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E-government adoption in sub-Saharan Africa

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ABSTRACT

Over the past decade, there has been increased interest in understanding the underlying factors that influence the adoption of e-government services using a variety of technology acceptance models. One such model is the *unified model of electronic government adoption* (UMEGA), which has been validated as outperformed other models. The present study empirically tested UMEGA and an extended version of it using data from 282 respondents in a sub-Saharan African country, South Africa. The findings show that except for the association of effort expectancy with attitude, all other hypothesized associations of UMEGA were supported. Also, the extended version of the model performed better than the original version, with the total variance explained for attitudes modestly increasing and that for behavioral intention modestly improving also. We observed that performance expectancy, social influence, perceived risk and computer self-efficacy significantly influenced attitudes, while attitudes, facilitating conditions, trust of government and trust of the Internet had a direct significant influence on behavioral intention. For researchers, this study indicates the need to adequately refine e-government adoption models for use in different context. These findings from South Africa also provide an understanding of factors that the South African government can consider when developing strategies for improving the adoption of e-government services.

1. Introduction

Many governments around the world are increasingly taking advantage of developments in *information and communication technologies* (ICTs) to offer online services to their citizens. This process is generally termed as e-government, which can be broadly defined as government's use of ICTs and its applications to deliver services and information to various stakeholders such as citizens and businesses (Lavanya and Gayatri, 2015; Padmapriya, 2013). E-government has been known to provide significant benefits, especially to citizens (Dwivedi et al., 2017). As such, many researchers and practitioners have been increasingly interested in understanding citizens' adoption of available e-government systems.

E-government researchers over the years have examined the adoption of e-government via existing technology acceptance models such as the *theory of reasoned action* (TRA) used by Alryalat et al. (2015) in India. In addition, the *theory of planned behavior* (TPB) was used by Ozkan and Kanat (2011) in Turkey, the *decomposed theory of planned behavior* (DTPB) was used by Susanto et al. (2017) in Indonesia, and the *technology acceptance model* (TAM) was used by Lin et al. (2011) in Gambia. Further, the extended version of TAM (TAM2) was used by Sang et al. (2009) in Cambodia, *diffusion of innovation theory* (DOI) was used by Lawson-Body et al. (2014) in the United States, and the *perceived characteristics of innovation* (PCI) was used by Boon et al. (2013) in Malaysia. Beyond these, *social cognitive theory* (SCT) WAS used by Rana and Dwivedi (2015) in India, the *unified theory of acceptance and use of technology* (UTAUT) was used by Rabaai (2017) in Jordan, and the extended UTAUT (UTAUT2) was used by Lallmahomed et al. (2017) in Mauritius.

Most of these concepts were adapted from the prior e-commerce adoption literature, owing to the close link between e-commerce and e-government solutions. However, some scholars (Alghamdi and Beloff, 2014; Shareef et al., 2011) have argued that models simply adopted from e-commerce literature are not sophisticated enough to fully capture and stipulate the comprehensive nature of citizens' e-government adoption behaviors. Consequently, domain-specific e-government adoption models, some of which are the *e-government adoption model* (GAM) by Shareef et al. (2011), the *e-government adoption and utilization model* (EGAUM) by Alghamdi and Beloff (2014) and the *unified model of electronic government adoption* (UMEGA) by Dwivedi et al. (2017) have been developed to address shortfalls of existing technology adoption models.

In sub-Saharan Africa (SSA), the majority of researchers evaluating e-government adoption to date have primarily focused on TAM (Asianzu and Maiga, 2012; Bwalya, 2011; Khanyako and Maiga, 2013; Komba and Ngulube, 2015; Lin et al., 2011; Rukiza et al., 2011). A key

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challenge with too much reliance on TAM is that many other factors that can explain e-government adoption, are left out. This follows from the argument by Benbasat and Barki (2007) that too much dependence on TAM basically creates an illusion of advances in new knowledge creation, while thwarting researchers from identifying new dimensions of technology adoption. As such, a recent study from SSA by Lallmahomed et al. (2017) which combined UTAUT and GAM to examine e-government adoption dimensions in Mauritius is quite timely and necessary.

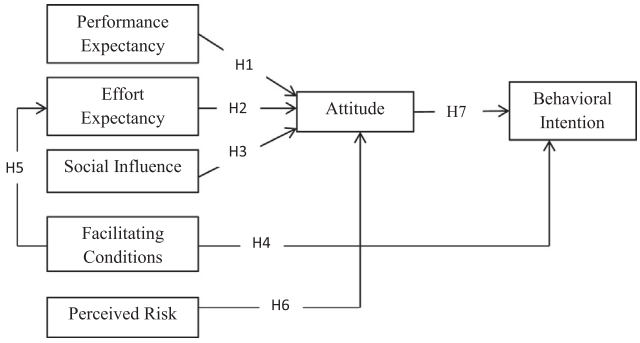
There is still a huge gap in the literature from SSA with respect to validating other models like EGAUM and UMEGA in the region though. They may provide new insights in e-government adoption. Unlike EGAUM, which is quite complex with numerous moderating relationships, UMEGA is a more parsimonious and comparatively simpler model that balances the trade-off between model complexity and explanative power. The validation of UMEGA showed that it outperformed all other models for the explanatory power of the behavioral intention to adopt e-government solutions (Dwivedi et al., 2017).

This study focuses on UMEGA as a valuable e-government adoption model that can bring new insights for understanding e-government adoption in SSA. Consequently, the main objectives of this study are to: validate UMEGA in the SSA context; and modify UMEGA with relevant e-government adoption dimensions pertinent for application in the SSA context.

2. E-Government adoption in SSA

SSA is the geographical area on the African continent that lies south of the Sahara Desert and consists of all African countries except for Algeria, Egypt, Libya, Morocco, and Tunisia, which constitute the North African Arab countries. SSA is one of the least developed regions with respect to e-government. Over the years, there have been several efforts to document e-government adoption in different SSA countries. While some of the researchers have presented only theoretical models (Bwalya and Healy, 2010; Jain and Akakandelwa, 2014), many more have carried out empirical studies on e-government adoption in SSA countries (Asianzu and Maiga, 2012; Bwalya, 2011; Komba and Ngulube, 2015; Lallmahomed et al., 2017; Lin et al., 2011; Rukiza et al., 2011; Yonazi et al., 2010). However, the majority of these empirical studies have been primarily based on TAM. Only Lallmahomed et al. (2017) adopted other theoretical models such as UTAUT2 and GAM, while Yonazi et al. (2010) used randomly selected variables.

The numerous empirical studies carried out on e-government adoption in SSA indicated some vital factors that influence e-government adoption in the region. However, the findings have not been consistent. For example, Rukiza et al. (2011) found that the perceived usefulness dimension of TAM model significantly influenced e-government adoption in Tanzania. Conversely, Komba and Ngulube (2015) established that the perceived usefulness was not significantly associated with e-government adoption in Tanzania. Similarly, Bwalya (2011) and Lin et al. (2011) found perceived ease of use to have a significant influence on e-government adoption in Zambia and Gambia respectively. However, Komba and Ngulube (2015) found no support for the influence of perceived ease of use on e-government adoption in Tanzania. Likewise, Lallmahomed et al. (2017) failed to find support for the significant influence of effort expectancy (an equivalence of perceived ease of use) on e-government adoption in Mauritius. Significant antecedents of e-government adoption that have been confirmed by at least two studies in SSA include: computer self-efficacy (Bwalya, 2011; Lallmahomed et al., 2017), perceived ease of use (Bwalya, 2011; Lin et al., 2011), perceived security (Khanyako and Maiga, 2013; Muraya, 2015), perceived trust (Asianzu and Maiga, 2012; Bwalya, 2011; Khanyako and Maiga, 2013; Rukiza et al., 2011), perceived usefulness/performance expectancy (Lallmahomed et al., 2017; Rukiza et al., 2011), social influence (Komba and Ngulube, 2015; Muraya, 2015) and website quality/system quality (Komba and Ngulube, 2015; Muraya, 2015). Consequently, it is imperative to take into consideration these factors when extending and validating e-government adoption models in the context of SSA.



Source: Dwivedi et al. (2017, p. 219)

Fig. 1. The Unified Model of E-Government Adoption (UMEGA). .
Source: Dwivedi et al. (2017, p. 219)

3. Proposed research model and hypothesis development

Dwivedi et al. (2017) provided a comprehensive evaluation of nine well-known theoretical models covering 29 different constructs as the basis for developing UMEGA (see Fig. 1). Following from their evaluation, UMEGA was developed and validated as an e-government specific model that could be used to understand the factors influencing the acceptance of e-government services.

UMEGA postulates that four factors (performance expectancy, effort expectancy, social influence, and perceived risk) influence the behavioral intention to adopt e-government systems through the mediating role of attitudes towards e-government services. Also, attitudes and facilitating conditions directly influence behavioral intention, while facilitating conditions also has an indirect influence on attitudes through the mediating role of effort expectancy. UMEGA's variables are discussed below.

3.1. Umega's variables

3.1.1. Performance expectancy, effort expectancy, and social influence

Performance expectancy, effort expectancy and social influence are three factors that were initially conceptualized in UTAUT to evaluate technology adoption in the organizational context (Venkatesh et al., 2003) and later adopted and used in the creation of the UATUT2 to extend their applicability in a consumer context (Venkatesh et al., 2012). Performance expectancy refers to the extent to which an individual believes that using a given technology will enable him or her to accomplish improvements in completing a given task or job role (Venkatesh et al., 2012). This suggests that an individual's perception that using an e-government system will help to achieve gains in completing a government-provided service will influence their attitudes and intention to use the system. *Effort expectancy* refers to the "degree of ease associated with consumers' use of technology" (Venkatesh et al., 2012: 159), suggesting that an individual will generally be more inclined to adopt an e-government solution that requires minimal effort to use. *Social influence* refers to the degree to which an individual perceives that significant others (family, friends and colleagues) will approve of using a given technology (Venkatesh et al., 2012). This suggests that individuals will generally be inclined to adopt a given system if important others (family, friends and colleagues) approve of using such a technology.

Several studies have shown that *performance expectancy* has a significant influence on e-government adoption (Lallmahomed et al., 2017; Weerakkody et al., 2013). This association has not always been

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