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Trusting and Adopting E-government Services in Developing Countries? Privacy Concerns and practices in Rwanda

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Abstract. E-government is a strong focus in many developing countries. While services can technically benefit from solutions developed elsewhere, organizational development and user trust and acceptance are always local. In Least Developed Countries (LDCs) such issues become more dramatic as services are transformed quickly from traditional manual procedures to digitized ones copying models from developed countries. One of the most critical trust issues is privacy protection; e-government services must be developed in balance with citizens' privacy views.

To understand how to design trusted services in an LDC this study investigates information privacy concerns, perceptions of privacy practices, trust beliefs and behavior intentions towards using e-government services in Rwanda. The study was conducted by means of a survey (n=540).

A majority of the respondents had a considerable level of trust, and a positive view of the effectiveness of service providers' privacy practices. Most respondents expressed positive intentions towards using e-government services. Still, a majority of the respondents expressed considerable privacy concerns. Men were more concerned than women and reported a higher reluctance to use e-government service. As this study is one of the few studies of privacy, trust and adoption of e-government in LDC, it contributes to broadening the context in which such issues have been researched.

Keywords: E-government, Privacy, Trust, Behavior intentions, Rwanda.

1 Introduction

As many developing countries, including LDCs (Least Developed Countries), now move ambitiously towards developing e-government they can technically build on more than two decades of developments in the industrialized world. The required technology is readily available, affordable, and to a large extent standardized, and can hence

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quickly be installed. Users in developing countries, including LDCs, are rapidly becoming comfortable with the digital world, perhaps most immediately through the rapid uptake of smart phones and social media.

While technology is universal, the organizational development and user acceptance necessary to achieve the benefits of e-government are always local [1]. They both rest on local practices, customs, and views developed over long time, and are hence difficult to change quickly; "all business is local" – even the global ones, as for example Google has learned from the discussions about use of user data which have occurred in many countries.

Information privacy, typically defined as the individuals' ability to control information about themselves [2], is one of the major factors affecting the development of e-government services[3][4]. Government organizations' practices in collecting, handling, and disseminating citizens/users personal information are important for preserving privacy, and these procedures need to be known and trusted by citizens [5]. People need assurance from service providers that their personal information is not changed, disclosed, deleted or misused in any way. Therefore, government organizations require to adopt adequate privacy practices in order to assure users' privacy protection.

But even if privacy practices are adopted, there is no way citizens can themselves inspect how data is handled in any depth, so they must trust the organization and the procedures involved. Trust is therefore a critical issue for sharing personal information in the context of online services [6] and is considered as one of the major factors influencing users' adoption of e-services[4]. Trust is defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" [7]. Earlier studies show that trust affects users' adoption of e-government services [8]. Adoption of e-services is usually studied by assessing the users' behavior intentions into using these services[9].

Impact of privacy issues on trust and adoption of e-government have been considered in a substantial amount of the research literature, but even though e-government is now rapidly growing in developing countries and LDCs, these countries are yet under-researched[10][11]. There are many reasons to try to bridge that research gap. Previous studies show that privacy issues vary from country to country due to many factors such as differences in culture, regulation, laws and technical arrangements[12]. A literature review by Nkohkwo and Islam suggests that for successful implementation of e-government in LDCs it is very important to understand privacy issues in these countries as privacy is among the major challenges to e-government implementation in Sub-Saharan countries [13].

This paper takes one step in that direction by presenting a study from Rwanda, an LDC in Eastern Africa with high ambitions for not just e-government but generally for IT and moving into the information society, and with a good development record for the past two decades [14]. The study asks (1) *what are Rwanda citizens' concerns about information privacy*? (2) *What are their perceptions of effectiveness of privacy practices?* (3) *to what extent do they trust the ways in which government organizations handle their personal information*, and (4) *What are their behavior intentions towards using e-government services*?

2 Privacy concerns, privacy practices, trust and acceptance in e-government

In the literature, the concept of privacy concerns is conceptualized in various forms and assigned different meanings. A commonly used definition is "beliefs about who has access to information disclosed when using internet and how it is used" [15].

Many studies have investigated the impact of privacy concerns on trust and adoption of e-government services. For example, Cullen and Reilly [16] investigated New Zealanders' concerns in relation to information privacy and the impact of these concerns on the trust they place in government. The study found that most respondents had low levels of confidence in the privacy of online communication but still used it for convenience. They also had greater confidence in government than in commercial organizations. In another study Cullen investigated Japanese's information privacy concerns found considerable differences compared to the earlier New Zealand study. The Japanese had major concerns about information privacy and had considerably less trust in government than the New Zealanders [17].

Choudrie, Raza, & Olla investigated the relationships between privacy, trust and adoption of e-government in the UK and found that respondents who were concerned about their information privacy reported significantly less intention to use e-government services than those who were less concerned[18]. Sarabdeen, Rodrigues, & Balasubramanian investigated the impact of privacy and security concerns on e-government adoption in Dubai and found that security and privacy concerns were important factors influencing e-government adoption [19]. Similarly, Abri, Mcgill, & Dixon investigated the impact of privacy concerns on Omani citizens' intentions to use e-government services [8] . Their findings indicate that people with high privacy concerns have low perceptions of trust in e-government services and low intention to use them. Another empirical study conducted in Jordan investigates the antecedents of trust in the context of e-government [20]. The study shows that numerous factors such as privacy concerns, information quality, trust in technology and trust in government affect trust in e-government. All in all, the literature strongly indicates that privacy concerns are antecedents for trust and as well as adoption of e-government services.

In the information system literature indicated that possible consequences of privacy concerns mentioned include for instance lack of trust and/or weak intentions to use online service [21].

To reduce privacy concerns, organizations need to provide privacy assurances, which can also increase trust and intentions to use e-services. Organizational privacy assurance are the practices that an organization applies to ensure service users that enough effort has been devoted to protect personal information [22]. Studies of e-government privacy practices focus on checking the availability of privacy policies on e-government websites, assessing the comprehensibility and clarity of the available privacy policies and investigating users' level of awareness of privacy policies [23][24]. Most studies conclude that an effective privacy policy reduces users' lack of trust in e-government and unwillingness to use e-government services. The present study inves-

tigates service users' perceptions of the effectiveness of privacy policies and organization's privacy self-regulation. According to Culnan & Bies, privacy policy and self-regulation are two common types of practices that an organization can apply [25].

It is generally agreed in the literature that privacy concerns and privacy protection practices within e-services are both important for citizen/user trust and their intentions to adopt and use those e-services. However, research is inconclusive about the influence of various personal factors such as age, gender, personal experience, and level of technical skills. Some studies have suggested that younger people are less concerned with information privacy issues than older [26]. Other studies have shown that young people's privacy concerns in online environments do not differ from those of older people [27]. Some studies have found that women are more concerned about privacy of their personal information than men[28] but there are also other studies indicate that men expressed a higher level of concerns regarding privacy than women [29].There are also studies that show that people who are employed in government trust government more than people who work in the private sector, and vice versa [30].

One reason that research is inconclusive on factors like age and gender might be that they come out differently in different countries or cultures. For example, gender issues and age are very differently viewed in Asian and European cultures. While such factors are likely situated it still makes sense to include them in studies as they potentially have great influence over local development.

3 E-government and Information Privacy in Rwanda

Rwanda is a small (26,388 km2) and landlocked country located in East Africa, with an estimated population of 11,609,666 and GDP per capita of 697.3 USD (World Bank, 2015). The Rwandan economy is based largely on agricultural production with 80 % of the population engaged in (mainly subsistence) agriculture [31]. Striving for poverty reduction, the government of Rwanda formulated the Vision 2020 policy, whose overarching aim is to transform the country into a knowledge based, middle income society and modernize agriculture [32]. Rwanda identified advancing science, technology and ICT as an approach to achieve this vision. It therefore facilitates the creation of technology enterprises and develop access to ICT within government, in accordance with the national ICT plan, called NICI, National Information and Communication Infrastructure. The first NICI plan was launched in 2000, and so far there have been four phases of the NICI plan, each covering 5 years.

The Government of Rwanda have initiated e-government projects since 2005. The main goal is to facilitate government service delivery to citizens and businesses and bring people close to Government through the use of ICT[33]. So far, notable progress has been achieved and e-government is changing the service delivery schemes. Many initiatives including the launch of the "Irembo" portal to e-government services are deployed. Irembo is a big e-government portal currently providing access to 40 e-services from 6 different government agencies [34]. Rwandans can access Irembo services online or via smartphone.

As in other LDCs, infrastructure challenges including insufficient network access and power supply hamper use of e-government services. Rwanda puts a lot of effort in overcoming that, and significant developments have taken place. For example, national fiber optic backbone network has been completed and is available in all 30 districts [35]. As of December 2015, Rwanda had 33.5% internet penetration rate, and 77.8 % mobile phone penetration rate [36].

Interaction between citizens and e-government services also requires a legal infrastructure to cater for, among other things, information security and privacy. The government has enacted laws to govern electronic messages, electronic signatures, transactions, data protection, cyber -security and ICT usage.

A Rwanda cyber security policy has been established, a security infrastructure is established and security applications are deployed in government offices. A cyber security capacity building project is initiated so as to keep on pace with the ongoing development in the field [35].

Concerning privacy, the Rwanda Constitution Article 22 ensures the protection and respect of the rights to privacy [37]. Besides that, other laws have been established to protect individuals' right to privacy in the context of digital information, for example; law no 02/2013 regulating media (article 9); law no 03/2013 regulating access to information (article 4); law no 60/2013 regulating the interception of communication [37]. This regulation has been established during the time of e-government and is hence generally designed to cover also the digitized world.

The existing e-government services and the supporting privacy laws and policies are newly established and represent a new phenomenon to Rwandans. It is of great importance to learn how Rwandans are adopting them.

4 Method

The aim of this study is to investigate to Rwandans' privacy concerns, their perceptions of the effectiveness of privacy practices, their trust in the way the e-government services use personal information, and their intentions to use e-government services.

The study is conducted by means of a questionnaire based on five constructs adapted from the previous literature: privacy concerns[22], perceived effectiveness of privacy policy[22], perceived effectiveness of organizations self-regulations [22], trust beliefs [38] and behavior intentions[9]. Statements for each of the constructs are shown in the Results section. All items are measured on seven-point, Likert-type scale where 1 = strongly disagree, 2 = mostly disagree, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = mostly agree, and 7 = strongly agree.

The questionnaires were distributed to 700 individuals. 604 were returned and 540 could eventually be used, which yields a response rate of 77%. For data collection, an intercept approach was adopted by visiting shops, public servants organizations, private companies, churches, banks and universities from selected interview sites to achieve a high response rate. Five sites were chosen; City of Kigali, the capital; the Huye district of the Southern Province; the Musanze district of the Northern Province; the Rubavu district of the Western province, and Nyagatare City of the Eastern Province. These

sites were chosen so as to provide geographic diversity and generalizability of the sample to the entire country. The survey was conducted during three months from June to September 2016.

In terms of demographic characteristics, the sample is fairly representative for Rwanda as concerns age and geographic distribution (Table 1). However, there is a considerable bias towards well educated people. One reason for these biases is that it is well-educated people in the cities people who mainly use electronic services, and views on services have to be collected among people who actually use them. Men are also overrepresented.

Table 1. Respondents demographic

Demographic variables	**Category**	**Frequency(Percentage)**
Gender	Men	330 (60.3 %)
	Women	217 (39.7 %)
Age	18-30	248 (45.3 %)
	31-45	215 (39.3 %)
	46-55	71 (13 %)
	>55	13 (2.4 %)
Occupation	Government staff	92 (16.8 %)
	Private organization staff	167 (30.5 %)
	students	127 (23.2 %)
	businessman	138 (25.2 %)
	Unemployed/retired	23 (4.2 %)
Education level	Training/instructions	8 (1.5 %)
	Primary school	35 (6.4 %)
	Secondary school	79 (14.4 %)
	University degree	425 (77.7 %)

Data was analyzed using descriptive statistics. By displaying mean and standard deviation of the statements, the respondents' level of concerns, perceptions of effectiveness of privacy practices, trust beliefs and behavior intentions were recognized. Furthermore pairwise correlation tests were done in order to see the effect of demographic factors (gender, age, occupation). The software used for data analysis was STATA.

5 Results

This section presents the results from the study organized by the four research questions.

5.1 What are Rwanda citizens' concerns about information privacy?

The privacy concerns construct is composed of four statements (Table 2). Respondents are concerned about their information privacy. The majority of the respondents answered "slightly agree" for PCON2, PCON3 and PCON4 and by "mostly agree" for

PCON1. Means for all statements are above 4.50 and their standards deviations are between 1.59 and 1.80. The correlation test between privacy concerns and different respondents' demographic factors (gender, occupation and age) indicated that there is a significant correlation between gender and privacy concerns. Men's level of concern is higher than that of women; the mean for men are between 4.67 and 4.80 for the four items, and between 4.40 and 4.51 for women.

Table 2. Privacy concerns.

Privacy Concerns (PCON): Mean = 4.60, Std. Deviation = 1.21
PCON1: I am concerned that the information I submit could be misused.
PCON2: I am concerned that others can find private information about me.
PCON3: I am concerned about providing personal information because of what others might do with it.
PCON4: I am concerned about providing personal information because it could be used in a way I did not foresee.

5.2 What are Rwanda citizens' perceptions of effectiveness of privacy practices?

The perceived effectiveness of privacy practices is examined through two constructs; perceived effectiveness of privacy policies (POLICY) and perceived effectiveness of organizational self-regulation (SREG). As Table 3 shows, respondents' perception of effectiveness of privacy practices is generally high with a mean of 4.99 for POLICY and 4.95 for SREG. A majority of the respondents answered "strongly agree" for POLICY1, POLICY3 and SREG1. Similarly, a majority answered "mostly agree" for POLICY 2 and SREG 2. Means for all statements are between 4.92 and 5.18, with a standard deviation between 1.67 and 1.71. The correlation test indicate that there is no correlation between perceptions of effectiveness of privacy practices constructs and respondents demographics factors (gender, age, occupation).

Table 3. Perceived effectiveness of privacy practices.

Perceived effectiveness of privacy policy (POLICY): Mean = 4.99, Std. Deviation = 1.33
POLICY1: I feel confident that privacy statements from service providers reflect their commitments to protect my personal information.
POLICY2: With their privacy statements, I believe that my personal information will be kept private and confidential.
POLICY3: I believe that privacy statements are an effective way to demonstrate their commitments to privacy.
Perceived effectiveness of privacy self-regulation (SREG): Mean= 4.95, Std. Deviation = 1.39
SREG1: I believe that privacy related regulations will impose sanctions for service providers' noncompliance with privacy policy.

SREG2: Privacy related regulation will stand by me if my personal information is misused during and after transactions.

5.3 To what extent do Rwanda citizens trust the way government organizations handle their personal information in e-services?

The citizens' trust in the way government organizations handle their personal information is examined though the trust belief construct which is composed of 5 statements. Table 4 shows that respondents to some extent trust the way the e-government service providers treat their personal information. The majority of the respondents answered "slightly agree" on four of the statements and were neutral to TRUST4. The means for the statements vary from 4.35 to 4.71, with a standard deviation between 1.52 and 1.80. Correlation test indicates that respondents trust beliefs do not correlate with any of their gender, age or occupation.

Table 4. Trust beliefs.

Trust Beliefs (TRUST): Mean: 4.56, Std. Deviation = 1.28
TRUST1: E-service providers are trustworthy in handling personal information.
TRUST2: I trust that e-service providers tell the truth and fulfill promises related to my personal information
TRUST3: I trust that e-service providers keep my best interests in mind when dealing with personal information
TRUST4: I trust that e-service providers are in general predictable and consistent regarding the usage of personal information
TRUST5: I trust that e-service providers are always honest with customers when it comes to using (the information) that I would provide.

5.4 What are Rwanda citizens' behavior intentions towards using e-government service?

The construct 'behavior intention' is composed of four statements. As Table 5 shows, a minority of respondents had refused to give their personal information or to use e-service due to the concerns of their personal information. The majority answered "strongly disagree" for all statements. The means for all the four statements are below 3.50 and the standards deviations are between 1.65 and 1.87, which is rather high. The correlation test indicates a significant correlation between respondents' behavior intentions and their gender – men are more prone to refuse to provide information than women.

Table 5. Behavior intentions

Behavior intentions (BEHAV): Mean = 2.77, Std. Deviation = 1.27
BEHAV1: I decide not to use e-service because I don't want to provide certain kind of my personal information
BEHAV2: I refuse to give personal information

BEHAV3: I refuse to use e-service because I disagree with the way e-service providers use personal information.
BEHAV4: I take action to have my name removed from direct mail list

6 Discussion and conclusion

This paper set out to investigate Rwandans' concerns about information privacy, their perceptions of effectiveness of privacy practices, the extent to which they trust the way government organizations handle their personal information, and their intentions to use e-government services.

Overall, Rwandans mainly perceive e-government privacy practices as effective, and they trust the way governmental organizations handle their personal information. They are not inclined to refuse using e-government services although their privacy concerns are rather high.

Regarding trust, the majority answered "slightly agree" for four out of five statements. This indicates that Rwanda citizens have a certain level of trust. However, they were "neutral" to the statement "I trust that e-service providers in general are predictable and consistent regarding the usage of personal information". This may indicate that trust varies across different organization so each service provider needs to show users that they have trustworthy procedures. This appears as a critical factor in previous studies where citizens trust in e-government is found to be a primary input of transactional usage [4].

Regarding behavior intentions, only a minority of respondents were negative towards using e-government services and report they may refuse to provide personal information. Even though only a minority holds these views they must be taken into consideration as provision of personal information to government organizations is sometimes compulsory [16] . Even though such requests for personal information are supported by governmental mandates[39], it is important to take measures to assure service users that personal information is in fact handled correctly from the point of view of privacy.

Rwandans are concerned about their information privacy – the respondents answered "slightly agree" or "mostly agree" for all of the privacy concerns statements. This is a critical issue as the privacy literature recognizes privacy issues as one of the biggest barriers to a successful e-government development [4][3]. Even though the results suggest that users trust that privacy practices are effective, measures need to be taken in order to overcome their concerns. This study found that privacy concerns correlate significantly with gender and that men are more concerned than women.

In Rwanda, there is a quite comprehensive e-government initiative aimed at improving the integration of government information and services to business and citizens [24]. In order to sustain this initiative, government organizations must find ways to build relationships with people within the new environment of e-government and work to increase citizens' trust.

In sum, this study results suggest that e-government in Rwanda has a good potential. Citizens trust e-government services and have positive intentions towards using them.

However, they also have considerable concerns about information privacy, and overcoming these is one important issue. Some measures toward that end have already been practiced successfully elsewhere; it is, for example, common practice in both e-government and e-commerce to provide adequate privacy practices and explain how personal information that is requested is processed and stored. Obviously it is not enough to provide good practices, these also has to be effectively communicated to service users.

Governments in developing countries, including Rwanda, are increasingly adopting e-government and this study contributes to this work by assisting e-government project leaders, policy makers, and private sector organizations involved in developing e-government services in obtaining a better understanding of citizens privacy concerns, trust and adoption. For academics, this research provides an extended empirical base concerning privacy issues by investigating the situation in a least developed country. The limitations of this research includes a considerable bias towards well educated people in the sample. While this is unavoidable in a country where use of electronic services is yet limited to such groups, future research should investigate the views of other groups as they start using such services. Another complementary study would be using focus groups or individual interviews to investigate more in depth the reasoning and perspectives of Rwandans toward e-government services.

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