

A Review of Digital Government Challenges in Developing Nations

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Abstract

From a developing countries perspective, little is known about the feasibility challenges of e-Government cloud migration. There is scant literature published in comparison to more developed nations. A review was undertaken to investigate what the e-Government feasibility challenges were in Nepal and several developing regions, including Africa, South and Central Asia, the Middle East and in the Caribbean. Challenges unique to e-Government cloud migration were identified, including the impact of poor ICT infrastructure, low digital literacy, and a lack of financial and internal resources as the most common. The study concludes with a call for further e-Government research relevant to developing nations and for further in-depth studies that can focus on minimizing the effects of the key challenges identified. This study has strong relevance for digital government policy, feasibility and migration framework specialists, and scholars in the fields of cloud migration and electronic government.

Keywords: digital government, e-Government, e-Government challenges, developing nations, cloud migration feasibility.

1. Introduction

For those in developing countries the anticipated outcomes of implementing e-Government technologies are diverse. They can include more efficient delivery of government services to citizens, citizen empowerment through access to information, more efficient government management, corruption reduction, increased transparency, and cost reductions. However, the benefits of e-Government as espoused by cloud vendors are not always successfully achieved, and the aspirations have been proven to be more difficult to attain; with initiatives often failing to deliver on expected outcomes. According to the United Nations e-Government Survey Report (2018), 193 different nations were listed in the e-Government

Development Index (EGDI), and some of the e-Government projects implemented in developed nations such as the USA, the United Kingdom, the Republic of Korea, New Zealand and Australia have been highly successful. The same report discloses that many developing nations, like the Federal Democratic Republic of Nepal, were not considered mature enough as yet to deliver any effective governance or any better service delivery to their citizens through e-Government services.

The literature is dominated with a larger number of studies focusing on aspects of relatively successful e-Government implementations in western nations, and yet, comparatively, there are very few studies focusing on the needs of developing nations. Some issues are known to be common, such as the deployment of e-Government services requiring a minimum level of IT infrastructure, in terms of hardware, software and staff skilled in maintenance (Abid, et al., 2013). For developing nations seeking to leverage the advantages of modern technologies such as cloud computing, there appears a clear gap in available literature to draw upon. This challenge also occurs in the context of a donor-vendor issue sometimes experienced in technology projects where developing nations have been highly reliant on the technologies, advice, and knowledge on offer from donor countries or donor technology providers. It was believed that developing nations may have quite unique and different needs to those of western nations in terms of planning, designing and exploring the feasibility of e-Government implementations.

1.1. Research aim

The aim of the review presented in this paper was to investigate and identify what were the common e-Government challenges in developing countries. The research question was: *what are the most common e-Government challenges identified in the literature in the context of developing countries?* It was believed that the literature may reveal an improved understanding of the common challenges in

developing countries where similar challenges may be in place.

The identification of common challenges unique to developing countries may provide a useful basis for further e-Government research and provide opportunities for informing solutions.

2. Background

Around two decades ago Heeks (2003) argued that 35% of total e-Government projects undertaken in developing countries have resulted in complete failures. A further 50% were partial failures, and only 15% were considered successes. This represented a large design-reality gap where poor project management and impractical planning were considered key reasons for failure. Continuing a trend over several decades, e-Government projects in developing countries have faced a range of challenges and are often subject to failures. Studies suggest that factors such as infrastructure, budget, skills, culture, governance, and sustainability are critical to the success of e-Government initiatives, and that a more systematic and integrated approach is needed to address these challenges (Alemneh, 2016; Alshehri et al., 2016; Islam & Rahman, 2011; Mbhele & Dlodlo, 2019).

Similarly, Dada (2006) had also referred to a large design reality gap in e-Government systems as a major reason for project failure and stated that e-Government continues to evolve. On the other hand, he also noted that poor connectivity, poor technology infrastructure, a lack of highly skilled ICT professionals within government agencies (including in projects outsourced to the private sector), and insufficient funding lead to a dependency of donors' aid programs being further challenges. Likewise, Zhang, Xu, and Xiao, (2014) used a technology-organization-environment framework to identify the contributing factors to success, that included broadband access, interoperability among government agencies, agency size and structural focus, strong financial capacities, high ICT employee skills, willing political leadership, decentralization of decision making, supportive institutional environment and culture as the key factors that positively influenced successful e-Government diffusion.

Reece (2006) called for further investigation and testing of theories with new databases, specific cases considered, and a review of emerging new technology solutions as a pressing need. Twizeyimana and Andersson (2019) argued strongly for the public value of e-Government, identifying that successful e-Government deployment can be determined with an improved administration, Open Government (OG)

capabilities, improved ethical and professional behaviors, improved services, improved social value and improved trust and confidence in governance. They noted the absence of research in the context of developing countries and particularly in the *Least Developed Countries* (LDCs). They called for comparative studies to be undertaken. Avgerou (2003) had similarly urged for studies to focus on a developing country context and argued that the successful e-Government models of developed countries might not work for developing countries, such as Nepal.

With these unique challenges in mind, a review of literature seemed highly pertinent to identify common aspects that may be unique for e-Government implementation in Nepal that may identify similarities and potential differences with other developing regions.

3. Method

Denyer and Tranfield's (2009) five-step approach to conducting a systematic literature review was followed. The approach included the development of a search strategy, selection criteria, analysis and then synthesis of the literature. The type of publications collected included conference papers, journal articles and others (book chapters, white papers, and website resources). The database search focused on literature published between 2000-2022.

3.1. Locating studies

A small collection of studies has previously investigated the challenges and barriers in e-Government, such as Rana et al., (2013b) and Dwivedi, et al. (2016), who explored approaches to bridge the digital divide, the present study focused on addressing the gap in the literature focused on developing nations. The review focused on identifying e-Government challenges that would be relevant across several developing countries rather than being confined to a specific and smaller pool of literature for one country only. The keyword search focus was mainly on known concepts of e-Government challenges. Publications were sourced from the Digital Government Reference Library (DGRLv16.0), along with Google Scholar and the library portal at the Auckland University of Technology.

3.2. Study selection and evaluation

Studies that did not cover the e-Government challenges were removed from the review and

excluded. An initial collection of publications found was 11,877 in total. Of these only 276 were related to developing countries. Studies in a developing country context were notably lower in number when compared to the number of studies relating to developing nations.

From the pool of 276 developing nation publications, 35 journals, 17 conference papers and 5 book chapters were shortlisted for the review due to their inclusion of e-Government challenges.

Challenges were identified and placed into one of ten following challenge categories with abbreviated codes: ICT infrastructure-related challenges (II), legislation & policy issues (LP), human capital and digital literacy (HC), change management (CM), strategy (S), financial resources (FR), leadership & political instability (LR), social and cultural factors (SC), corruption (C), donor dependency and technology ownership (DD). These abbreviated codes represented ten broad categories of e-Government challenges.

The selection of the publications was not based on their publication ranking and category. However, to understand the significance of the short-listed literature and the future need for research in this area, the reviewed publications were also converted to abbreviated code according to the type and rankings. The publications were ranked according to ranking portals Scimago Journal & Country Rank (SJR) (scimagojr.com) for Journals and Computing Research & Education (CORE) Rankings Portal, (portal.core.edu.au/conf-ranks/) for the conference publications respectively. The abbreviated code for the source was used for Journal publication (J), Book Chapter (BC), and Conference Proceedings (CP). The rankings of the journal publications available in SJR are as quartile first, second, third and fourth (Q1, Q2, Q3, Q4) and H-index available for the journal. Similarly, for published conference proceedings, categories of publication quality were drawn from the Computer Science Conference Rankings online database at the Computing Research and Education Association of Australasia (CORE). These rate conference proceedings across 7 categories from the highest flagship conferences at A* (7.15% of 811 ranked conferences), A (7.15% of 811 ranked conferences), B (37.24% of 811 ranked conferences), Australasian B (1.6% of 811 ranked conferences) C (36.37% of 811 ranked conferences), and Australasian C others, as specified by the CORE Rankings Portal. The representation is mentioned under the type column of the table used for e-Government challenges from different regions as, Publication Type: Ranking: H-index (example J:Q1:H31) for Journals and Conference Proceedings as Publication Type: Ranking (example CP:A). Only the publication type is

mentioned for the publications whose rankings are not available.

3.3. Data Analysis

The frequency of e-Government challenges from developing countries for each category were calculated and compared to those focused on the context of Nepal. The top three most common challenges were identified according to the top three by frequency in each category of e-Government challenges. The weightage for each challenge is the sum of total publications referring to the specific challenges falling under each category.

4. Results

4.1. Africa

Table 1 below presents the e-Government challenges in the Africa region from a total of 11 publications that were included in the review. The publications included came from the countries and regions of Ghana (1), Nigeria (1), Tanzania (3), South Africa (2), Rwanda (1), Kenya (1), the Africa region (1) and Sub-Saharan Africa (1).

Table 1
e-Government Challenges in the African Region

Reference	Country	II	L P	H C	C M	S	F R	L R	S C	C	D D	Type
Kalu & Masri, 2019	Nigeria	✓			✓							J
Twizeyimana, Larsson, & Grönlund, 2018	Rwanda	✓		✓	✓	✓	✓	✓			✓	J
Adu & Ngulube, 2017	Ghana West Africa	✓		✓			✓					J:Q1: H59
Mkude & Wimmer, 2016	Tanzania	✓	✓		✓		✓	✓	✓			CP
Aikins, 2015	Africa region	✓	✓			✓	✓				✓	J
Mkude & Wimmer, 2015	Tanzania	✓	✓		✓		✓	✓	✓			CP: A
Nkohkwo & Islam, 2013	Sub Saharan Africa	✓	✓	✓	✓		✓	✓	✓	✓		J:Q4: H31
Sæbø, 2012	Tanzania	✓		✓	✓		✓	✓				CP:B
Mutula & Mostert, 2010	South Africa	✓		✓						✓	✓	J:Q1: H33
Wachira & Arlikatti, 2010	Kenya	✓		✓			✓			✓		J
Sibanda, 2009	South Africa	✓		✓								CP
Total	11	11	4	7	6	2	8	5	3	3	3	7(J) 4(CP)

Mkude and Wimmer (2016) identified six main e-Government challenges in Tanzania using a hierarchical model of Political, Economic, Social,

Technological, Environmental and Legal challenges (PESTEL). An earlier study in Tanzania by Sæbø (2012) mentioned a lack of change management, poor availability of hardware resources, a low budget for IT, poor ICT literacy and insufficient ICT manpower as the major ICT challenges.

Corruption was identified as a barrier for e-Government development in the context of Kenya and South Africa. Kenya's challenges also included endemic corruption, a lack of citizen involvement, low Internet penetration, scant connectivity in poor rural households, and costly satellite internet alternatives (Wachira & Arlikatti, 2010). Rwanda and Central East Africa's e-Government challenges were classified as information infrastructure (including hardware, software, database, electricity and regulation), management (including collaboration, communication and challenges in financing), governance (leadership and strategy), social inclusion (including the digital divide and a lack of ICT skills), trust in the new system (including change management) and no common taxonomy of IT terms (Twizeyimana et al., 2018).

Adu and Ngulube (2017) examined the challenges in sub-Saharan Africa with particular reference to Ghana as including funding, levels of security and privacy, low skills training and technological obsolescence as contributing challenges. The authors also recommended that government ministries and agencies could address some of the challenges with IT migration strategies towards more advanced technologies. A review of 75 articles and documents on the Sub-Saharan Africa region by Nkohkwo and Islam (2013) also summarized e-Government challenges as infrastructural, financial, human, political, organizational and socio-economic. These challenges were related to poor access to the ICT infrastructure, a lack of required human resources and barriers in the legal framework, low internet access and the digital divide. Studies covering the entire African region shared challenges in the high cost of mobile and broadband services, poor infrastructure, the digital divide between rural and urban areas, a lack of long-term sustainability and commitment to broadband investment, along with a lack of financial resources Aikins, (2015).

4.2. The Middle East

Traditionally included within the Middle East are Iran (Persia), the countries in Asia Minor, Mesopotamia, the Levant, the Arabian Peninsula, and Egypt. It consists of nations from various socio-economic and political contexts. For example, it consists of recent war zone countries such as Syria, Lebanon, and Yemen, where infrastructure has been

devastated, <https://en.wikipedia.org/wiki/Yemen> and countries with more advanced economies and significantly stronger ICT infrastructure such as the United Arab Emirates, Oman and Qatar.

Table 2
e-Government challenges in the Middle East

Reference	Country	I	L	H	C	S	F	L	S	C	D	Type
		I	P	C	M	R	R	C				
Sarrayrih & Sriram, 2015	Oman	✓	✓	✓		✓						J:Q1:19
Sebie, 2015	Sharjah & Dubai	✓	✓				✓					J:Q4:31
Alsaeed et al., 2014	Syria & Middle East Arabic Countries	✓	✓	✓	✓	✓	✓	✓	✓	✓		J:Q3:25
Al-Badi et al., 2011	Oman			✓								J:Q2:H13
El-Haddadeh et al., 2010	Qatar	✓	✓	✓	✓	✓	✓	✓	✓			CP:A
Al Nagi & Hamdan, 2009	Jordan	✓	✓	✓	✓	✓					✓	J:Q1:H84
Elsheikh et al., 2008	Jordan	✓	✓	✓			✓		✓		✓	CP:A
Al-Shafi & Weerakody, 2007	Qatar			✓		✓		✓	✓			CP:B
Al-Sebie & Irani, 2005	Dubai	✓	✓	✓	✓		✓		✓			J
Total	9	7	7	8	4	5	6	3	5	1	2	6 (J) 3 (CP)

Common e-Government challenges in the country of Jordan included poor education and low computer literacy, a lack of awareness and acceptance of digital services, economic and poor management skills, a lack of appropriate legislation, inconsistent technologies, social and cultural challenges and the digital divide (Elsheikh, Cullen, & Hobbs, 2008; Al Nagi & Hamdan, 2009). In Oman, there was a need for increasing IT Training programs for both government staff and citizens and enhancing interconnection between government agencies (Al-Badi, Majeeni, & Mayhew, 2011). Several of the Middle Eastern Arabic countries that included the Syrian region were adversely affected by war and instability and the challenges for e-Government were identified as poor infrastructure (electricity, internet services, web services and security), human (ICT literacy), political challenges, and organizational challenges (Alsaeed, Adams, & Boakes, 2014). In the context of the United Arab Emirates, Sharjah and Dubai also exhibited similar technical barriers for e-Government development, such as poor IT support, poor infrastructure, security issues, increasing financial demands to upgrade and maintain ICT services, poor server communication, poor system compatibility due

to various vendors sources, vendor pressure and false commitment (Sebie, 2015). Qatar tended to have superior ICT infrastructure, but a lack of awareness, poor bureaucratic practices, socio-cultural issues, poor strategy and legislative provisions for e-Government development, and financial limitations (Al-Shafi & Weerakkody, 2007; El-Haddadeh, Weerakkody, Al-Shafi & Ali, 2010).

Sarrayrih & Sriram (2015) acknowledged that the government in Oman had wisely invested in e-Government developments but still exhibited challenges that included low ICT literacy and skills of ICT staff and citizens, poor ICT infrastructure, data security concerns, poor planning, a lack of a relevant legal framework and poor strategy. However, Al-Badi et al., (2011) considered only human capital as the major challenge in Oman. The developing countries in the Middle East have various socio-economic distribution, and the review summary of 9 publications in Table 2 shows the challenges were similar to that of the African region.

4.3. South and Central Asia

18 publications specific to the South and Central Asian region and Fiji in Melanesia were shortlisted for review and the summary is presented in Table 3 below. The publications included Bangladesh (3 publications), Indonesia (7), India (4), Kazakhstan (1), Fiji (1), Malaysia (1) Central and Asian States (1).

Table 3
e-Government challenges in South and Central Asia

Reference	Country	I	L	H	C	S	F	L	S	C	D	Type
		I	P	C	M		R	R	C		D	
Rituraj, 2019	India	✓		✓			✓					BC
Brimkulov & Baryktabaso v, 2018	Central Asian States	✓	✓	✓			✓	✓				BC
Nurdin, 2018	Indonesia		✓			✓			✓			J:Q3: H25
Ramli, 2017	Malaysia	✓	✓	✓	✓		✓	✓				J:Q4: H31
Choi, Park, Rho, & Zo, 2016	Indonesia	✓	✓	✓				✓	✓	✓		J:Q1: H60
Dash & Pani, 2016	India	✓	✓	✓			✓	✓	✓			J:H4 7
Rahman, Naz, & Singh, 2016	Fiji	✓	✓	✓	✓		✓		✓			J:Q4: H31
Sony, 2015	India	✓	✓	✓	✓		✓	✓	✓	✓		J
Ahmad & Hasibuan, 2012	Indonesia	✓	✓	✓				✓	✓	✓		CP
Nurdin, Stockdale, & Scheepers, 2012	Indonesia	✓	✓	✓			✓	✓	✓			J
Nurdin et al., 2012	India	✓	✓	✓			✓					J

Faroqi & Siddiquee, 2011	Bangladesh	✓		✓			✓				✓	J
Hariguna, 2011	Indonesia	✓		✓			✓					J:Q3: H20
Pudjianto, Zo, Ciganek, & Rho, 2011	Indonesia	✓	✓	✓				✓				J
Bhuiyan, 2011a	Bangladesh	✓		✓			✓	✓	✓	✓	✓	J:Q1: 84
Bhuiyan, 2011b	Bangladesh	✓	✓		✓			✓				J:Q3: 25
Bhuiyan, 2010	Kazakhstan	✓		✓				✓	✓		✓	J:Q2: 23
Furuholt & Wahid, 2008	Indonesia	✓		✓	✓			✓	✓			CP
Total	18	17	12	16	5	1	13	12	8	5	3	14 (J) 2 (CP) 2 (BP)

Indonesian challenges shown in Table 3 above were similar to the other developing nations, such as limited access to the ICT infrastructure, low ICT budgets and poor leadership. Six authors out of seven named limited access to ICT infrastructure and human capital as the major e-Government challenges. Similarly, in case of India, social and cultural background is highly weighted (along with the challenges of poor ICT infrastructure, budget limitations and a lack of appropriate ICT skills). On the other hand, Rituraj, (2019) identified key challenges in India as relating to an overwhelming population, poor interdepartmental coordination, poor digital literacy of the country, the cost to adopt ICT infrastructure, poor existing ICT infrastructure, security threats, slow speed internet, poor governance, corruption, a lack of bureaucratic commitment, poor political will, a lack of open standardization of technology, high infrastructure and maintenance costs, and the rural-urban digital divide (Sony, 2015). Malaysian e-Government challenges were identified as technical (infrastructure), inappropriate legislative structure, budgetary constraints, and a lack of ICT expertise, poor leadership, people's poor IT skills (citizen and public officials) and poor change management (Ramli, 2017).

Bhuiyan (2010) mentioned challenges such as difficulty gaining political consensus, citizen bureaucracy relationship, the digital divide, corruption, a lack of ICT human resources, and inadequate infrastructural development in Kazakhstan. Bangladesh shared challenges, such as social and cultural issues, a lack of political consensus, low ICT human resources, the digital divide, infrastructure development constraints due to a poor financial state, inadequate legal regulations, electricity shortages, unwillingness of top-level management,

service integrity issues (Bhuiyan, 2011a; Faroqi & Siddiquee, 2011).

A citizen survey in the Melanesian Island nation of Fiji showed that the challenges included poor ICT competencies, inappropriate design of systems, inadequate ICT infrastructure, an inadequate legal framework, insufficient funding, a lack of organizational readiness, a lack of internal willingness and a lack of cultural readiness (Rahman et al., 2016).

4.4. The Caribbean

The review of publications available for this region resulted in just two studies as shown in Table 4 below.

Table 4
e-Government challenges in the Caribbean

Reference	Country	I	L	H	C	S	F	L	S	C	D	Type
		I	P	C	M	R	R	C	C	D	D	
Waller & Genius, 2015	Jamaica	✓					✓		✓		✓	J:Q2:32
Bissessar, 2010	Trinidad & Tobago	✓	✓				✓					J
Total	2	2	1	0	0	0	2	0	1	0	1	2 (J)

Jamaica faced technical issues such as poor ICT infrastructure, privacy and security concerns, the digital divide and financial issues (Waller & Genius, 2015). On the other hand, for Trinidad and Tobago, the major challenges were in ICT infrastructure and legislation and policy related (Bissessar, 2010).

4.5. Further Developing Countries

There were 7 publications out of the 57 shortlists that had no specific developing country or regional focus, or they included more than one country as a focus of their study. The e-Government challenges in developing countries, in general, were found to be similar to those in the four regions. The summary of the publications e-Government challenges is presented in Table 5 below. Sarantis, Smithson, Charalabidis and Askounis (2010) identified ten challenges, including a lack of ICT Human resources, bureaucratic complexity, large stakeholders to manage, a lack of public trust, ambiguous goals, multiple government agencies, poor interoperability of e-Government projects, poor planning, a lack of best practice utilization, poor legal and regulatory provisions, and over-involvement of politicians. Findings by Rana et al., (2013b) included technological barriers, lack of security and privacy, a lack of trust, a lack of resources, the digital divide, poor management and

infrastructure, a lack of awareness, legal barriers, a lack of IT infrastructure, and low resilience as most commonly experienced challenges and barriers. Similar legal and political barriers were identified in an Estonian analysis (Kotka, et al., 2021). The study by Alcaide Muñoz and Rodríguez Bolívar (2018) listed seven challenges that included a poor e-Government plan and strategy, no departmental internal coordination and cooperation, obsolete technology, change management issues due to rigidity and system incompatibility, a lack of ICT skills, poor leadership and management, inadequate policies, the digital divide and a lack of finance.

Table 5
Challenges in other developing countries

Reference	II	L	H	C	S	FR	LR	SC	C	D	Type
	P	C	M	R	R	C	C	D	D	D	
Muñoz & Bolívar, 2018	✓	✓	✓	✓	✓	✓	✓	✓		✓	BC
Mohammed, Ibrahim, & Ithnin, 2016	✓	✓	✓	✓	✓	✓	✓				J:Q2:20
Rana, Dwivedi, & Williams, 2013	✓		✓	✓		✓					J:Q2:32
Moatshe & Mahmood, 2012	✓	✓	✓			✓				✓	CP:C
Rana, Dwivedi, & Williams, 2012	✓	✓	✓			✓				✓	CP:B
Sarantis et al., 2010		✓	✓			✓	✓				J:Q2:31
Ramaswamy & Selian, 2007	✓		✓	✓		✓		✓			CP:A
Total (7)	6	5	7	4	3	6	3	2	0	3	J (3), CP (3), BC (1)

A review by Mohammed et al., (2016) considered several authors and outlined the three most common e-Government challenges in developing countries as ICT Infrastructure, financial and internal resources and human capital and digital literacy.

4.6. Summary of e-Government challenges

A summary of the most frequent challenges is presented in Table 6, which shows ICT Infrastructure (II) followed by Human Capital and Digital Literacy (HC) and Financial Resources (FR) cited as the top three categories of major challenges for e-Government implementation in developing countries.

Table 6*Summary of e-government challenges*

e-Government Challenges	Africa J (7) CP (4)	Middle East J (6), CP (3)	South & Central Asia J(14), CP(2), BC(2)	Caribbean J (2)	Other Countries J(3), CP(3), BC(1)	Total J(32), CP(12), BC(3)
II	11	7	17	2	6	43
LP	4	7	12	1	5	29
HC	7	8	16	0	7	38
CM	6	4	5	0	4	19
S	2	5	1	0	3	11
FR	8	6	13	2	6	35
LR	5	3	12	0	3	23
SC	3	5	8	1	2	19
C	3	1	5	0	0	10
DD	3	2	3	1	3	12

4.7. Journal and conference ranking

Research in the field of e-Government for developing countries has received a lot less attention by researchers. The reviewed journals and conference papers categorized according to ranking portals for journals and conferences are mentioned in Table 7 and Table 8 below respectively. Out of 35 journals reviewed, 22 journals were listed in the Scimago Journal & Country Rank (SJR) as Q1: five journals, Q2: six, Q3: five, Q4: and four listed in SJR but unranked, with two not ranked (see Table 7 below). The H-Index (HI) of the published journals is also provided in the table. On the other hand, only 10 out of 17 conferences, as shown in Table 7 below, were ranked by the Computing Research & Education (CORE) 2021 Rankings: with four 'A' conferences, three 'B' conferences and three 'C' conferences.

Table 7*Journals and their rankings*

S N	Region	Q1	Q2	Q3	Q4	Listed only	Not listed	Total
1.	Nepal	-	-	-	-	1	2	3
2.	Africa	1 (HI:59)	-	1 (HI:33)	1 (HI:31)	0	4	7
3.	Middle East	2 (HI:84, HI:19)	1 (HI:13)	1 (HI:25)	1 (HI:34)	0	1	6
4.	Asia	2 (HI:84, HI:60)	1 (HI:23)	3 (HI:25, HI:20, HI:25)	2 (HI:31, HI:31)	1 (HI:47)	5	14
5.	Caribbean	-	1 (HI:32)	-	-	-	1	2
6.	Other Developing countries	-	3 (HI:32, HI:31, HI:20)	-	-	-	-	3
	Total	5	6	5	4	2	13	35

Table 8*Conferences and their rankings*

S N	Region	A/A*	B/Aust B	C/Aust C	Ranking unavailable	Total
1.	Nepal	-	-	1	4	5
2.	Africa	1	1	1	1	4
3.	Middle East	2	1	-	-	3
4.	Asia	-	-	-	2	2
5.	Caribbean	-	-	-	-	0
6.	Other Developing Countries	1	1	1	-	3
	Total	4	3	3	7	17

5. Discussion

In response to the research question of: *What are the most common e-government challenges identified in the literature in the context of developing countries?* 57 publications were systematically reviewed. The review suggests that many of the same challenges are occurring across developing countries. The top three most common categories of e-Government challenges include a lack of ICT Infrastructure (43), low human capital and digital literacy (38) and a lack of financial and internal resources (35).

5.1. Fundamental challenges

The findings of this study indicate that the three most common e-Government challenges in the context of Nepal and other developing countries are highly similar:

ICT Infrastructure (II) as a category is defined as limited access to ICT infrastructure (Computer hardware and software resources, networks and servers and adoption of new technologies). Infrastructure also included poor internet connectivity, inadequate meaningful information sharing among government entities, businesses and citizens, a focus on city-centric ICT services, geographic diversity in access and a core need to expand the ICT services to reach rural populations, along with the challenge of interoperable e-Government existing systems.

Human capital and digital literacy (HC) as a category is defined as challenges that include poor ICT skills of users (both citizens and employees), and inadequate access to technical expertise to operate ICT services, modest human resource training awareness and a very low capacity of government institutions.

Financial and internal resources (FR) as a category is defined as increasing ICT budgets for operational upgrading and maintenance, donor dependency for the implementation of e-Government and ICT services, the poor return on investment of

existing projects, and less budget priority for ICT infrastructure investment as most of the developing countries have other significant priorities to focus on.

Other challenges include (a) legislation and policy (LP) - a lack of the regulatory framework and low priority of legislative provision to expand e-Government services, (b) leadership (LR) - a lack of political commitment towards technology adoption and influences of political instability, (c) change management (CM) - Government employee resistance to change with the fear of losing jobs and a lack of strategic alignment, collaboration, knowledge management, and a whole of government approach to information sharing and (d) social and cultural challenges (SC) - these were especially seen in the context of Nepal, India, Indonesia and Fiji, with challenges, such as a lack of adequate motivation and attitude for the shift to a new model of governance based on ICT service provision and a persistent perception from stakeholders that public services should be delivered face-to-face.

Among 57 reviewed publications, 35 were Journal publications and 17 were conference publications. Interestingly, out of 35 Journals, only five of the journals were published as 'Q1' ranked Journals. Similarly, four out of 17 Conference Proceedings were ranked as 'A' conferences. The lower number of 'Q1' journals and 'A' conferences found in this review is an indication that studies in the context of developing countries are very limited and those specific to Nepal are scant. The conference and journals rankings obtained in this review in the context of Nepal urge a need for further study in this area and at a higher level. Further study in the context of e-Government and its challenges in developing countries can be highly significant to contribute to the growing body of knowledge relevant to the developing world.

There appear to be very few articles of consistently high quality focused on developing countries. This presents a research gap for those seeking empirical research to support decision making and implementation for e-Government initiatives in developing countries. More research on e-Government with a developing country focus is needed. If both scholars as well as governments are forming studies and policy decisions, the findings from this present study may act as helpful guidelines for identifying priority areas as well as unique gaps in current vendor service offerings, thereby filling an important gap in the literature.

What this article can offer should funders, leaders, government agencies and NGOs be considering the

important decisions regarding technology infrastructure is that a holistic view feasibility assessment needs to be undertaken rather than relying on vendor migration guidance on how best to migrate to their chosen platform. Important factors to consider when designing and implementing e-government services in developing nations should include an assessment identifying what the cloud opportunities are in the context of the specific agency, then the current IT Landscape, then identifying what service, deployment and workload analysis can be estimated, followed by an assessment of whether cloud adoption may be beneficial for the agency given the wider political, legal and human aspects.

Ultimately such feasibility of these aspects can form the grounds for a business case that will identify the core areas that are relevant to a specific agency's needs and political landscape. Even if a decision is not to proceed, such an approach will identify the cloud readiness of an agency, and that may change over time to ultimately maximize the investment to the greatest benefit to the public.

6. Conclusion

This study reviewed existing research on the e-Government challenges in the context of developing countries from four different regions Africa, the Middle East, South and Central Asia, the Caribbean and developing countries in general. The e-Government in the context of Nepal was also reviewed separately. Common e-Government challenges were categorized into 10 categories with abbreviated codes attached. The study selection was performed using some keyword search strings in the endnote library. 57 publications in the context of developing countries from various regions and 10 publications specific to the Nepalese context were reviewed and used to group the key e-Government challenges.

The primary aim of this study was to provide a review of e-Government challenges in the developing countries from various geographic regions and their comparison in the context of Nepal. This literature review establishes that of the 10 categories of challenges identified, the top three include a lack of ICT infrastructure, low human capital and digital literacy, and a lack of financial and internal resources were the most frequent challenge factors affecting the successful implementation of e-Government services.

The review also identified that there are common e-Government challenges across the developing countries reviewed, including Nepal. The review also

presents a useful summary of the reviewed articles rankings on the basis of Scimago Journal & Country Rank (SJR) and CORE rankings.

7.1. Limitations of the study

The review is based on secondary data and thereby challenging the generalization of the results. It also lacks some validation through primary empirical evidence, such as case study or expert review. This also offers an opportunity for further research.

While the findings appear similar in nature across the 4 regions studied, however, it would be expected that as each country has its own specific context, in particular, the regulatory environment for e-government, the specific needs off a specific government agency and the e-Government readiness of a particular developing nation. Therefore, the outcomes of this study may not always be identical in all countries.

Though ISM provides an understanding about the interrelationships among variables, it does not answer “why” of the relationship. Thereby, future studies can apply “Total ISM” approach to develop deeper understanding of the relationships. Further, ISM considers relationships in either “yes” or “no” type. However, in many cases a relationship may fall on a spectrum, thereby future studies may use Fuzzy-ISM to accommodate such relationships and develop a more realistic judgement about the relationship between a set of enablers.

A limitation that this research does not provide the review of theories and models, for example, in this article, we have not utilized any theory of technology acceptance or adoption (Dwivedi et al., 2017), which might be commonly relevant in such studies. Other work has investigated the theories and models such as that by Rana et al. (2013a; 2013b; 2012b; 2011).

7.2. Future research

One of the findings of this study is a clear argument that e-Government feasibility studies in the context of developing nations and those specific to Nepal were very limited. This suggests a call for further studies of e-Government challenges in developing countries and their potential solutions to have a deeper understanding. Also, the call is for research to identify the most effective solutions to minimize the challenges identified in this literature review that can also contribute to both the knowledge gap and improving the lives of citizens in developing

nations around the world.

7. References

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