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Reflecting on the role of dynamic capabilities in digital government with a focus on developing countries

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ABSTRACT

The ability to reconfigure organisational resources dynamically in order to adapt to changing environments is an important organisational capability. Developing countries in particular have a greater need to reconfigure their government resources. The aim of this study was therefore to conduct a systematic literature review of research into the dynamic capabilities of digital government. The findings suggest that most researchers have focused on the innovative capability compared with adaptive and absorptive capabilities. This means the focus is primarily on new services and infrastructure using ICT, but rarely on scanning the environment to identify new ways to provide existing services, nor on finding new ways to provide new services using ICT. The findings further highlight the absence of research in developing countries, specifically in Africa and Latin America. This research contributes to ICT4D literature in identifying research gaps on how to reconfigure government resources using ICT in developing countries.

Keywords: Dynamic capability, dynamic capabilities, e-government, electronic government, digital government

1. Introduction

Governments have increasingly been using ICTs as the main strategy to improve their services to citizens, yet ICTs do not necessarily result in the envisaged benefits (Carter & Bélanger, 2005). It is important continually to adapt the ICTs being implemented to the dynamic environment (Siddiquee, 2008).

In this paper, we draw on strategic management literature, particularly from the dynamic capabilities framework. Pisano (2017) defines dynamic capabilities as the learned and stable pattern of collective activities directed to the development and adaptation of operating routines.

The objective of this study has therefore been to conduct a systematic literature review of research done into the dynamic capabilities of digital government projects and reflect specifically on developing countries. The key ideas emphasised in this study are the following:

- To identify and select research articles on digital government using the lens of dynamic capabilities
- To classify and codify the emphases of the selected research works
- Briefly to summarise the key objectives and results of the selected papers
- To discuss the research gaps and indicate challenges for future researches

The remainder of the paper is structured as follows: The next section presents the methodology of the systematic literature review. It is followed by a section that gives a conceptual background to digital government and dynamic capabilities. Section 4 presents the findings of the systematic literature review and a discussion of the findings. Section 5 contains conclusions and areas for future research, and finally Section 6 discloses the limitations of the paper.

2. Search procedures, coding, and classification

Systematic literature reviews play a significant role in identifying previous research works and investigating the unique characteristics of these researches so that a clear indication of the research gaps, opportunities and challenges can be provided to potential researchers (Amui, Jabbour, de Sousa Jabbour, & Kannan, 2017). In this paper, a systematic literature review that follows the procedures of the work of Amui et al (2017) was implemented. The procedures of the work of Amui et al (2017) were followed because their research is based on the views of the dynamic capability theory. In their research work, the following procedures are used:

- Carrying out a survey of the existing research works published on the subject area
- Developing and using a classification coding system that enables researchers to classify the characteristics of the selected research works
- Recognising the main results of research works based on the coding system

- Analysing and discussing gaps, opportunities and challenges for potential future studies

Fahimnia et al (2015) followed a similar procedure.

Numerous searches for articles relating to dynamic capabilities (adaptive, absorptive and innovative capabilities) (Hu, Pan, Lin, Kang, & Best, 2014) of digital government system were performed. The key terms used in the search process were *dynamic capability, dynamic capabilities, e-government, electronic government and digital government*.

In this study, research works were downloaded from leading digital government journals, including *Government Information Quarterly, International Journal of Information Management, Information Systems Frontiers, Public Administration Review, Journal of Public Administration Research and Theory, Information Polity, Transforming Government: People, Process and Policy, International Journal of Electronic Government Research*. Other journals accredited with the host universities were also considered. It was important to use accredited journals to avoid the challenge of predatory journals. This is a limitation of the paper as conference papers, book chapters and other research outlets were not considered.

The collected research works were checked for inclusion or exclusion criteria and quality assessment criteria (Kušen & Strembeck, 2017) (see Table1). The purpose of exclusion and quality assessment criteria is to evaluate papers for their quality (Kušen & Strembeck, 2017). Finally, 11 important papers published between 2005 and 2013, and 23 recent publications (published since 2013) (Bartol, Budimir, Dekleva-smrekar, Pusnik, & Juznic, 2014) made up the 34 papers considered for the systematic literature review.

A summary of objectives and results of each article is contained in Table 2. The classification and coding of the selected articles were designed as described in Table 3.

Table 1. Inclusion/exclusion and quality assessment criteria

Inclusion criteria	<ul style="list-style-type: none"> • Papers published since 2005 • Papers in English • Papers that propose a solution to the selected dynamic capability issues in digital government • Full versions of journal articles that report, discuss or investigate dynamic capabili-
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	<p>ties in digital government</p> <ul style="list-style-type: none"> • Papers published in journals accredited with the host universities to overcome the challenge of predatory publishers
Exclusion criteria	<ul style="list-style-type: none"> • Papers not published in accredited journals • Papers that do not focus on research into dynamic capability in e-government • Papers not in English • Papers not recently published, except for some important ones • Any research work whose full text is not accessible
Quality assessment criteria	<ul style="list-style-type: none"> • Is the paper based on research? • Is there a clear statement of the aim? • Is there an adequate description of the context in which the research was carried out? • Does the paper review previous research into the topic? • Is the methodology described sufficiently? • Does the paper contain clear findings? • Does the paper indicate future work?

Table 2. Brief summary of the articles

	Authors	Brief summary	Country
1	Elkadi (2013)	The factors that influence the implementation of an e-government project are described based on integrated methodologies.	Egypt
2	Valdés et al (2011)	An e-government maturity model has been developed. The model explains “the assessment of the capabilities in terms of technological and human aspects in a comprehensive way”.	Chile
3	Gil-García, (2005)	The article analyses resources used by government practitioners to help them in the process of e-government implementation. A framework indicating the challenges of	USA, Canada

		ICT projects has been developed.	
4	Hu, Shi, Pan & Wang (2012)	A model that illustrates the service capabilities of e-government system is proposed. The paper indicates the relationship between the effects produced by e-government services.	China
5	Klievink & Janssen (2009)	A model that explains the development from “stove piped level to a nationwide joined up government” is described. The dynamic capabilities required at each stage are identified.	Netherlands
6	Wu & Hsia (2008)	The differences in technological knowledge, business models and aspects of dynamic capability in “internet commerce, mobile commerce and ubiquitous commerce” are investigated.	Taiwan
7	Janowski (2015)	The article describes a four-stage digital government evolution model that comprises digitalisation, transformation, engagement and contextualisation stages.	Portugal
8	Raus, Flügge & Boutellier (2009)	The paper identifies factors that affect the adoption of e-custom solutions by investigating the diffusion of a standardised innovation-customs solution.	Netherlands, Denmark
9	Janssen, Ae & Gil-garcia (2009)	The paper explains that policymakers should focus on ‘the next generation digital government infrastructure’ since it will make advance the availability of technological services.	Canada
10	Cui, Pan, Newell & Cui (2017)	The authors used the concept of resource orchestration or reconfiguration as a theoretical lens to develop a model that explains how resources are orchestrated.	China
11	Janssen & Estevez (2013)	The paper improves our understanding of different factors that affect how researchers share data.	Netherlands
12	Barrett, Davidson &	The paper aims at advancing the theoretical understanding of service innovation by indicating the impact of boundary	USA

	Vargo (2015)	resources.	
13	Mergel (2016)	The process tracing approach and qualitative interviews are used to give insight into existing policies on the implementation of an agile innovation management approach.	USA
14	Meijer (2015)	The paper develops a “theoretical model of e-governance innovation” that clarifies the different phases in the process of service innovation.	Netherlands
15	Choi, Jae, Jeung & Zo (2016)	The study suggests a technique that may be used to evaluate the execution of digital government in developing countries.	Indonesia
16	Yeh (2017)	The findings of the paper reveal that citizens are excited to use “ICT-based smart city services” that protect their privacy.	Taiwan
17	Medaglia & Zhu (2017)	The study examines different aspects of citizens, such as attitude and cognition, using ‘government-managed social media accounts’.	China
18	Svein ØlnesJolien Ubacht (2017)	The paper presents a detailed evaluation of the benefits of block chain technology.	Norway, Netherlands
19	Jing Zhan, Luis F. Luna-Reyes (2014)	The paper focuses on major factors that speed up transformation with the help of information technology.	Mexico
20	Kindström, Kowalkowski, & Sandberg (2013)	The paper recognises micro-foundations that help to realign the capabilities of organisations to adapt to the dynamic environment.	Sweden, Finland
21	Sun, Ku&Shih (2015)	The study proposes a “novel implementation framework for E-government 2.0”. This framework integrates different processes that ensure the participation of stakeholders.	Korea, Antigua and Bar-

			buda, and Ecuador
22	Janssen & van der Voort (2016)	The paper introduces “the concept of adaptive governance” and discusses its implications for governments that implement e-government.	Netherlands
23	Tay (2017)	This article investigates how living labs may function as “public open innovation intermediaries”. The authors conducted semi-structured interviews. Scalability and sustainability are the two major problems that challenge living labs.	USA
24	Scupola & Zanfei (2016)	This paper examines “the co-evolution of public governance and innovation”, and proposes Hartley's model.	Denmark
25	Arduini, Denni, Lucchese & Nurra (2013)	The authors identify different factors that affect local digital government.	Italy
26	Gonzalez, Llopis & Gasco (2013)	The paper considers the association between innovative behaviour and organisational size. The paper also identifies different factors that can influence the development of e-government services.	Spain
27	Arduini, Belotti, Denni, Giungato & Zanfei (2010)	The authors identify factors that affect the e-government services offered by local public administrations.	Italy
28	Bygstad (2006)	The paper investigates the relationship between “broadband and service innovation” in an e-government context.	Norway
29	Carter & Bélanger (2005)	The paper integrates constructs from the “technology acceptance model, diffusion of innovation theory and web trust models” to form a comprehensive model.	USA
30	Hu et al (2014)	The study explains “capability management perspectives to develop a concept that relates to path relationships”.	China
31	Merhi (2015)	This study investigates the major factors that are essential to e-government success.	USA

32	Li & Lin (2015)	The study proposes a framework to address the adoption of technologies for innovative activities.	Taiwan
33	Wilson & Daniel (2017)	The study identified key capabilities that are essential for the transformation process of electronic businesses.	UK
34	Siddiquee (2008)	The study focuses on analysing the association between e-government and innovations during service delivery.	Malaysia

After the selected papers had been analysed, a classification framework was designed. Number and letter codes were used to develop the classification framework. In the process of designing and developing the classification framework, the works of Jabbour (2013) and Mariano, Sobreiro & Rebelatto (2015) were considered. The classification dimensions of the research works described in Table 3 were based on the following coding criteria:

- National context (1), coded on an A-B scale, based on the works of Jabbour (2013) and Mariano et al (2015).
- Focus of the dynamic capability (2), coded on a scale of A-C (i.e. whether the research focuses on the adaptive, absorptive or innovative capability of the digital government system). This kind of coding was inspired by Junior and Filho (2012).
- Method of the research work (3), coded on a scale of A-C, based on the works of Junior and Filho (2012), but including a design science approach as an alternative emerging research method (Hevner, March, Park, & Ram, 2004). Design science is aimed at creating new artefacts that are context suitable. Design science research is pragmatic in nature as it is useful in solving practical human problems (Kuechler & Petter, 2017).
- Sector of emphasis in the research (4), coded on an A-C scale, based on the work of Jabbour (2013).
- Dimension of analysis used in the research, if they are more related to technical, human or organisational aspects (Charbel Jose Chiappetta Jabbour, Jugend, De Sousa Jabbour, Gunasekaran, & Latan, 2015) (5), coded on an A-C scale.
- The continent where the study originated (6), coded on an A-E scale based on the work of Fahimnia et al (2015).

Table 3. Classification criteria with codes

Classification		Codes
Context	Developed countries	1A
	Developing countries	1B
Focus of the study	Adaptive capability	2A
	Absorptive capability	2B
	Innovative capability	2C
Method	Qualitative	3A
	Quantitative	3B
	Design science	3C
Sector	Infrastructure	4A
	Service	4B
	Not applicable	4C
Dimension of emphasis	Technical aspect	5A
	Human aspect	5B
	Organisational and others	5C
Origin/continent	North America	6A
	Europe	6B
	Asia	6C
	Africa	6D
	Latin America	6E

3. Brief conceptual background

3.1. Digital government

Digital government can broadly be defined as the utilisation of ICTs by government organisations to provide intended services to citizens. It can be implemented by providing citizens with better and improved access to information and enhanced services, as well as by ensuring the accountability of government to citizens (Norris & Reddick, 2013). Digital government is also ex-

plained as the exploitation of ICTs by different arms of the government to enable effective communication with its citizens in the process of service delivery (Siddiquee, 2008).

Digital government is not only the implementation of new ICT systems, it also targets the provision of effective and efficient services to citizens by improving access to information and creating a transparent system (Norris & Reddick, 2013). Digital government is supposed to improve and enhance public sector performance, reduce costs, improve revenue and reduce transaction costs (Siddiquee, 2008). Therefore digital government is especially important for developing countries because these countries demand the aforementioned advantages.

There are four other broad dimensions of digital government services (Siddiquee, 2008). The government-to-government (G2G) dimension is an approach in which a government communicates with its different arms using ICTs. The government-to-business (G2B) dimension is also a digital government type where government organisations use ICTs to communicate with private businesses. The third type of digital government is government-to-citizen (G2C), which entails that citizens communicate and get their services from the government through the use of ICTs. The last type of digital government is government-to-employ (G2E). This is the type of digital government where employees of government organisations get services from the government with the help of ICTs.

This paper focuses on digital government services and digital government infrastructure. Infrastructure relates to technologies and conditions necessary to provided services to customers, while service relates to the benefits customers get based on the infrastructure.

3.2. Dynamic capabilities

Organisations demonstrate two types of capabilities: ordinary and dynamic capabilities. Ordinary capabilities are demonstrated in everyday routines and are usually based on tradition, while dynamic capabilities reflect the ability to recognise the changing environment and re-invent routines (Hu et al., 2014).

Dynamic capabilities are defined as the organization's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Wilson & Daniel, 2017). They are systematic activities in which organizations are able to enhance their effectiveness and efficiency (Klievink & Janssen, 2009).

Dynamic capabilities assist organisations in adapting to the dynamic environment by sensing opportunities, making strategic decisions and reconfiguring the resource base. Most scholars discuss dynamic capabilities from the point of view of process aspects, though there are some research works that investigate dynamic capabilities from the perspective of *search*, *selection* and *deployment* (Hu et al., 2014).

In this paper the focus is placed on the three overarching types of dynamic capabilities, namely adaptive capability, absorptive capability or innovative capability (Wang & Ahmed, 2007). The adaptive capability is the ability to identify changes in the environment and recognise the implication of those changes for the organisation. The absorptive capability is the ability to identify new ways of working that are uniquely suitable for the organisation. The innovative capability is reflected in the creation of new products and services as a means of survival.

3.2.1. Dynamic capabilities in the public sector

Before explaining the applicability of dynamic capabilities in public sector organisations, it is essential to examine the difference between private and public organisations (see Table 4).

Table 4. Difference between public organization and private firms

Public organisations	Private firms
<ul style="list-style-type: none"> • Owned by political communities • Less competitive pressure • Funded by taxation • Directed by political force • Creation of public value • Less incentive to innovate 	<ul style="list-style-type: none"> • Owned by shareholders • More competitive pressure • Funded by customers • Directed by market force • Creation of profit • More incentive to innovate

The theory of dynamic capability is applicable to public organisations though it was initially created to analyse the behaviour of competitive profit-oriented firms (Pablo, Reay, Dewald, & Casebeer, 2007; Piening, 2013a). Since both public sector and private firms function as a collection of resources, the concept of dynamic capabilities applies to both of them (Easterby-smith, Lyles, & Peteraf, 2009; Pang, Lee, & Delone, 2014; Piening, 2013b).

Therefore, having dynamic capabilities in government agencies can result in greater development in developing countries as it enables these countries to utilise their limited resources wisely. Most of the resources in developing countries are from government (Mohammed et al., 2016), hence a continuous reconfiguration of these limited resources is essential in order to use them efficiently (Siddiquee, 2008).

4. Results and discussion

The selected articles were analysed using the inclusion, exclusion and quality assessment criteria.

4.1. National context

It is essential to analyse the national context (Jabbour, 2013; Mariano et al, 2015). A considerable number of the articles are from developed countries (1A) while only few are from developing countries (1B) as described in Figure 1. The authors' location was not considered based on affiliation but on the national context of the study, since authors from developing countries may produce articles associated with developed countries and vice versa.

The results reveal that only 8.8% of the total published papers are from developing countries while 81.2% are from developed countries. There are different reasons for the lower number of research works in developing countries. The dynamic capability approach is given less attention in the public sector than in the private sector in general (Piening, 2013b). Digital government is relatively not as mature in developing countries. Another reason is that developing dynamic capabilities needs committed managers who can sacrifice a lot of time and energy in public organisations; limited managerial autonomy and incentives might discourage managers from being committed in their work (Piening, 2013b; Pang et al, 2014). This is the reality, especially in developing countries, as there are often budget constraints.

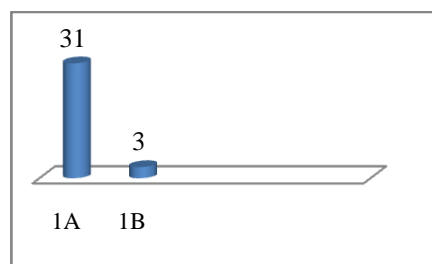


Figure 1. National context distribution

4.2. Focus on the dynamic capability

This discussion is based on the extent to which dynamic capabilities are emphasised in the study. Adaptive, absorptive and innovative capabilities are given due consideration in the analysis (Amui et al., 2017).

The articles that report on research into adaptive capabilities are classified as 2A, those on absorptive capabilities as 2B and those on innovative capability as 2C.

Papers published on adaptive capabilities alone represent 2.9% of the total articles, while absorptive capabilities alone represent 5.9%. 38.2% represent innovative capabilities alone, while 11.8% represent adaptive and innovative capabilities together. 41.2% of published articles focus on adaptive, absorptive and innovative capabilities together, as described in Figure 2. This indicates that there is lack of articles published on adaptive and absorptive capabilities.

Developing countries are resource deficient (Mohammed et al., 2016). The development of dynamic capabilities like adaptive and absorptive capabilities in the public organisation of developing countries can lead to the efficient use of their limited internal resources.

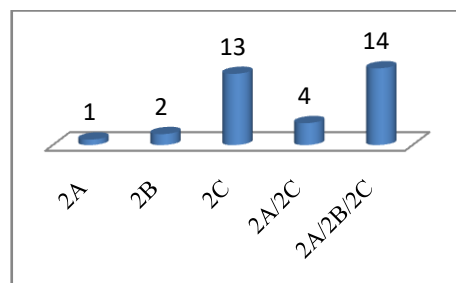


Figure 2. Focus area distribution

4.3. Research methods

Based on the work of Jabbour (2013), the methodological approach of each article has been analysed following the classification 3A for qualitative studies, 3B for quantitative studies and 3C for design science approaches.

The analysis indicates that 47.1% of the studies are qualitative studies, while the other 41.2% are quantitative studies. 11.8% of the studies are the design science type (see Figure 3). This shows that other than qualitative and quantitative studies, more conceptual studies (reviews) are

needed. There is an opportunity for research that uses a design science approach and mixed methodologies (quantitative and qualitative studies).

More research into the dynamic capabilities of digital government is needed in developing countries since these countries are challenged by different problems, for instance, low levels of internet penetration, a digital divide, computer illiteracy and a lack of allocated budget, which impede the implementation of digital government. Since ICT is a means to development, developing countries need to focus on how to implement better services using digital government.

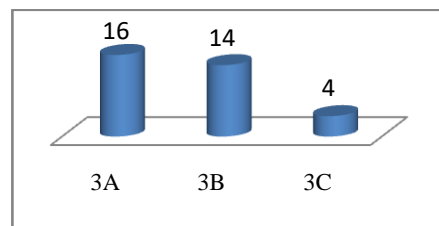


Figure 3. Method distribution

4.4. Sector

Research works that emphasise digital government infrastructure are classified as 4A. Those papers that study digital government service are classified as 4B, while those that do not emphasise any of the two are classified as 4C.

The service sector represents 67.6% of all the analysed articles, while the infrastructure sector represents 14.7%. The rest of the papers (17.7%) do not focus on infrastructure or services, but on the dynamic capabilities (organisational) of different government agencies related to the dynamics of ICTs (see Figure 4).

There is therefore an opportunity for research into the creation of new ICT infrastructure in response to the changing environment, as well as how governments reorganise their resource base to take advantage of the new ICT.

Research shows that most developing countries are deprived of the benefits obtained from ICTs (digital government) due to the high cost of infrastructure and inappropriate management mechanisms. Therefore, governments of these countries should pay a significant attention to solve the problems.

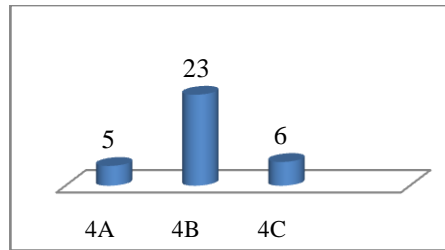


Figure 4. Sector distribution

4.5. Technical, human and organisational dimensions

Technical aspects include technologies, structure, technical knowledge and processes. Human aspects include training, decisions, cultures and teams, and organisational aspects include the structure of an organisation (Amui et al., 2017).

Articles on technical, human and organisational aspects together represent 67.6% of the articles. 11.8%, 5.9% and 8.8% of the total articles represent technical, human and organisational aspects respectively. The other 5.9% of the papers focuses on the combination of technical and human aspects; and the combination of human and organisational aspects (see Figure5).

To implement and operate digital government projects successfully, all three dimensions (technical, human and organisational) should be integrated as each of these dimensions are symbiotically related (Arduini et al., 2013). Implementing and operating a successful digital government system is not only a matter of technical change, but also of transformation of organisational and socioeconomic structures (Arduini et al., 2013).

The finding highlights that most of the research has taken a holistic approach to the technical, human and organisational dimensions. More research can therefore focus on each dimension and their relation to one another.

In most of the developing countries it is a challenge to capacitate people with techniques to use ICTs, to transfer appropriate technologies and to build suitable organisational structures where ICTs can be implemented. This research suggests that the governments of these countries should place significant emphasis how to solve these problems.

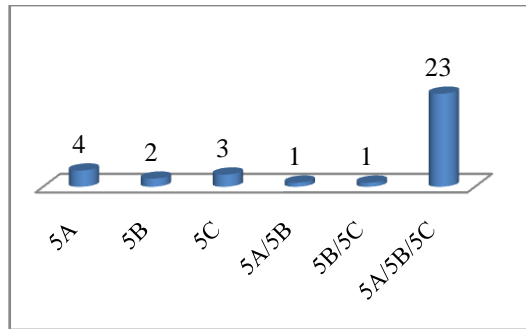


Figure 5. Dimension distribution

4.6. Geographical origin

The last classification explored in this analysis is the origin of the studies (see Figure 6). The study reveals that most of the works, namely 41.2%, come from the European continent. The North American continent accounts for 29.4% of the articles, while 23.5% of the studies come from Asia. 2.9% originate from Africa and another 2.9% from Latin America. These results demonstrate that there is room for research into the dynamic capabilities of digital government in Latin America and Africa. The two continents are characterised by resource constraints, yet they are rapidly adopting mobile technologies (ITU, 2016). This finding suggests that a great deal of research is required in these resource-constrained continents, especially because the premise of dynamic capabilities focuses on better utilisation of limited internal resources.

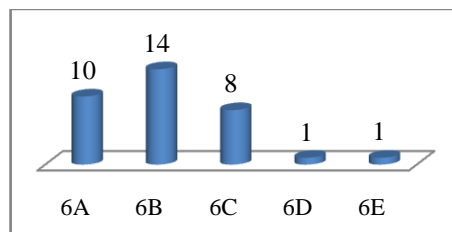


Figure 6. Origin distribution

5. Conclusions and implications for future researches

The aim of this paper was to present a review of literature on digital government from the perspective of dynamic capabilities, with a reflection on developing countries. The results indicate that more research is needed into the dynamic capabilities of public sector organisations in de-

veloping countries, with a methodological choice of design science and mixed methodologies (qualitative and quantitative studies).

Although much research has been done into the service sector, there is room for further research into the dynamic capabilities of digital government infrastructure and digital government organisational functions. Most existing research focuses on innovative capability, while little or no research focuses on absorptive and adaptive capabilities. Very little research is done into developing countries.

This paper is valuable for developing countries – it recommends that governments should consider the development of dynamic capabilities so that government organisations can use their limited resources more efficiently.

The institutional as well as economic structures of developing countries are unpredictable due to political and social instabilities (Barrett et al, 2015). This creates a suitable condition for researchers both to expand and to adapt previously studied research works on the dynamic capabilities of public organisations in the context of developed countries. Moreover, there are opportunities for researchers in developing countries to become involved in producing novel research in their own context, as these countries do not have legacy technologies. In other words, the unique condition of emerging economies offers an opportunity to researchers to study the dynamic capabilities of public organisations that use ICT as a tool to accomplish their objectives.

Adaptive governance is taken as an instrument for implementing stable, efficient, robust and accountable governance on the one hand, and dealing with complex and unexpected changes resulting from the mismatch between the external environment and the mechanism for organisational management on the other hand (Janssen & Van der Voort, 2016). Therefore, there is a research gap in determining optimal adaptive governance in developing countries.

The micro-foundations, which include intangible tacit elements such as organisational structure, distinct skills, procedures and decision rules that help to realign the capabilities of organisations to adapt to the changing environment, are identified (Kindström et al, 2013). However, research is still needed into the evaluation of performance and the impact of the identified micro-foundations, which are the basic factors for the development of dynamic capabilities in organisations in general and public ICT-based organisations in particular.

More research is needed into the process of developing the dynamic capabilities of public sector organisations. Governments need to scan their social and economic environments to identify

new ICT-based ways of providing the existing services and to find ways of providing new ICT infrastructure or re-orienting the organisational aspects of digital government. Future research could also investigate the flexibility of government policy to allow for such new services and infrastructure as can be provided by emerging ICTs.

The paper concludes that intentional efforts may be required in the resource-constrained regions of Latin America and Africa, where most developing countries are. Where these constraints exist, internal resources should be reorganised to take advantage of emerging ICTs in changing economic conditions.

This research potentially contributes to ICT4D literature, because there is insufficient research into the implementation of digital government in a dynamic ICT environment to increase the performance of governments. This research also contributes to practice, specifically in developing countries, as they need to apply dynamic capabilities in their public organisations in order to utilise their limited resources wisely.

6. Limitations of the paper

We acknowledge that there are limitations in this paper. One limitation of the paper is its focus on articles about digital government in leading digital government journals, which do not tend to highlight the issues experienced in developing countries. Another limitation of the paper is the limited number of reviewed articles.

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