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ONE: A DECADE OF e-GOVERNMENT RESEARCH IN AFRICA

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ABSTRACT: The state of research on e-government evolution in Africa is ripe for analysis. The article analyses e-government research and scholarly publishing through an assessment of the key features of the research and the community spearheading its emergence. This exploratory study seeks to map the terrain of e-government research in Africa at the end of the first decade of the 21st century. For this purpose, 50 articles were identified using the Scopus citation database, and were subjected to content analysis. This work is intended to encourage continental e-government researchers to further explore and analyse the e-government phenomenon from varying starting points, perspectives, disciplinary orientations and research traditions, and to pave the way for a greater understanding of the dynamics, nature and key features of e-government on the continent.

KEYWORDS:

e-government research community, state of e-government research, ICT and public sector reform, ICT and socio-economic development, Africa

INTRODUCTION

Africa is the second largest continent, with a population of 1.03 billion in 2010 making it the world's second most populated continent, representing about 15% of the world's population (WEF, World Bank, AfDB, 2011). It is a continent of extraordinary diversity and contrasts. Aggregate indicators provided in global development reports mask striking differences between countries in terms of physical and population size, density, economic output, human development and a host of other features including the range of political systems and cultural diversity. Table 1 provides a snapshot of this striking diversity.

TABLE 1: COUNTRY DIVERSITY IN TERMS OF PHYSICAL SIZE, POPULATION, ECONOMIC OUTPUT AND GROWTH

Basic indicators		Countries	Indicators
Physical Size (thousand square kilometres)	Largest	Sudan	2 506
	Median	Congo	342
	Lowest	Seychelles	0.45
Population size (thousands)	Largest	Nigeria	158 259
	Median	Tunisia	10 374
	Lowest	Seychelles	0.850
Population density (per square kilometre)	Highest	Mauritius	636
	Median	Morocco	46
	Lowest	Namibia	3
GDP (based on PPP valuation in USD million)	Largest	South Africa	521 779
	Median	Mauritius	156 306
	Smallest	São Tomé & Príncipe	327
GDP per capita (PPP valuation, USD)	Highest	Equatorial Guinea	26 472
	Median	Ghana	1 526
	Lowest	Zimbabwe	256
Annual real DGP Growth in (2002-10)	Highest	Equatorial Guinea	12.9%
	Median	Libya	5.2%
	Lowest	Zimbabwe	-3.1%

Source: Compiled based on data from OECD, 2011

It is argued that Africa's economic geography imposes limitations on its growth and development that need to be overcome. Venables (2010) asserts that Africa's distance from the main global economic hubs, its low population density and income and its fragmentation into a large number of small countries limits access to markets both outside and within the continent. Its cultural, linguistic and religious diversity further contributes to fragmentation and fractionalisation. These features have contributed to "low productivity through economies of scale foregone" (Venables 2010, p. 470). Yet a number of positive developments have occurred during the first decade of the 21st century, despite the constraints associated with its specific colonial history, physical geography and remoteness, and the fragmentation of its polity and economy.

Africa has experienced a decade of economic growth. Economic output has increased at an average of 5.2% since the turn of the millennium. This is second only to the Asia and Pacific region, which grew at an average rate of 6% over the same period, and is higher than the world average of 3.7% as indicated in Table 2:

TABLE 2: REAL GDP GROWTH RATE

Region	Real GDP growth (annual percentage change)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
Africa	3.8	4.4	5.6	5.2	6.1	5.7	6.3	6.6	5.5	3.2	4.7	5.2
Asia and Pacific	5.7	3.3	5	5.7	6.8	7	7.8	8.5	5	3.4	8.2	6.0
Europe	4.6	2.5	1.8	2.3	3.3	2.7	4.1	4	1.4	-4.6	2.1	2.2
North America	4.4	1	1.7	2.3	3.6	3.1	2.9	2.1	0.2	-2.9	3.1	2.0
South America	3.2	0.9	0.1	2.2	7.1	5.2	5.7	6.7	5.5	-0.3	6.5	3.9
World	4.8	2.3	2.9	3.6	4.9	4.6	5.2	5.4	2.9	-0.5	5	3.7

Source: IMF, no date

According to the African Competitiveness Report (AfDB, 2011), this rate of growth can be explained by the implementation of more sustainable fiscal policies, inflation control and an increase in foreign direct investment and exports. However, concerns have been raised about the unevenness of this growth across countries and the continued dependence on oil and commodities exports to sustain growth. Yet the commodities boom only partly explains this growth, since resources only accounted for 24% of Africa's GDP growth from 2000 through 2008 (McKinsey Global Institute, 2010).

According to the McKinsey report (2010), the agricultural sector continues to dominate economic activity in many countries such as Burundi, Republic of Congo, Ethiopia and others, where it contributes more than 40% to GDP. Furthermore, the services sector is an important contributor to growth. The tourism sector remains a key sector in many countries, while services such as trade, financial services and real estate also contribute to growth. The major priority for the continent remains the structural transformation of the economy with a view to changing the sectoral composition of output. The aim of the transformation process is to ensure longer term sustained growth, an increase in labour productivity and a higher capacity for job creation (UNECA, 2011). At the same time, there is a need to ensure that continued economic growth is translated into tangible human and social development outcomes.

Sub-Saharan African ranks the lowest in terms of the Human Development Index (HDI), the measure for life expectancy, literacy, education and standards of living of countries. The region has, however, made the most significant progress over the last decade compared with other regions, due to rising income per capita in most countries, improvements in access to knowledge and health outcomes (AfDB et al, 2011). Closer inspection reveals stark contrasts. For instance, Burkina Faso has made the fastest progress in human development, with growth in access to water, expanding basic service and a decline in income poverty. At the other end of the spectrum, Zimbabwe has regressed from an HDI of 0.232 in 2000 to 0.140 in 2010 due to a contraction in all the indicators except literacy levels (UNDP, 2010), as shown in Table 3.

TABLE 3: REGIONAL HUMAN DEVELOPMENT INDEX, 2000-2010

Developing regions	Human Development Index		Average annual HDI growth rate
	Value in 2000	Value in 2010	2000-2010
Latin America and the Caribbean	0.660	0.704	0.64
Europe and Central Asia	0.648	0.702	0.80
East Asia and the Pacific	0.559	0.643	1.40
Arab States	0.525	0.588	1.14
South Asia	0.440	0.516	1.16
Sub-Saharan Africa	0.315	0.389	2.10
World	0.570	0.624	0.89

Source: UNDP, 2010

It is in this context of economic growth and improvements in social development that the role of government in economic development and in producing tangible human development outcomes is brought into sharp focus. Evidence suggests that countries able to successfully transition from agrarian to industrial or services economies had governments that played a leading role in facilitating the process of transformation (UNECA, 2011). African countries have been engaged, to varying degrees, in public sector reform, characterised by a redefinition of the role of the public sector and the rejuvenation of administrative systems (Ayee, 2008). These reforms have taken place in the context of competing public administration and management paradigms, including new public management (NPM) and conceptions of the state as a developmental state.

New public management has left an indelible mark on the three phases of public-sector reform in Africa (Ayee, 2008; OECD, 2002). The first phase between the mid-1980s to mid-1990s was a direct outcome of the structural adjustment programmes (SAPs) sponsored by the World Bank and the International Monetary Fund (IMF). The objective of these types of reforms was to make the public sector more efficient through cost reduction and containment measures, especially by way of rationalising the machinery of government. The second phase sought to address weak institutional and human resource capacity as the root problem in the poor delivery of public services. The key interventions included the development of staff skills, improving management systems and structures, restoring incentives and improving pay, as well as improving the work environment. Thirdly, the need to improve service delivery characterised the reform agenda after 2000. NPM-induced reform during this period called for less, but more efficient, government. Conceptions of the developmental state called for an interventionist approach by the public sector, noting the advances made by the Japanese state in fostering industrial development (Johnson, 1982).

Whether reform was influenced by NPM thinking or the more interventionist oriented conceptions of a development state, information and communication technologies (ICTs) were viewed as fundamental to strategies for public sector reform. Since government is the single largest collector, user, holder and producer of information (Heeks 1999),

technologies that facilitate its access, storage, communication and usage can make a significant impact on transforming government services and the informatisation of the public sector (Frissen, Snellen, Wolters & Brussaard, 1992). The informatisation of the public sector has provided the basis for the adoption and greater use of electronic information systems "beyond the computerisation of administrative tasks" (Abrahams & Newton-Reid, 2008). The term "e-government" is used to describe the use of "new information and communication technologies, and particularly the Internet, as a tool to achieve better government" (OECD, 2003, p. 23), and is considered a driver of public sector reform due to its perceived potential to improve the quality of the services offered to citizens and businesses and to rationalise the internal organisation of the administrative apparatus (Cordella, 2007).

Africa has been one of the most dynamic regions in terms of ICT growth over the last decade. In 2000 there were only 11 million mobile cellular subscriptions and three million Internet users. This increased to 32 million Internet users and 246 million cellular subscriptions by the end of 2008 (ITU, 2010; ITU, 2009). In addition, there has been a steady geographical expansion of telecommunications networks, with significant infrastructure growth in wireless networks and in submarine fibre-optic cables connecting Africa to the world (Williams, Mayer & Minges, 2011). Despite this progress, the region's absolute penetration rates and access figures remain low and far behind levels in other developing regions. Access to the Internet is growing slowly, due to high prices and low bandwidth in domestic backbone networks and fixed line access networks (Foster & Briceño-Garmendia, 2010).

TABLE 4: REGIONAL HUMAN DEVELOPMENT INDEX, 2000-2010

Basic ICT infrastructure access indicators	2003	2008	CAGR (%)
Main (fixed) telephone lines	9 552 700	10 617 000	2.5
Mobile cellular subscriptions per 100 inhabitants	5.3	32.5	44.0
Internet users per 100 inhabitants	1.3	4.2	27.0
International Internet bandwidth			
(bits per second per Internet user)	20.3	433	16.3
Fixed broadband Internet subscribers (in 000s)	32.2	643.9	82.1
	2002	**2007**	**CAGR (%)**
Proportion of households with Internet access	0.4	2.3	38.2
Proportion of households with computers	1.9	5.3	22.8

Source: ITU, 20

It is in this context that e-government in Africa has evolved. According to the e-Government Development Index (UN, 2010, p. 61), "Africa continues to lag far behind the world average". The index is a composite measure to assess a country's capacity and willingness to use e-government for development, and measures the quality of online services, telecommunication connectivity and human capacity. The latest survey, which ranks countries and regions on a scale between one and zero, indicates that Africa scores a low 0.27 compared to the world average of 0.44 (Table 5). Insofar as e-government project implementation is concerned, it is claimed that projects mainly ended in total or partial failure (Heeks, 2002), though some progress has been made post-2002. These assessments, if accepted uncritically, paint a sombre picture of e-government development in Africa.

TABLE 5: REGIONAL E-GOVERNMENT DEVELOPMENT INDEX

Region	e-Government Development Index
Africa	0.2733
Americas	0.4790
Asia	0.4424
Europe	0.6227
Oceania	0.4193
World	0.4406

Source: UN, 2010

The e-Government Development Index has been questioned for the relevance of some of the indicators used. For instance, Mwangi (2006) argues that the measures used in the telecommunications infrastructure component are based on telephony (the number of people per 1 000 with personal computers, telephone lines, mobile phones, televisions, online population), whereas Rwanda's IT system is based on radio waves and is not captured by the indicators currently in use. Furthermore, there is no evidence to suggest that public sector IT project failure rates are higher in Africa than in other developing regions. Thus, conducting research on how e-government is emerging in the African context is of critical importance in order to capture the history and identify lessons to inform future e-government policy and strategy formulation.

E-GOVERNMENT RESEARCH THEMES AND MATURITY

A scientific body of knowledge is defined by its theories, concepts, methods and community that emerge around fields of enquiry and intervention. Synthesis and meta-analysis of a body of knowledge are important to create mechanisms for defining the scope of the knowledge domain, as well as understanding its evolution, structure and application. The outcome of such synthesis and meta-analysis contributes to the accumulation of knowledge on the subject and provides markers along its evolution that describe its nature, shape and character. Several studies on e-government research now provide a mapping of the terrain (Kraemmergaard & Schlichter, 2011).

At its inception, e-government emerged as a field of enquiry for practitioners, who organised conferences to apply their minds to the challenges presented by the increasing application of ICT in government. Academia followed suit and contributed to the rapid growth of knowledge in the field. Several studies bemoaned the quality of the research in the early years of development. Grönlund (2004) critiqued the rigour and relevance of the early work. Heeks and Bailur (2007, p. 258) were particularly critical of papers "playing fast and loose with generalisations" and concluded that e-government research was in a poor state. Since then it has been argued that e-government has emerged as a distinct discipline (Scholl, 2007) that has grown beyond its infancy (Scholl, 2010). According to Scholl (2010) e-government research investigates information and technology use, public policy, government operations, government services and citizen engagement as the key concepts in the field. The main themes in the field are technological innovation and modernisation in the public sector; e-government programme evaluation and policy analysis; e-participation and digital democracy; e-services; and accountability, transparency and the dissemination of information (Bolívar, Muñoz & López Hernández, 2010).

The type of research against which the maturity of a field can be assessed has been categorised by Grönlund (2004) as philosophical, descriptive, theory generating and theory testing. Based on an analysis of 170 papers published in three major e-government conferences, he concluded that case studies and product descriptions were most frequent, while very few papers were produced contributing to theory generation and testing. Yildiz (2007) regards as a major obstacle the vagueness of e-government as a concept, and the general lack of in-depth analysis in regard to its political nature and the complex institutional environments in which e-government develops. This is seen to be further exacerbated by the lack of coherence and common bases for communication and accumulation of knowledge in the field (Heeks & Bailur, 2007).

The field is, however, in a dynamic state of evolution. More recent studies, based on larger literature samples, assert that the state of e-government research is maturing. The knowledge base consists of a body of literature in excess of 2 500 peer-reviewed papers, seven core journals, three core conferences, and two international professional associations. At least 300 new research papers are added to this knowledge stock every year (Scholl, 2010). In analysing the literature base, Scholl (2010) found that in the core e-government research community, 225 authors have published four or more papers and a further 55 authors have published eight or more papers. Furthermore, Erman and Todorovski (2009) confirm that the research field has a stable group of elite authors that are frequently cited and have a major influence on the field.

Kraemmergaard and Schlichter (2011) analysed 450 peer-reviewed journal publications from 2000-2009 and concluded that the growth in the number of papers published has stabilised and that the percentage of theoretical papers has increased during the decade, indicating that the field is reaching maturity. e-Government research draws on several disciplines. In a study of papers published in the first two years of an e-government publication, Dwivedi (2009) found that the disciplinary background of the authors is generally either in information systems, business, or computer science and information technology. According to Heeks and Bailur (2007),

e-government sits at the cross-roads of a number of other research domains, being principally computer science, information systems, public administration and political science. Scholl (2007) argues that e-government research draws on public administration, information systems and computer science, using procedures and methods prevalent in those fields, and that unique clusters of research problems are investigated that fall outside those disciplines. Therefore, e-government as a field of research belongs to a "class of integrative interdisciplinary sciences addressing evolving clusters of research problems systematically underserved and understudied within the boundaries of established disciplines" (Scholl, 2007, p. 29).

Yet after more than a decade of e-government research, the "theoretical ground is still under construction" (Assar, Boughzala & Boydens, 2011). Grönlund (2010, p. 23) asserts that as yet there is no explicit e-government theory and that the main challenge for the next generation of researchers is to "better understand the relation between technology, organisation and government values".

Understanding e-government research in different environments is an issue that has not yet been explored in much detail. Although Khan, Moon, Park, Swar and Rho (2010) begin to address this issue in their study on e-government in developing countries, more detailed work on the formation of the research field in different countries and regions of the globe would provide useful insights into how the field is developing under different conditions. Such studies should not only focus on the contribution that researchers from more peripheral regions make to the development of the field, but also on how the field is developing in those regions. Otherwise, there is the risk of setting up the dichotomy of centre-periphery logic without understanding what can be learnt from analysing the conditions for e-government development in specific contexts. It should be noted that countries and regions develop from different starting conditions and follow unique development paths, shaped by a range of factors such as resource endowments, research infrastructures, research problems and the dynamism of their respective research communities.

OUTLINE OF METHODOLOGY

An extensive search of the literature yielded no results for previous analytical studies on the state of e-government research in Africa. Exploratory research is useful when little or no knowledge exists about a process or activity, and research of this nature is therefore a "broad-ranging, purposive, systemic, prearranged undertaking" (Stebbins, 2001, p. 4). Thus, the aim of the study is to provide a description of e-government research pertaining to Africa, through a process of analysing the content of articles published in peer-reviewed journals and conference proceedings between 2000 and 2010. The dimensions covered in the exploration relate to: (1) the number of articles published in peer-reviewed journals and conference proceedings over this period; (2) the objectives of the research undertaken; (3) when the research was published; (4) collaboration among authors and where they were based at the time of writing the articles; (5) the type of data used in preparation of the article; (6) the methodology used in the research; (7) the maturity of the research undertaken; (8) the unit of analysis used; and (9) the publication outlets.

The Scopus citation database was selected as the database for the review of the literature on e-government in Africa. Citation databases have become key tools for research literature information retrieval and science evaluation. These databases are used to discover scientific and research literature and enable researchers to keep up to date with what has been published in specific fields. In 2004, the publishing company Elsevier introduced Scopus, which claims to be the largest abstract and citation database of research literature and quality web sources, covering nearly 18 000 titles from more than 5 000 publishers (Scopus, no date). Scopus compares well with other citation databases such as Web of Science and Google Scholar, offering a wealth of data when the citation period is limited to 1996 and onwards (Bar-Ilan, 2010; De Moya-Anegón, Chinchilla-Rodríguez et al, 2007).

The focus of the literature review was to discover bibliographic data covering research undertaken on e-government in Africa and thus research on e-government initiatives in any African country. The literature search took place in June 2011, using several terms to search the article title, abstract, keywords and authors' search fields, as indicated in Table 6. An initial list of 119 records was produced once duplicate articles had been removed. The list was further reduced to 84 articles when items other than refereed journal articles and conference proceedings were removed. A final list of 50 was produced after a review of each abstract for the relevance of the article in respect of covering research on e-government in an African country or in the region.

TABLE 6: SEARCH TERMS AND RESULTS

Search terms	Date	Results
Electronic Government AND Africa	06/06/2011	67
e-Government AND Africa	06/06/2011	17
e-Governance AND Africa	06/06/2011	16
Public Sector AND Information Technology AND Africa	06/06/2011	47
Internet AND Government AND Africa	10/06/2011	115
Information Technology AND Government AND Africa	10/06/2011	200
ICT AND Public Administration AND Africa	10/06/2011	4
e-Society AND Africa	22/06/2011	2
e-Services AND Africa	22/06/2011	10
e-Participation AND Africa	22/06/2011	3
e-Democracy AND Africa	22/06/2011	2
Digital AND Government AND Africa	22/06/2011	56
Information Society AND Africa	22/06/2011	247

A review of previous studies (Grönlund, 2004; Heeks & Bailur, 2007; Dwivedi, 2009; Bolívar et al, 2010; and Kraemmergaard & Schlichter, 2011) provided a basis for the development of an initial coding structure to undertake content analysis pertaining to the topics researched, authors, author institutions, main literature used, publication and methods used. Additional codes were developed to supplement the codes used in previous studies. This was done through applying

the initial set of codes to 10 randomly selected articles, representing a sample of 20%, and developing additional codes through a grounded approach to meet the requirements of the nine dimensions presented above. Each article was reviewed line by line with a view to identifying items relevant to the nine dimensions. Categories and labels were generated, reviewed and further clustered into categories pertaining to each dimension. The coding structure generated in this way is set out in Annexure A.

Once the coding structure had been formulated, an Excel database was developed to capture the results of the content analysis for each article and create the tables used in the analysis of the data. Each article was then reviewed over a two-month period between August and September 2011, applying the coding categories. Frequency tables were then generated for the purposes of analysis.

LIMITATIONS

Articles published in citation databases such as Scopus only represent a fraction of the research undertaken, especially research in developing countries (Shrum, 1997). Furthermore, the articles selected were limited to English-language, peer-reviewed articles that excluded contributions from Arabic and French-speaking Africa. African research is not widely disseminated or indexed outside the country of research or publication, or beyond the continent, thus limiting its visibility (Smart, 2005). African research is also poorly documented and represented online. Abrahams, Burke and Mouton (2010) argue that low visibility and accessibility have mutually reinforcing effects that work in tandem to place Southern Africa on a downward spiral as regards cycles of research productivity. This may apply equally to research on e-government in Africa. It can be deduced that the research found in internationally accredited journals listed in citation databases represents the tip of the proverbial iceberg. Thus, generalisations based purely on the visible literature should be made with caution.

FINDINGS AND DISCUSSION

Articles on e-government in Africa published in journals and conference proceedings indexed in Scopus only started appearing in the year 2003 (Odendaal, 2003). Table 7 indicates that the volume of journal articles more than doubled in the period 2007-2008 compared with the previous two-year period, jumping from nine to 19 articles. In the period 2009-2010, the volume appears to have temporarily stabilised at around 20 articles every two years. Articles on e-government development in Africa published in conference proceedings have grown at a steadier rate than journal articles. Despite this growth over the last decade, the annual volume of articles is low. For instance, if one considers the study undertaken by Kraemmergaard and Schlichter (2011) in which they identified 450 relevant e-government peer-reviewed journal articles published during the period 2000-2009, the number of journal articles produced on e-government development in Africa represents less than 1% percent of the total articles published. The scientometric study by Khan et al (2011 on e-government in developing countries found that only 11.1% of the 145 articles published in seven core e-government journals were of African origin.

TABLE 7: TOTAL NUMBER OF PEER-REVIEWED JOURNAL ARTICLES AND CONFERENCE PROCEEDINGS

Year	Total	Journal articles	Conference proceedings
2003-2004	2	1	1
2005-2006	9	8	1
2007-2008	19	10	9
2009-2010	20	11	9
Total	50	30	20

Additional Internet research was done to compile a database of all the authors identified in the study to determine, among other things, if authors were male or female. Table 8 confirms that research on e-government development in Africa is predominantly a male preoccupation. More than 80% of all authors are men and women take the lead in authoring articles in less than 15% of cases (the corresponding author was presumed to be the lead author). In his review of 41 articles published in one journal Dwivedi (2009) also found that the proportion of male authors (72%) is much higher than female authors (25.8%).

TABLE 8: AUTHORS BY GENDER

	Authors by gender		Lead author by gender	
	Frequency	Percentage	Frequency	Percentage
Male	72	81.8%	43	86%
Female	16	18.2%	7	14%
Total	88	100%	50	100%

The overwhelming majority of authors are based at universities, with only 11% based in the public sector (includes both government organisations and organisations in the not-for-profit sector), and less than 5% from industry. Table 9 shows that authors based in the public sector are more likely to author conference proceedings than journal articles. This is not surprising, given that conferences are more practitioner-oriented and the format and requirements for the publication of proceedings are less onerous.

TABLE 9: AUTHORS INSTITUTIONAL BASE

Research design	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
University	50	91%	24	73%	74	84%
Public sector	3	5%	7	21%	10	11%
Industry	2	4%	2	6%	4	5%
Total	55	100%	33	100%	88	100%

The largest number of articles is authored by single authors (46%), followed by papers written by two authors (40%). In cases where authors do collaborate, 41% of such collaboration takes place with authors based at the same institution. Collaboration between authors in more than half the cases is between authors based at universities, and in a quarter of the cases collaboration takes place between authors based at a university and a public sector institution, as shown in Table 10.

TABLE 10: AUTHOR COLLABORATION

Collaboration	Frequency	Percentage
Single author	23	46%
Two authors	20	40%
Three authors	3	6%
Four authors	4	8%
Forms of collaboration	**Frequency**	**Percentage**
Same institution	11	41%
University to university collaboration	15	56%
University and public sector collaboration	7	26%
University and industry collaboration	4	15%

An analysis of the disciplines in which the lead author is based shows that articles are most frequently written by authors based in library and information sciences. These authors typically approach e-government from an electronic records management (ERM) perspective (Mnjama & Wamukoya, 2007; Mutula, 2005), exploring how ERM supports e-government development and evaluating its constraints. This is followed by authors located in computer science and information systems, representing 12% of authors, (Table 11). Surprisingly, there are only three authors based in public administration, though this is a disciplinary area from which we could expect significant scholarly writing on e-government. A small number of contributions is made from authors based in a slightly broader range of academic disciplines, including history, communication science, public health and epidemiology, architecture, and geography.

TABLE 11: LEAD AUTHOR DISCIPLINE

Lead author discipline	Frequency	Percentage
Library and information science	17	34%
Computer science and information systems	6	12%
Practitioners	5	10%
Management science	3	6%
Public administration	3	6%
Political science	2	4%

The content analysis considered the research objectives of each of the articles. Most of the articles examine, investigate or evaluate various aspects of the adoption and usage of ICT in the public sector. One fifth of the articles draw attention to the implications of e-government and a further 16% examine the challenges that constrain e-government development and implementation, as shown in Table 12.

TABLE 12: RESEARCH OBJECTIVES

Research objectives	Frequency	Percentage
OBJ-ADO	18	36%
OBJ-IMP	11	22%
OBJ-CHA	8	16%
OBJ-IMT	6	12%
OBJ-CAP	5	10%
OBJ-OTH	2	4%
Total	50	100%

Secondary data comprised the main source used in the preparation of journal articles and conference proceedings, with 38% of papers indicating the use of secondary data such as existing academic literature and technical reports, official government reports and documents, unpublished research reports and project documentation. Of concern, however, is that nearly 25% of articles do not explicitly mention any data sources. This raises questions about the quality and rigour of the research. A quarter of the articles explicitly state that primary data was used in the research, with another 14% indicating the use of a combination of primary and secondary data, as indicated in Table 13. The frequency of using primary data in the case of articles published in conference proceedings is twice that of journal articles.

TABLE 13: TYPE OF DATA

Type of data	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
DAT-PRI	5	17%	7	35%	12	24%
DAT-SEC	15	50%	4	20%	19	38%
DAT-COM	3	10%	4	20%	7	14%
DAT-NON	7	23%	5	25%	12	24%
TOTAL	30	100%	20	100%	50	100%

An analysis of the broad methodological categories used in the study was undertaken following the schema by Kraemmergaard and Schlichter (2011). The most frequently used methodological approach is the descriptive kind (22%), in which a particular e-government phenomenon is described or argued, often only setting out a logical argument without any reference to data. Although this is somewhat of concern in regard to the quality of the research, it does provide a starting point for further research since these arguments often document observations, synthesise experience and bring together different ideas. Eighteen percent of articles use the

case study approach and a further 18% use data collected through surveys of a qualitative and quantitative nature. The case study approach is used three times more frequently in the case of articles published in conference proceedings (30%) compared with journal articles (10%). Table 14 indicates that theoretical research is one of the least frequently used methods.

TABLE 14: RESEARCH METHODOLOGY

Method	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
TYP-ARC	3	10%	2	10%	5	10%
TYP-CAS	3	10%	6	30%	9	18%
TYP-DES	8	27%	3	15%	11	22%
TYP-DSN	3	10%	1	5%	4	8%
TYP-EXP	2	7%	2	10%	4	8%
TYP-SUR	6	20%	3	15%	9	18%
TYP-THE	3	10%	2	10%	5	10%
TYP-NON	2	7%	1	5%	3	6%
Total	30	100% [1]	20	100%	50	100%

The analysis further determined what entity authors focused on in their research. Macro, meso and micro units of analysis have an established history in social theory (Smith, Schneaider & Dickson, 2006). Macro-level analysis describes the structures and patterns of societal change, meso-level analysis describes the organisational and institutional structures within society, and micro-level analysis refers to the individuals, their relationships and the factors that influence their behaviour. The majority of studies used the meso unit of analysis (52%), exploring those aspects of e-government relating to changes in the institutions of government and transformation in the organisation of government. This indicates that the usage by (micro-level) and impact of e-government (macro-level) on citizens and the economy is not yet a focus of African e-government research, as indicated in Table 15.

TABLE 15: UNIT OF ANALYSIS

Unit of analysis	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
UOA-MAC	2	7%	1	5%	3	6%
UOA-MES	15	50%	11	55%	26	52%
UOA-MIC	2	7%	3	15%	5	10%
UOA-COM	11	37%	5	25%	16	32%
TOTAL	30	100% [2]	20	100%	50	100%

1 101% due to rounding off
2 101% due to rounding off

Grönlund (2008) describes the maturation of a research field in terms of a model that moves through stages, from exploring unknown phenomena to more structured analysis as increasingly more knowledge is gained. This model identifies stages that incorporate philosophical research, in which new phenomena are observed with no or few explanatory theories and are speculative, based on philosophy; anecdotal case studies, in which a phenomenon is described without the use of theory; clustering, where similarities are identified among cases and used to hypothesize clusters; and theory creating and theory testing research, in which attempts are made to systematically analyse and interpret data for the purposes of model building, prediction and testing. Forty-six percent of articles fall within the philosophical research stage. This is followed by the anecdotal case study (30%) and clustering (14%) stages. Only 10% of articles involve any theory generation or testing, as indicated in Table 16.

TABLE 16: RESEARCH MATURITY

Maturity	Journal articles		Conference proceedings		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
MAT-PHI	15	50%	8	40%	23	46%
MAT-CAS	8	27%	7	35%	15	30%
MAT-CLU	4	13%	3	15%	7	14%
MAT-THG	2	7%	1	5%	3	6%
MAT-THT	1	3%	1	5%	2	4%
TOTAL	30	100%	20	100%	50	100%

There are now well established e-government conferences such as the dg.o conference, International Federation for Information Processing (IFIP) EGOV conference, and the e-Government track at the Hawaii International Conference on Systems Sciences (HICSS e-Gov), which provide opportunities for academics and practitioners to share their work and disseminate it globally through the publication of conference proceedings. Moreover, there are core journals that have provided in excess of 300 English-language, peer-reviewed articles per annum since 2004 (Scholl, 2010). The articles on e-government in Africa were published in a broad range of publications. The top three journal outlets are the Government Information Quarterly, the Electronic Library, followed by the Journal of Southern African Studies and the Records Management Journal. The ICEGOV Conference Proceedings is dominant in regard to publishing papers on e-government in Africa.

TABLE 17: PUBLICATION OUTLETS

Journals	Frequency	Percentage
1. Government Information Quarterly	4	8%
2. The Electronic Library	3	6%
3. Journal of Southern African Studies/ Records Management Journal	2	4%
Conference proceedings	**Frequency**	**Percentage**
1. ICEGOV Conference proceedings	12	60%
2. IST-Africa Conference proceedings	1	5%
3. Proceedings of the International Conference on Digital Government Research	1	5%

CONCLUSIONS

The terms electronic government or digital government first appeared in the academic and non-academic literature in the mid-1990s (Scholl, 2010; Grönlund & Horan, 2004) and the work has grown rapidly into an interdisciplinary research field. Compared with these developments, e-government research in Africa started relatively late with the first research paper appearing only in 2003 (Odendaal, 2003). Since then, there has been a steady growth of academic literature on e-government in Africa, with a doubling during the period 2007-2008 compared with the previous two years. At least a tripling of the productivity and visibility of articles is needed (to 30 or more articles and papers per year) for African research to make a significant impact on e-government practice on the continent.

The continental e-government research community is male dominated, overwhelmingly based at universities and most frequently authors' papers alone. When collaboration does take place, it tends to be with authors within the same universities or with other universities. Scholarly collaboration with practitioners in the public and private sector is infrequent. It is understood that collaboration cannot take place without effective organisation and resources. This involves bringing researchers together to share their work and learn from one another. A dedicated conference for scholars studying African e-government could serve as a catalyst for research collaboration among a more diverse community of researchers, through providing opportunities for networking and peer review.

At this stage of its development, authors from the library and information science, as well as the computer science and information systems disciplines, have made the most significant contribution to the literature. Surprisingly, authors from the public administration and development management disciplines feature poorly in contributing to the literature, despite the fact that globally, e-government research draws on public administration, computer science, information systems and political science as the core disciplines (Heeks & Bailur, 2007; Scholl, 2007).

The research undertaken on e-government in Africa is primarily aimed at gaining an understanding of, and insights into, the adoption and usage of ICTs in government. This is followed by a focus on exploring the implications of e-government from a transformation and change perspective, as well as interest in the challenges and constraints to e-government advancement. Data underpinning the studies is most frequently from secondary sources. Studies are primarily descriptive in nature, drawing on case studies and surveys as well as archival material in terms of research design and methods. Since government is the objective of study (Grönlund & Horan, 2004), the most frequent unit of analysis used is the meso-level, focusing on the institutions and organisation of government. Important new directions will include research that examines and publishes new macro- and micro-level data, as these types of research are necessary to understanding social and economic trends and to building future strategy and practice.

Research and scholarly publishing is in the early stages of development and is characterised primarily by its philosophical orientation, in which arguments are made to motivate for increasing the pace of e-government advance and for ensuring that strategies and programmes are contextually relevant. The clustering of similarities or attributes across cases is not yet prevalent in the research, hence this is important for future research as the basis for work that is explanatory and able to determine causality.

The authors and pioneers of e-government research have explored the terrain of e-government in Africa at the end of the first decade of the new millennium. The challenge now is to move beyond providing descriptions of e-government to providing deeper analysis, formulating perspectives and developing theories that explain its development, specific to the context and conditions shaping e-government in Africa in the second decade of the 21st century.

It should be noted that relatively few journals produced in the developing world and in Africa are indexed in databases such as Scopus, so that the volume of literature in this study almost certainly represents an underestimation of the total academic activity and research output on the subject of e-government. Future studies should broaden the scope of the literature review to include grey literature and other unpublished material. This would provide a more comprehensive view of the scope of e-government research in Africa.

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ANNEXURE A: CODING STRUCTURE

Dimensions and codes	Explanation
Research objectives	**The reason why the research was undertaken or the purpose of the article**
OBJ-ADO	Articles that examine, investigate or study the adoption and use of ICT in government.
OBJ-IMP	Articles that examine, investigate or study and highlight the implications of e-government development.
OBJ-CAP	Articles that examine, investigate, evaluate or study one or other capacity building aspect of e-government or e-government as a capacity building initiative.
OBJ-CHA	Articles that examine the challenges that confront e-government implementation or the needs that need to be addressed.
OBJ-IMT	Articles that examine, investigate or study one or other aspect of e-government implementation such as planning, resourcing, critical success factors, or management.
OBJ-OTH	Articles that do not fit into any of the above descriptions and require a unique classification.
Author number	**Number of authors**
AUT-ONE	One
AUT-TWO	Two
AUT-THR	Three
AUT-FOU	Four
AUT-FIV	Five
AUT-MOR	Six
Author Affiliation	**Type of institution to which the lead author is affiliated**
AU-UNI	Universities.
AU-IND	Private-sector institutions.
AU-PUB	Public-sector institutions (both government and organisations working in the not-for-profit sector).
Department	**University discipline in which the lead author is based**
DEP-PAD	Public Administration
DEP-PSC	Political Science
DEP-ACC	Accounting, Business and Economics
DEP-LIS	Library and Information Science
DEP-MSC	Management Science
DEP-CS&IS	Computer Science and Information Systems
DEP-MKT	Marketing and Communication
DEP-PRA	Practitioner
DEP-MUL	Multi-disciplinary Centre
DEP-OTH	Other than the list above
Gender	**Gender of the authors and the lead author**
GEN-MAL	Male
GEN-FEM	Female
GEN-LED	Gender of lead researcher

Number of Institutions	Number of institutions per article
INS-ONE	One
INS-TWO	Two
INS-THR	Three
INS-FOU	Four
INS-FIV	Five
INS-MOR	More than five authors
Data	**Type of data used in the study**
DAT-PRI	Primary
DAT-SEC	Secondary
DAT-COM	A combination of primary and secondary
DAT-NON	Not explicitly referred to
Publication	**Publication in which article was published**
PUB-NAM	
Methodology	**Data collection methodology used (Kraemmergaard & Schlichter, 2011)**
TYP-CAS	Papers reporting on studies that are involved with a single or a few sites often over a period of time
TYP-ARC	Papers using secondary data such as public records, existing data sets and statistics fall into this category
TYP-THE	Papers analysing existing theory, typically with the aim of developing new theory
TYP-SUR	Data gathered by means of questionnaires
TYP-EXP	Either laboratory or field experiments used
TYP-DES	Describes or argues solely for a phenomenon and often very practically oriented
TYP-DSN	Papers that construct systems and / or tools
TYP-EXR	Papers using qualitative methods to gain new insights into a phenomenon (often using grounded theory)
TYP-COM	Paper using a combination of the above categories
TYP-NON	Unable to determine type of paper
Unit of Analysis	**Unit of Analysis**
UOA-MIC	Micro
UOA-MES	Meso
UOA-MAC	Macro
UOA-COM	Combination
Maturity	Maturity insofar as body of knowledge is concerned (Grönlund 2008)
MAT-PHI	Reflects upon a phenomenon without data or reference to any theory
MAT-CAS	Describes a phenomenon
MAT-CLU	Clusters together the properties, features, or findings from several cases to establish the key elements of a theory
MAT-THG	Theory generation – attempts to analyse, interpret, quantitative or qualitative data in a systematic manner for the purposes of model building and prediction
MAT-THT	Theory testing – attempts to test a theory using quantitative or qualitative data