# Electronic government: Factors that influence adoption by agencies in Papua New Guinea

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**Abstract**

The advancement of information and communications technology has enabled businesses to enhance their processes to improve their customer service. With the aim of achieving similar gains, public agencies in Papua New Guinea are striving to adopt electronic government to improve their processes and delivery of services. Such adoption is presently operating at a basic level of service delivery, which could be affected by various factors that need to be properly researched. This paper examines these factors using qualitative methods including the thematic network analysis technique. Results of interview data from government officers of five agencies are presented using this analysis technique. Results indicate that adoption can be influenced by three main factors (technological, organisational and environmental) which need to be properly addressed to improve progress in adoption.

**Key words:** agencies, e-government, purposive sampling, qualitative method, thematic network analysis

## Introduction

The advancement of information and communications technology (ICT) has enabled businesses to enhance their processes in order to minimise cost and improve customer service. With the intention of achieving similar gains, public agencies (government departments and statutory bodies such as authorities) aim to achieve efficiency in their internal processes and effectiveness in service delivery (Huang, 2006). They seek to do this by leveraging the advances in ICT and Internet technologies, a phenomenon known as electronic government (e-government) (Daniel, 2016). Thus, agencies in Papua New Guinea are striving to attain process efficiency and effective service delivery (PNG Government, 2010) through the adoption (implementation and use) of e-government. Such adoption is mainly operating a basic level of service delivery (Daniel, 2016) due to various influential factors, a situation this paper seeks to address.

As mentioned above, this paper will examine the factors that might influence the adoption of e-government by agencies in PNG. It will discuss the research context, literature review and methodology used to collect and analyse the data, including thematic network analysis. The paper will describe how this analysis technique was used to analyse the interview data to gauge the main influential factors. These initial findings will indicate that adoption of e-government could be affected by three contextual factors (technological, organisational and environmental). The paper will also provide an understanding of these factors so that they could be properly addressed to facilitate expansion of e-

government adoption. It is now necessary to present the specific research context of this study.

**Research context**

Several plans have been formulated to guide development in PNG (Daniel, 2016). The Medium Term Development Plan 2011 – 2015 sets out the PNG Development Strategic Plan goals, deliverables and strategies for building the foundations for national growth (PNG Government, 2010). The stated aims in the plan include providing quality education to all citizens, improving access to the Internet and communication services, strengthening budgeting, financial management, and electoral process. The government also aims to provide advanced and affordable ICT infrastructure to reach all parts of the country, an integrated information system, and an access to e-government services such as e-passport and various online applications. These goals could be accomplished with adoption of e-government, which the government claims it plans to fully adopt by 2030.

Moreover, the Vision 2050 Directional and Enabling Statements provide the basis for socio-economic growth (PNG PNG Government, 2009). These statements include improving access to basic infrastructure and services, utilising ICT in areas such as health and education, strengthening the three-tier government system and improving service delivery, implementing an effective service delivery model, and establishing a communications satellite network and national information management system.

As previously mentioned, PNG agencies are striving to achieve these goals through the adoption of e-government (PNG Government, 2010). From the present literature review, there appears to be inadequate e-government research in PNG and the factors that influence adoption by agencies need to be properly investigated. In addressing this situation, this paper seeks to fill this gap and provide an understanding of these factors so that they could be addressed for further expansion of e-government.

**Literature review**

Although e-government could be used to improve processes and service delivery, there are several influential factors that need to be addressed for successful adoption (Daniel, 2014). Agencies in many developing countries show that they face similar challenges when adopting e-government. In their study of such adoption in Saudi Arabia, Alshehri and Drew (2010) identified several factors including lack of infrastructure, promotion and awareness programs, security, privacy and trust, and strategic planning. Other factors include resistance to change, lack of financial resources, policy and regulation, qualified personnel and training, leadership and management support, partnership and collaboration, and cultural differences. Similarly, Qaisar and Ahmad (2010) identified similar challenges in Pakistan including lack of infrastructure, literacy, professional workforce, collaboration and commitment from top management and leadership, and handling resistance to change.

It is essential that these factors be properly addressed so that governments can be expected to gain from the benefits of successful e-government adoption. As a developing nation, PNG could be facing similar factors, an issue this paper seeks to investigate using a methodology now to be discussed.

**Methodology**

Qualitative methods were employed to explore the factors that influence e-government adoption. Purposive sampling was used to select officers from five agencies for an interview. This form of sampling is used in qualitative research and allows researchers to use their judgment when selecting participants who have the information needed and best enables them to answer their research question(s) and meet objectives (Saunders et al., 2007). Thus, senior officers from relevant areas such as planning and information technology within the agencies, were chosen for interview. Permissions were obtained from senior management before interviews were conducted.

Interviews were used to collect rich qualitative data regarding experiences, views and perceptions concerning the factors faced by agencies in their adoption process. Probing questions were asked when more insight and deeper understanding of the phenomena was needed. A qualitative analysis technique known as thematic network analysis which will now be discussed was used to analyse the interview data.

**Thematic network analysis**

Qualitative data collected through interviews are raw and have little meaning in themselves (Saunders, Lewis, & Thornhill, 2007). To extract meaning, the data obtained from the interviewees (officers) were analysed using thematic network analysis.

> Applying thematic networks is simply a way of organizing a thematic analysis of qualitative data. Thematic analyses seek to unearth the themes salient in a text at different levels, and thematic networks aim to facilitate the structuring and depiction of these themes (Stirling, 2001, p. 387).

This technique involves six main steps: (1) coding the material (2) identifying themes (3) constructing thematic networks (4) describing and exploring thematic networks (5) summarising thematic networks and (6) interpreting patterns.

Several studies (Kolodziejczyk, 2012) have used this method to analyse their interview data. Thus, it provides a useful technique for analysing the data from officers to examine factors that influence e-government adoption. This leads to the findings from the thematic network analysis, which is now presented.

**Results**

The findings from the analysis showed technological, organisational and environmental factors influencing e-government adoption. The findings identified several technological factors, as expressed by the interviewees. The codes were grouped into basic categories (themes): strategy, infrastructure, interoperability and data management (Figure 1). Under these categories, several factors were identified.

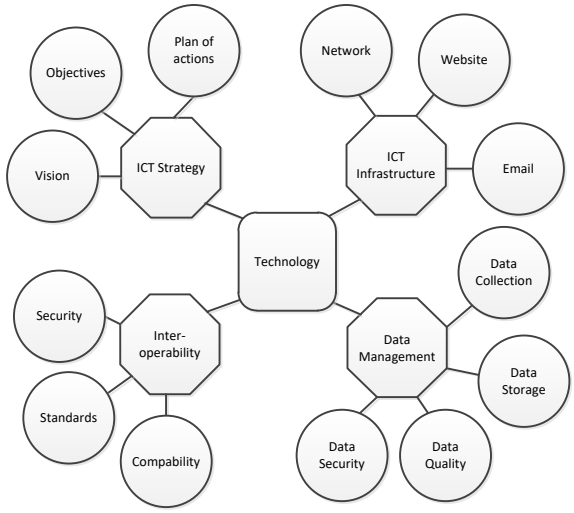


**Figure 1**: Thematic network showing technological factors that influence e-government adoption.

In relation to the thematic networks on technological factors, the following paragraphs show some typical expressions provided by interviewees. Many are presented verbatim but others have been edited to include only those sections relevant to the theme under consideration.

> I would say for all government departments; the way forward to bring effective service and effective communication is with ICT facilities…It makes work easy, very effective, saves cost, at a minimum cost, saves time... Effective data management is vital for effective implementation and use of e-government services because information is at the heart of IT systems (Interview #2).

> ICT strategic plan is essential. This plan should contain information about the initiatives such as e-government, their objectives and benefits…Having a vision of implementing e-government to improve delivery of services online is also essential (Interview #3).

> Interoperability and integration with other agencies is vital as this will allow sharing of information and resources to improve delivery and accessibility of common e-government services (Interview #4).

The findings from the thematic networks also illustrate a number of organisational factors. The codes were categorised into four categories: management support (communication with staff, motivation of staff and awareness and understanding from management), human capacity (number and quality of staff with the knowledge, skills and experience), management (project and change management) and organisational culture (teamwork and collaboration, sharing of information and learning).

In relation to the thematic networks on organisational factors, the following paragraphs provide some typical expressions provided by interviewees.

> Top management support is necessary for successful implementation of e-government in agencies. This kind of support is needed to initiate and fund ICT initiatives such as e-government. Top management would be supportive when they have an awareness and understanding of how e-government can bring a lot of benefits to the organisation (Interview #1)

> ICT initiatives such as e-government can also be affected by staffing. People with relevant knowledge, skills and experience are usually required when adopting new technologies to implement e-government (Interview #1)

> Available staffing is also a challenge. Limited staffing can result in performing multiple tasks (project tasks and daily operational tasks) causing pressure and stress, which could result in under performance. Required and relevant staff are needed to effectively roll out e-government projects (Interview #2).

> It would be better to implement projects in phases so that it's easy to manage, execute and test and see how it works. Then use the lessons learnt to work on the next phase or part of the project rather than setting everything all at once. Developing incrementally in phases allows agencies to use their experiences from the previous phases to do well in the current phase of the project. If something didn't work, we plan well for the next phase so we don't waste time and resources (Interview #2).

Further, the findings illustrate a number of environmental factors as expressed by interviewees. The codes were grouped into four categories: political (stability, decisions and support), economic (funding, supplies, rates and prices), cultural (regionalism, participatory) and regulatory (policies and regulations).

In relation to the thematic networks on environmental factors, the following paragraphs provide typical expressions provided by interviewees.

> It's mainly funding and staffing for the moment, it's funding and manpower, human resources. If you include funding…that will also cater for resources like equipment and software. The underlying factor is funding. It's challenging in that area but we are doing what we can

> with what we have... But we can perform beyond what we do here if we get considerable funding. That is one of contributing challenges (Interview #4).
>
> Talking about political environment …, I think change of management is also one of those factors that affects IT or e-government implementation. When government makes a decision to change someone, like top management, the person who is there and has a vision to do something but when there is a change…we don't achieve our goals because of those changes that are made from the political arena or environment... that new person has his own way of doing things. He comes on with some other ideas and that's one of the factors that can also affect e-government" (Interview #5).

It is now essential to provide discussion of the findings within the context of the literature of influential factors of e-government adoption.

**Discussion**

As mentioned, the findings from the analysis showed influential factors (technological, organisational and environmental). These findings are similar to those of various studies in other developing countries as discussed below.

*Technological factors*

There was a general consensus among the interviewees that a conducive technological environment is essential for successful adoption of technological initiatives such as e-government. This reflects similarity with other developing countries, which face similar challenges (Abdalla, 2012; Alshehri & Drew, 2010). Benefits and advantages can only be realised if there is a well-defined technological environment. A poor technological environment has contributed to a lack of e-government services in many developing countries including PNG.

ICT is a major technological factor and necessary for the adoption of innovations (Abdalla, 2012). Interviewees have expressed the view that a well-established infrastructure is a vital component of e-government. Lack of such an infrastructure is considered to be a barrier between those who have access to technology and those who do not (United Nations, 2008). It is considered necessary for agencies to have necessary internal infrastructure for successful adoption of e-government systems. External infrastructure is also essential for interacting with systems from other agencies as well as interacting with citizens, businesses and non-governmental organisations. Conducive external infrastructure will provide the backbone that will allow connectivity between the government and citizens. Adoption would not be successful if users are not able to access e-government services.

There was also a general consensus that a well-defined strategy is also necessary for adoption of technological innovations such as e-government, which is similar to the findings from other developing countries (Abdalla,

2012). The strategy should contain the vision, mission, goals, objectives and planned actions for achieving successful adoption (Ndou, 2004). PNG could use experiences and lessons from developed countries and other developing countries which have well-defined strategies to formulate their national e-government strategies (World Bank, 2013).

E-government has other requirements such as interoperability, compatibility, security and reliability (Alshehry, 2008; Altameem, 2007). Its adoption not only depends on technical aspects (Abdalla, 2012) but also on factors such as data management, policies and regulations (Pudjianto & Hangjung, 2009).

*Organisational factors*

Technological innovations have changed the way organisations perform their daily activities. Research studies have been conducted to understand the factors within the frame of organisational context that affect adoption of technological innovations by agencies (Abdalla, 2012), which include organisational culture, human capacity and management processes.

There was a consensus that it is essential to address organisational factors for successful adoption of technological initiatives such as e-government. This reflects similarity with other developing countries, which face similar challenges (Abdalla, 2012; Qaisar & Ahmad, 2010). E-government initiatives fail for various reasons including a lack of top management support, awareness and understanding, knowledge and skills, and resistance to change by employees (Alshehry, 2008; Schein, 2004).

Further, the general consensus is that organisational culture influences initiatives such as e-government, which can in turn cause changes in culture of an organisation. Organisational culture has several characteristics including collaboration, sharing of information and resistance to change by employees (Abdullah, Rogerson, Fairweather, & Prior, 2006; Altameem, 2007). These essential aspects of organisational culture affect e-government developments.

There was also a general consensus that support from top management is essential as it crucial to the success or failure of e-government. Top management refers to an individual or a group of individuals responsible for managing the organisation. This level of management is responsible for directing, controlling and monitoring the organisation as well as providing leadership (Abdalla, 2012). It usually has the authority to enact and enforce policies and regulations within an organisation (Cavaness & Manoochehri, 1993). Having this authority, it may either accept or reject adoption of e-government initiatives. Therefore, gaining the support of this level of management is critical to the success or failure of e-government adoption (Altameem, 2007).

Since strong leadership and management support is essential, lack of commitment would delay adoption or could even lead to its failure (Eynon & Dutton, 2007 as cited in Abdalla, 2012). Top management commitment and support requires that leadership and management needs to possess certain

qualities and skills such as strategic thinking, awareness and understanding of e-government and its usefulness, and motivate, communicate and encourage staff (Abdalla, 2012). Commitment from top management is needed from the start to its completion of e-government implementation (Aldrich et al., 2002 as cited in Abdalla, 2012).

*Environmental factors*

There was a general consensus that the external environment that surrounds an organisation can also influence the success of adoption. This reflects similarity with other developing countries which face similar challenges (Abdalla, 2012; Alshehri & Drew, 2010). These environmental factors may include politics, regulations, economic conditions, and cultural settings.

The political environment in which an organisation operates affects the adoption of innovation (Nour, Abdelrahman, & Fadlalla, 2008). The interviewees expressed that government decisions and actions influence adoption of technological innovations such as e-government initiatives. Political turbulence, instability and corruption militate against the successful adoption of e-government. Hence, strong political leadership, support and informed decisions are essential.

A close relationship has been found to exist between the adoption of e-government and economic environment in a country (Gronlund, Anderson, & Hedstrom, 2006; United Nations, 2010). Another general consensus is that the economic environment in which an organisation functions has a great influence upon its adoption. This environment consists of factors such as interest rates, taxes, inflation, exchange rates, national wealth and resources as well as market size, supply, demand, competitors, suppliers and distribution chain such as retailer stores. These factors act as external constraints on an organisation, which means that you have little, if any, control over them (MBA Official, 2015).

Regulatory environment also influences the operations of an organisation (Abdalla, 2012). This environment consists of laws, regulations and policies created by the government to exert control over the operations and practices of organisations. When created to foster e-government adoption, they can provide a favourable environment for successful adoption. To further facilitate expansion in e-government, the legal and regulatory environment should provide a framework that enables the development of sustainable technological innovations (Africa, 2014).

The interviewees expressed that these technological, organisational and environmental factors are to be addressed properly to promote and facilitate further expansion of e-government adoption, which leads to the conclusion of the paper.

## Conclusion

The advancement of ICT and the Internet technologies has enabled businesses to minimise cost and improve customer service. With the intention of achieving similar gains, agencies aim to achieve efficiency in their processes and effectiveness in service delivery (Huang, 2006). They seek to do this by leveraging the advances in ICT and Internet technologies. Thus, agencies in PNG are striving to attain process efficiency and effective service delivery (PNG Government, 2010) through the adoption (implementation and use) of e-government to achieve the stated aims of the various development plans. However, such adoption is mainly operating a basic level of service delivery and this paper has demonstrated that adoption is affected by various factors.

Moreover, this paper examined the factors that influence the adoption of e-government in PNG. It discussed the research context, literature review and methodology used to collect and analyse the data, including thematic network analysis. By using this analysis technique, the paper described how it was used to analyse the interview data to examine the main influential factors. The initial findings demonstrated that adoption is affected by three main factors (technological, organisational and environmental), under which several were identified. It also found that findings reflect similarity with other developing countries, which face similar challenges. As a result, the paper provided an understanding of these factors so that they could be carefully addressed to facilitate expansion of e-government adoption in PNG.

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