denyer and Tranfield, 2009).

Areas for future research are highlighted. Future studies are encouraged to empirically test theoretical benefits and drivers of SPP in developing countries towards enhancing SPP implementation. Considering the limited studies on process-oriented e-government management, future studies are also directed at developing universal and holistic methodologies for assessing the state and managing the e-government implementation process in developing countries. Besides enhancing access to market and consequent fall in operational costs (Karjalainen and Kemppainen, 2008), what are the impacts of the public sector e-procurement system and SPP practice on local SMEs. Future studies should also explore these impacts and outline their implications for SPP in developing countries. Lastly, future studies should develop standardized SPP criteria apt for the developing country context (Geng and Doberstein, 2008; McCrudden, 2004).

Appendix A. Coding schema for SLR analysis – exemplar table (based on Durach et al., 2017)

Author	Year	Epistemological Orientation ²										Method ³				Level of analysis ⁴					Unit of analysis ⁵					Focus	Focal nation
		Con	Nor	Des	Exp	Pre	Int	Quant	Qual	Mix	CA	Con	Int	Nat	CG	LG	PO	Bus	Cit	P&P	Web						
Aboelmaged, 2010	2010						X	X						X				X					E-proc't	UAE			
Ahmad et al., 2013	2013			X							X				X				X				E-gov't	Pakistan			
Al Nagi and Hamdan, 2009	2009	X									X				X						X		E-gov't	Jordan			
Aladwani, 2016	2016	X									X						X				X		E-gov't	Dev. countries			
Al-Busaidy and Weerakkody, 2009	2009		X												X					X			E-gov't	Oman			
Alshawi and Alalwany, 2009	2009	X									X				X			X					E-gov't	Dev. countries			
Anan and Kasimin, 2011	2011		X												X			X					E-proc't	Malaysia			
Asogwa, 2013	2013			X											X			X					E-gov't	Nigeria			
Athmay et al., 2016	2016		X								X				X					X			E-gov't	UAE			
Barahona and Elizondo, 2014	2014													X							X		E-proc't	Costa Rica			
Basu, 2004	2004				X									X						X			E-gov't	Dev. countries			
Belwal and Al-Zoubi, 2008	2008				X						X				X								E-gov't	Jordan			
Bhuiyan, 2011	2011				X									X						X			E-gov't	Bangladesh			
Bwalya and Mutula, 2016	2016				X						X				X			X					E-gov't	Zambia			
Choi et al., 2016	2016					X				X				X						X			E-proc't	Indonesia			
Chomchaiya and Esichaikul, 2016	2016					X				X							X						E-proc't	Thailand			
Choudrie et al., 2017	2017																X		X				E-gov't	Nigeria			
Concha et al., 2012	2012			X														X		X			E-proc't	Latin America, the Caribbean			
Córdoba-Pachón and Orr, 2009	2009					X				X				X				X			X		E-gov't	Colombia			
Elkadi, 2013	2013									X					X					X			E-gov't	Egypt			
Elsheikh et al., 2008	2008	X									X				X					X			E-gov't	Jordan			
Gao et al., 2013	2013	X									X				X					X			E-gov't	China			
Gunasekarana and Ngai, 2008	2008													X				X					E-proc't	Hong Kong			
Gupta et al., 2017	2017			X				X		X							X						E-gov't	India			
Kurfali et al., 2017	2017						X			X				X					X				E-gov't	Turkey			
Lallmahomed et al., 2017	2017													X					X				E-gov't	Mauritius			
Lau et al., 2008	2008			X										X						X			E-gov't	Argentina, Brazil, Mexico			
Lim and Tang, 2007	2007			X													X				X		E-gov't	Korea			
Mnjama and Wamukoya, 2007	2007	X													X					X			E-gov't	Dev. Countries			
Mohammed et al., 2016	2016				X									X							X		E-gov't	Yemen			
Mutula and Mostert, 2010	2010	X													X						X		E-gov't	South Africa			
Neupane et al., 2014a,b	2014									X				X				X					E-proc't	Dev. countries			
Neupane et al., 2014a,b	2012			X										X									E-proc't	Nepal			
Neupane et al., 2014a,b	2014						X			X				X				X					E-proc't	Nepal			
Nkwe, 2012	2012	X													X					X			E-gov't	Botswana			
Nurmandi and Kim, 2015	2015			X							X				X			X					E-proc't	Indonesia			

Author(s)	Year	Country	Study Design	Population	Intervention	Comparison	Outcome	Conclusion
Ojha and Pandey, 2017	2017	X	X	X	X	X	X	India
Osei-Kojo, 2017	2017	X	X	X	X	X	X	Ghana
Paroši et al., 2013	2013	X	X	X	X	X	X	Serbia
Ray and Mukherjee, 2007	2007	X	X	X	X	X	X	India
Rorissa and Demisse, 2010	2010	X	X	X	X	X	X	Africa
Rotchanakitumnuai, 2013	2013	X	X	X	X	X	X	Thailand
Sharma et al., 2015	2015	X	X	X	X	X	X	India
Sangki, 2017	2017	X	X	X	X	X	X	Korea
Sarayirih and Sriram, 2015	2015	X	X	X	X	X	X	Onan
Schuppan, 2009	2009	X	X	X	X	X	X	Kenya, Tanzania, Ghana
Sharma et al., 2015	2015	X	X	X	X	X	X	Onan
Siddiquee, 2016	2016	X	X	X	X	X	X	Bangladesh
Singh et al., 2010	2010	X	X	X	X	X	X	India, Fiji, Ethiopia
Soni et al., 2017	2017	X	X	X	X	X	X	India
Som-In et al., 2015	2015	X	X	X	X	X	X	Thailand
Teoa et al., 2009	2009	X	X	X	X	X	X	Singapore
Tseng et al., 2008	2008	X	X	X	X	X	X	Taiwan
Waheduzzaman and Miah, 2015	2015	X	X	X	X	X	X	Bangladesh
Weerakkody et al., 2011	2011	X	X	X	X	X	X	Qatar
Zarei and Ghapanchi, 2008	2008	X	X	X	X	X	X	Iran
Zarei et al., 2008	2008	X	X	X	X	X	X	Iran
Zhou, 2004	2004	X	X	X	X	X	X	China
Aguepong and Nhamo, 2017	2017	X	X	X	X	X	X	South Africa
Geng and Doberstein, 2008	2008	X	X	X	X	X	X	China
Ho et al., 2010	2010	X	X	X	X	X	X	Asia
Jones, 2011	2011	X	X	X	X	X	X	East Asia
Lund-Thomsen and Costa, 2011	2011	X	X	X	X	X	X	Developing countries
Mansi, 2015	2015	X	X	X	X	X	X	India
McMurray et al., 2014	2014	X	X	X	X	X	X	Malaysia
Schwerin and Prier, 2013	2013	X	X	X	X	X	X	China
Wittman and Blesh, 2017	2017	X	X	X	X	X	X	Brazil
Zhu et al., 2013	2013	X	X	X	X	X	X	China

²Con: Conceptual, Nor: Normative, Des: Descriptive, Exp: Exploratory, Pre: Prescriptive, Int: Instrumental.

³Quant: Quantitative, Qualitative: Mix: Mixed, CA: Content analysis, Con: Conceptual.

⁴Int: International, Nat: National, CG: Central government, LG: Local government.

⁵PO: public officials/agencies, Bus: business/suppliers, Cit: citizens, P&P: policies & practices, Web: websites.

References

Included studies in synthesis

- Aboelmegeed, M.G., 2010. Predicting e-procurement adoption in a developing country: an empirical integration of technology acceptance model and theory of planned behaviour. *Ind. Manage. Data Syst.* 110 (3), 392–414.
- Agyepong, A.O., Nhamo, G., 2017. Green procurement in South Africa: perspectives on legislative provisions in metropolitan municipalities. *Environ. Dev. Sustain.* 19 (6), 2457–2474.
- Ahmad, M.O., Markkula, J., Oivo, M., 2013. Factors influencing e-government adoption in Pakistan. *Transform. Gov. People Process. Policy* 7 (2), 225–239.
- Al Nagi, E., Hamdan, M., 2009. Computerization and e-Government implementation in Jordan: challenges, obstacles and successes. *Gov. Inf. Q.* 26 (4), 577–583.
- Aladwani, A.M., 2016. Corruption as a source of e-government projects failure in developing countries: a theoretical exposition. *Int. J. Inf. Manage.* 36 (1), 105–112.
- Al-Busaidy, M., Weerakkody, V., 2009. E-government diffusion in Oman: a public sector employees' perspective. *Transform. Gov. People Process Policy* 3 (4), 375–393.
- Alshawi, S., Alalwany, H., 2009. E-government evaluation: citizen's perspective in developing countries. *Inf. Technol. Dev.* 15 (3), 193–208.
- Aman, A., Kasimin, H., 2011. E-procurement implementation: a case of Malaysia government. *Transform. Gov. People Process Policy* 5 (4), 330–344.
- Asogwa, B.E., 2013. Electronic government as a paradigm shift for efficient public services: opportunities and challenges for Nigerian government. *Libr. Hi Tech* 31 (1), 141–159.
- Athmay, A.A.A., Fantazy, K., Kumar, V., 2016. E-government adoption and user's satisfaction: an empirical investigation. *EuroMed J. Bus.* 11 (1), 57–83.
- Barahona, C.J., Elizondo, M.A., 2014. Introducing a disruptive service innovation: a national dilemma in e-procurement. *Manage. Decis.* 52 (9), 1782–1800.
- Basu, S., 2004. E-government and developing countries: an overview. *Int. Rev. Law Comput. Technol.* 18 (1), 109–132.
- Belwal, R., Al-Zoubi, K., 2008. Public centric e-governance in Jordan: a field study of people's perception of e-governance awareness, corruption, and trust. *J. Inf. Commun. Ethics Soc.* 6 (4), 317–333.
- Bhuiyan, S.H., 2011. Modernizing Bangladesh public administration through e-governance: benefits and challenges. *Gov. Inf. Q.* 28 (1), 54–65.
- Bwalya, K.J., Mutula, S., 2016. A conceptual framework for e-government development in resource-constrained countries: the case of Zambia. *Inf. Dev.* 32 (4), 1183–1198.
- Choi, H., Park, M.J., Rho, J.J., Zo, H., 2016. Rethinking the assessment of e-government implementation in developing countries from the perspective of the design–reality gap: applications in the Indonesian e-procurement system. *Telecomm. Policy* 40 (7), 644–660.
- Chomchaiya, S., Esichaikul, V., 2016. Consolidated performance measurement framework for government e-procurement focusing on internal stakeholders. *Inf. Technol. People* 29 (2), 354–380.
- Choudrie, J., Zamani, E.D., Umeoji, E., Emmanuel, A., 2017. Implementing E-government in Lagos State: understanding the impact of cultural perceptions and working practices. *Gov. Inf. Q.* 34 (4), 646–657.
- Concha, G., Astudillo, H., Porrua, M., Pimenta, C., 2012. E-Government procurement observatory, maturity model and early measurements. *Gov. Inf. Q.* 29, S43–S50.
- Córdoba-Pachón, J.R., Orr, K., 2009. Three patterns to understand e-government: the case of Colombia. *Int. J. Publ. Sect. Manage.* 22 (6), 532–554.
- Elkadi, H., 2013. Success and failure factors for e-government projects: a case from Egypt. *Egypt. Inf. J.* 14 (2), 165–173.
- Elsheikh, Y., Cullen, A., Hobbs, D., 2008. E-Government in Jordan: challenges and opportunities. *Transform. Gov. People Process Policy* 2 (2), 83–103.
- Gao, X., Song, Y., Zhu, X., 2013. Integration and coordination: advancing China's fragmented e-government to holistic governance. *Gov. Inf. Q.* 30 (2), 173–181.
- Geng, Y., Doberstein, B., 2008. Greening government procurement in developing countries: building capacity in China. *J. Environ. Manage.* 88, 932–938.
- Ghosh Roy, S., Upadhyay, P., 2017. Does e-readiness of citizens ensure better adoption of government's digital initiatives? A case based study. *J. Enterp. Inf. Manage.* 30 (1), 65–81.
- Gunasekaran, A., Ngai, E.W., 2008. Adoption of e-procurement in Hong Kong: an empirical research. *Int. J. Prod. Econ.* 113 (1), 159–175.
- Gupta, K.P., Bhaskar, P., Singh, S., 2017. Prioritization of factors influencing employee adoption of e-government using the analytic hierarchy process. *J. Syst. Inf. Technol.* 19 (1/2), 116–137.
- Ho, L.W., Dickinson, N.M., Chan, G.Y., 2010. Green procurement in the Asian public sector and the Hong Kong private sector. *Nat. Resour. Forum* 34 (1), 24–38.
- Jones, D.S., 2011. Recent reforms to promote social responsibility procurement in East Asian States: a comparative analysis. *J. Publ. Procure.* 11 (1), 61–94.
- Kurfali, M., Arifoğlu, A., Tokdemir, G., Paçin, Y., 2017. Adoption of e-government services in Turkey. *Comput. Human Behav.* 66, 168–178.
- Lallmahomed, M.Z., Lallmahomed, N., Lallmahomed, G.M., 2017. Factors influencing the adoption of e-government services in mauritius. *Telemat. Inf.* 34 (4), 57–72.
- Lau, T.Y., Aboulhosen, M., Lin, C., Atkin, D.J., 2008. Adoption of e-government in three latin american countries: Argentina, Brazil and Mexico. *Telecomm. Policy* 32 (2), 88–100.
- Lim, J.H., Tang, S.Y., 2007. Urban e-government initiatives and environmental decision performance in Korea. *J. Publ. Adm. Res. Theory* 18 (1), 109–138.
- Lund-Thomsen, P., Costa, N., 2011. Sustainable procurement in the United Nations. *J. Corp. Citizsh.* 42, 55–72.
- Mansi, M., 2015. Sustainable procurement disclosure practices in central public sector enterprises: evidence from India. *J. Purch. Supply Manage.* 21 (2), 125–137.
- McMurray, A.J., Islam, M.M., Siwar, C., Fien, J., 2014. Sustainable procurement in Malaysian organizations: practices, barriers and opportunities. *J. Purch. Supply Manage.* 20 (3), 195–207.
- Mnjama, N., Wamukoya, J., 2007. E-Government and records management: an assessment tool for e-records readiness in government. *Electron. Libr.* 25 (3), 274–284.
- Mohammed, F., Ibrahim, O., Ithnin, N., 2016. Factors influencing cloud computing adoption for e-government implementation in developing countries: instrument development. *J. Syst. Inf. Technol.* 18 (3), 297–327.
- Mutula, S.M., Mostert, J., 2010. Challenges and opportunities of e-government in South Africa. *Electron. Libr.* 28 (1), 38–53.
- Neupane, A., Soar, J., Vaidya, K., 2012a. Evaluating the anti-corruption capabilities of public e-procurement in a developing country. *Electron. J. Inf. Syst. Dev. Ctries.* 55 (1), 1–17.
- Neupane, A., Soar, J., Vaidya, K., 2014a. An empirical evaluation of the potential of public e-procurement to reduce corruption. *Australas. J. Inf. Syst.* 18 (2), 21–44.
- Neupane, A., Soar, J., Vaidya, K., Yong, J., 2014b. Willingness to adopt e-procurement to reduce corruption: results of the PLS path modeling. *Transform. Gov. People Process Policy* 8 (4), 500–520.
- Nkwe, N., 2012. E-government: challenges and opportunities in Botswana. *Int. J. Humanit. Soc. Sci.* 2 (17), 39–48.
- Nurmandi, A., Kim, S., 2015. Making e-procurement work in a decentralized procurement system: a comparison of three Indonesian cities. *Int. J. Publ. Sect. Manage.* 28 (3), 198–220.
- Ojha, S., Pandey, I.M., 2017. Management and financing of e-Government projects in India: does financing strategy add value? *IIMB Manage. Rev.* 29 (2), 90–108.
- Osei-Kojo, A., 2017. E-government and public service quality in Ghana. *J. Publ. Aff.* 17 e1620.
- Paroški, M., Konjović, Z., Surla, D., 2013. Implementation of e-government at the local level in underdeveloped countries: the case study of AP Vojvodina. *Electron. Libr.* 31 (1), 99–118.
- Ray, S., Mukherjee, A., 2007. Development of a framework towards successful implementation of e-government initiatives in health sector in India. *Int. J. Health Care Qual. Assur.* 20 (6), 464–483.
- Rorissa, A., Demissie, D., 2010. An analysis of African e-Government service websites. *Gov. Inf. Q.* 27 (2), 161–169.
- Rotchanakitumnuai, S., 2013. The governance evidence of e-government procurement. *Transform. Gov. People Process Policy* 7 (3), 309–321.
- Sangki, J., 2017. Vision of future e-government via new e-government maturity model: based on Korea's e-government practices. *Telecomm. Policy* 1–12 in press.
- Sarrayrih, M.A., Sriram, B., 2015. Major challenges in developing a successful e-government: a review on the Sultanate of Oman. *J. King Saud Univ.-Comput. Inf. Sci.* 27 (2), 230–235.
- Schuppan, T., 2009. E-Government in developing countries: experiences from sub-Saharan Africa. *Gov. Inf. Q.* 26 (1), 118–127.
- Schwerin, E., Prier, E., 2013. Rent-seeking obstacles to changing environmental practices and sustainable public procurement in China. *Environ. Pract.* 15 (3), 240–252.
- Sharma, S.K., Govindaluri, S.M., Gattoufi, S., 2015. Understanding and predicting the quality determinants of e-government services: a two-staged regression-neural network model. *J. Model. Manage.* 10 (3), 325–340.
- Siddiquee, N.A., 2016. E-Government and transformation of service delivery in developing countries: the Bangladesh experience and lessons. *Transform. Gov. People Process Policy* 10 (3), 368–390.
- Singh, G., Pathak, R.D., Naz, R., Belwal, R., 2010. E-Governance for improved public sector service delivery in India, Ethiopia and Fiji. *Int. J. Publ. Sect. Manage.* 23 (3), 254–275.
- Soni, V., Dey, P.K., Anand, R., Malhotra, C., Banwet, D.K., 2017. Digitizing grey portions of e-governance. *Transform. Gov. People Process Policy* 11 (3), 419–455.
- Sorn-In, K., Tuamsuk, K., Chaopanon, W., 2015. Factors affecting the development of e-government using a citizen-centric approach. *J. Sci. Technol. Policy Manage.* 6 (3), 206–222.
- Teoa, T.S., Lin, S., Lai, K.H., 2009. Adopters and non-adopters of e-procurement in Singapore: an empirical study. *Omega* 37 (5), 972–987.
- Tseng, P.T., Yen, D.C., Hung, Y.C., Wang, N.C., 2008. To explore managerial issues and their implications on e-government deployment in the public sector: lessons from Taiwan's Bureau of Foreign Trade. *Gov. Inf. Q.* 25 (4), 734–756.
- Waheduzzaman, W., Miah, S.J., 2015. Readiness assessment of e-government: a developing country perspective. *Transform. Gov. People Process Policy* 9 (4), 498–516.
- Weerakkody, V., El-Haddadeh, R., Al-Shafi, S., 2011. Exploring the complexities of e-government implementation and diffusion in a developing country: some lessons from the State of Qatar. *J. Enterp. Inf. Manage.* 24 (2), 172–196.
- Wittman, H., Blesh, J., 2017. Food sovereignty and fome zero: connecting public food procurement programmes to sustainable rural development in Brazil. *J. Agrar. Chang.* 17 (1), 81–105.
- Zarei, B., Ghapanchi, A., 2008. Guidelines for government-to-government initiative architecture in developing countries. *Int. J. Inf. Manage.* 28 (4), 277–284.
- Zarei, B., Ghapanchi, A., Sattary, B., 2008. Toward national e-government development models for developing countries: a nine-stage model. *Int. Inf. Libr. Rev.* 40 (3), 199–207.
- Zhou, X., 2004. E-Government in China: a content analysis of national and provincial web sites. *J. Comput. Mediat. Commun.* 9 (4), JCMC948.
- Zhu, Q., Geng, Y., Sarkis, J., 2013. Motivating green public procurement in China: an individual level perspective. *J. Environ. Manage.* 126, 85–95.

Other cited articles

- Bai, C., Kusi-Sarpong, S., Sarkis, J., 2017. An implementation path for green information technology systems in the Ghanaian mining industry. *J. Clean. Prod.* 164,

- 1105–1123.
- Boateng, R., 2013. The challenge of taking baby steps in E-governance in West Africa, extended. *Proceedings of the 1st Business and Development in Africa: Determining New Frontiers* April 8–9. University of Ghana Business School, Accra, Ghana.
- Bonsón, E., Torres, L., Royo, S., Flores, F., 2012. Local e-government 2.0: social media and corporate transparency in municipalities. *Gov. Inf. Q.* 29, 123–132.
- Cattaneo, G., 2012. Will public administrations overcome their own inertia before EC mandatory regulation will force them to? *Proceedings of the 1st International EIBURS-TAIPS TAIPS Conference on “Innovation in the Public Sector and the Development of E-Services”*. University of Urbino, Urbino April 2012.
- Davis, F.D., 1989. Perceived usefulness, ease of use, and user acceptance of information technology. *Mis Q.* 13 (3), 319–339.
- Denyer, D., Tranfield, D., 2009. Producing a systematic review. In: Buchanan, D., Bryman, A. (Eds.), *The Sage Handbook of Organizational Research Methods*. Sage Publications Ltd, London, pp. pp.671–89.
- Dunleavy, P., Margetts, H., Bastow, S., Tinkler, J., 2006. New public management is dead—long live digital-era governance. *J. Publ. Adm. Res. Theory* 16 (3), 467–494.
- Durach, C.F., Kembro, J., Wieland, A., 2017. A new paradigm for systematic literature reviews in supply chain management. *J. Supply Chain. Manage.* 53 (4), 67–85.
- Fang, Z., 2002. E-Government in digital era: concept, practice, and development. *Int. J. Comput. Internet Manage.* 10 (2), 1–22.
- Hall, M., Purchase, D., 2006. Building or bodging? Attitudes to sustainability in UK public sector housing construction development. *Sustain. Dev.* 14 (3), 205–218.
- Karjalainen, K., Kemppainen, K., 2008. The involvement of small and medium sized enterprises in public procurement: impact of resource perceptions, electronic systems and enterprise size. *J. Purch. Supply Manage.* 14, 230–240.
- Kjöllerström, M., 2008. Public procurement as a tool for promoting more sustainable consumption and production patterns. *Sustain. Dev. Innov. Briefs* 1 (5), 1–12.
- Kopp, A., 2011. Marrakech Task Force on Sustainable Public Procurement Led by Switzerland: Activity Report. Swiss Federal Office for the Environment (FOEN).
- Kusi-Sarpong, S., Sarkis, J., 2017. Virtual special issue on sustainable supply chains and emerging economies: call for papers. *Resour. Conserv. Recycl.* A6–A7.
- 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. *Gov. Inf. Q.* 28 (1), 47–53.
- McCrudden, C., 2004. Using public procurement to achieve social outcomes. *Nat. Resour. Forum* 28, 257–267.
- Myint, U., 2000. Corruption: causes, consequences and cures. *Asia-Pac. Dev. J.* 7 (2), 33–58.
- National Information Technology Agency (NITA), 2016. One Stop-Service Center (OSSC): The Concept of CICs. Accessed: 21/05/2017. From: <http://osscc.gov.gh/index.php/cics>.
- Neupane, A., Soar, J., Vaidya, K., Yong, J., 2012b. Role of public e-procurement technology to reduce corruption in government procurement. *Proceedings of the 5th International Public Procurement Conference (IPPC5)* 304–334.
- Preuss, L., 2009. Addressing sustainable development through public procurement: the case of local government. *Supply Chain Manage.: Int. J.* 14 (3), 213–223.
- Rousseau, D.M., Manning, J., Denyer, D., 2008. Evidence in management and organizational science: assembling the field’s full weight of scientific knowledge through syntheses. *Acad. Manage. Ann.* 2 (1), 475–515.
- Seuring, S., Müller, M., Westhaus, M., Morana, R., 2005. Conducting a literature review – the example of sustainability in supply chains. In: Kotzab, H., Seuring, S., Müller, M., Reiner, G. (Eds.), *Research Methodologies in Supply Chain Management*. Physica-Verlag HD.
- Seuring, S., Gold, S., 2012. Conducting content-analysis based literature reviews in supply chain management. *Supply Chain. Manage.: Int. J.* 17 (5), 544–555.
- Shakya, R.K., 2012. Procurement governance framework: Success to e-government procurement (E-GP) system implementation. *Proceedings of the 5th International Public Procurement Conference (IPPC5)* (pp. 17–19).
- Thai, K.V., 2001. Public procurement re-examined. *J. Publ. Procure.* 1 (1), 9–50.
- Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *Br. J. Manage.* 14, 207–222.
- United Nations, 2017. *World Economic Situation and Prospects 2017*. ISBN: 978-92-1-109175-5. Accessed: 5/09/2018. From: https://sustainabledevelopment.un.org/content/documents/25012017wesp_full_en.pdf.
- United Nations Department of Economic and Social Affairs (UNDESA), 2014. E-Government Survey 2014. E-Government for the future we want. United Nations.
- United Nations Environmental Programme (UNEP), 2011. Paving the Way for Sustainable Consumption and Production: the Marrakech Process Progress Report. UNEP, Paris.
- Vaidya, K., Sajeev, A.S.M., Callender, G., 2006. Critical factors that influence e-procurement implementation success in the public sector. *J. Publ. Procure.* 6 (1&3), 70–99.
- Walker, H., Brammer, S., 2012. The relationship between sustainable procurement and e-procurement in the public sector. *Int. J. Prod. Econ.* 140 (1)), 256–268.
- Walker, H., Miemczyk, J., Johnsen, T., Spencer, R., 2012. Sustainable procurement: past, present and future. *J. Purch. Supply Manage.* 18 (4), 201–206.
- Warner, K.E., Ryall, C., 2001. Greener purchasing activities within UK local authorities. *Corp. Soc. Responsib. Environ. Manage.* 8 (1), 36–45.
- Witjes, S., Lozano, R., 2016. Towards a more Circular Economy: proposing a framework linking sustainable public procurement and sustainable business models. *Resour. Conserv. Recycl.* 112, 37–44.
- World Bank, 2012. *Why Reform Public Procurement?* World Bank, Washington DC.
- Yin, K., 2003. *Case Study Research: Design and Methods*, third ed. SAGE, London.