

Does Enterprise Architecture Give Value to e-Government in Developed Countries?

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ABSTRACT

Because of the holistic capability of Enterprise Architecture (EA) governments of developed countries have promoted EA adoption to improve coherency in their e-Government programs. Yet, there are very few systematic reviews on the value it delivers to their e-Government. Using the UN global e-Government development index, this paper investigates whether EA is affecting the main variable used in the e-Government development index. In investigating EA in developed countries qualitative evaluation is used. Government websites and relevant publicly available articles are the sources of information for this evaluation. The presence of EA seems to have a positive impact on e-Government. Thus it can be perceived that EA is valuable for the development of e-Government. It has the potential to improve interoperability within and among government agencies.

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1. INTRODUCTION

Governments have long searched for ways to improve their public services. The discovery of electronic government (e-Government) has made this objective achievable. E-Government promises to modernize public services and enable governments to act better, faster, smarter and more reliably to the needs of people. To achieve these anticipated benefits, Information and Communication Technology (ICT) needs to be properly aligned to government businesses strategy. Recent studies of e-government reveal that there is an ICT planning gap in the transformation process [1]. Current research in information systems has acknowledged Enterprise Architecture (EA) as an instrument to make integration of business and technology visible. Ross et al. [2] propose EA to be used in this alignment strategy. Zachman [3], the first designer of an EA framework, claims that EA can be used to manage changes and complexity in the enterprise. EA can also be used to promote interoperability [4, 5] among and within government bodies.

Given the complexity of public sector systems [6] EA is utilized by government. Therefore governments in developed countries have introduced Enterprise Architecture as a key component of their holistic and coherent e-government approaches. Although the number of developed countries adopting EA is growing [7], very few studies have proven that EA lead to a better e-Government performance. Using the United Nations (UN) e-Government development index 2003, Shekkerman [8] identified that there was a strong correlation between rankings and EA activities. However, Shekkerman [8] used data from one year only. This article uses serial data from 2003- 2012 in the UN e-Government development index to investigate correlation between four developed countries' rankings and their EA programs.

2. E-GOVERNMENT DEVELOPMENT INDEX

The United Nations consistently produce an e-Government Development index. The first index was launched in 2003. In measuring the e-Government development index, the UN adopted the stage model [9-11]. Stage models identify the maturity of e-Government through how governments exploit ICT, such as the internet, to interact with their stakeholders e.g.: citizens, private sectors, and other government bodies. Although research by Coursey and Norris [12] found that it cannot be clearly perceived that e-Government is

progressing based on the proposed stages, the stage model may still be relevant to recognize at what stage the e-Government is. In evaluating how governments utilize ICT the UN used three major variables in their model.

2.1. Variables Measured

Three major variables that the UN used in their model measure the level of how well the application of ICT is used to improve public services, supporting infrastructure and human capital. The maximum result for each variable is one. All variables are weighted equally. The aggregate of these weighted variables lead to the total e-Government index for each country.

The application of ICT in the UN member countries was measured by a web measure index. A few years later, this variable was renamed to the online services index. This variable was measured purely by a quantitative online survey to particularly government website or portal on the Internet. The other two variables i.e. supporting infrastructure and human capital refer to the secondary data. Data for supporting infrastructure were predominantly taken from the UN International Telecommunication Union (ITU) and the UN Statistics Division. This variable is called as the telecommunication infrastructure index. In generating the human capital index, the UN depends on the United Nations Educational, Scientific and Cultural Organization (UNESCO) data. Since the two variables rely on secondary data, the dynamic in measuring the government index was partly changed to the application used to improve public services.

2.2. Changes in the Measurements

Since it was introduced in 2003, the UN has continuously refined its model and instruments. Initially, the objective was intended to be to measure the use of ICT, particularly the internet to deliver public services [13-15]. After that, the view of e-Government as a whole concept was initiated in 2008 [16]. As the number of mobile device users was growing rapidly [17], since 2010 the UN included mobile services [18]. Consequently, the web measure index was changed into the online services index. In addition to those changes, in the latest publication, the UN measured inter-linkages that will lead to sustainability of e-Government systems [19].

Evidence of the changes in objective of the UN e-Government index can be seen in the modification of the stage model. Originally, the UN stage model was comprised of five levels namely: Emerging Presence, Enhanced Presence, Interactive Presence, Transactional Presence and Networked Presence. In 2008, the UN modified the levels to Emerging, Enhanced, Interactive, Transactional, and Connected. The modified levels were then simplified to Emerging, Enhanced, Transactional, and Connected in 2010. Since then, the UN has shifted the focus of its objective to a more holistic approach to capture a country's performance in a single internationally-comparable value.

3. EA IN DEVELOPED COUNTRIES

The purpose of EA is to have a holistic approach to develop an integral design [20]. Having this in place will lead to better government services [21]. To make the most of ICT, the United States government received a mandate from the Congress to reform the management of Information Technology in their government. The mandate was called the Clinger-Cohen act [22]. In order to fulfill this law, the US CIO introduced the use of EA in its e-Government. They developed the Federal Enterprise Architecture Framework (FEAF) a common framework to be used in the US government [23]. Since then, other developed countries have adopted EA in their e-Government strategy.

3.1. The United Kingdom

The United Kingdom (UK) government acknowledged the importance of technology in transforming its government. Hence, in 2005 "the transformational government strategy enabled by technology" was introduced [24]. In this strategy, the UK government defined citizen centric ICT services that should promote shared services in government. This in turn will enhance the proficiency and adaptability level in the government to accommodate ICT enabled change. In order to achieve this, the UK government established the eGovernment Unit (eGU) [7]. From this unit, the UK government published the cross-Government Enterprise Architecture (xGEA) in 2005 [7, 25, 26]. Since then, the UK government refers to this xGEA in gaining sustainable alignment of business and IT functions [26].

3.2. Singapore

Singapore is a small country and considered to be the most advanced country in the South East Asia region. Although Singapore has limitations in their resources, they have successfully utilized technology to enhance their economy [27, 28]. The Singaporean government is politically committed to enable ICT in their public services [27]. Evidence of this commitment is that in 2006 the Singapore government has started to adopt Enterprise Architecture [29]. The development of Singapore Government Enterprise Architecture

(SGEA) [29, 30] was based on the US FEAF. SGEA was completed with the inclusion of Methodology for Agency ENTERprise Architecture (MAGENTA) in 2007 [31].

3.3. The Republic of Korea

The Republic of Korea paid significant attention to e-Government development. In order to enhance e-Government, the government started to develop Government Wide Enterprise Architecture as their EA program in 2003 [32]. By adopting EA, the Republic of Korea government expected that it would overcome inter-department and inter-ministry integration issues [33]. Although the EA program was started in 2003, the legislation related to EA was not available until 2005 [32]. Later, this EA law was formally merged into the e-Government act in late 2009.

3.4. Australia

In order to enhance the e-Government initiatives, in 2007 the Australian government decided to adopt the US FEAF in its EA program [30]. This EA was called the Australian Government Architecture (AGA) [34]. The development of AGA was completed with the provision of the Business Reference Model (BRM) details in 2009 [30, 35]. With EA in hand, the government expects that EA will be able to deliver significant improvement in e-Government systems.

4. SIGNIFICANCE OF EA TO E-GOVERNMENT

This paper measures significance of EA in the above mentioned countries by comparing their EA activities to their e-Government by looking at the UN data in the e-Government index. It can be inferred that the overall e-Government index depicts the snapshot of the e-Government development over time. As can be seen in Figure 1, in the first index published, the Republic of Korea e-Government was measured slightly under the Singapore e-Government. However, the Republic of Korea successfully gained the first rank with 0.879 out of 1.000 in the overall index in 2010. They retained their position by achieving 0.928 in 2012. Although the other observed countries were not reaching the same level as the Republic of Korea did, they either remained steady or gradually increased their ranking over time. All observed countries are showing similar trend wherein they are all declining in 2008, the year when the UN was significantly modifying its model [16]. The Australian e-Government index was considered steady from 2003 to 2008. In 2010, they were experiencing a decline but successfully bouncing back to 0.839 in 2012, two years after the completion of their EA [35]. Singapore's e-Government and the UK's e-Government showed similar results. They remained steady from 2003 to 2005, but declined in 2008. Notwithstanding they managed to gain better results in 2010 and 2012.

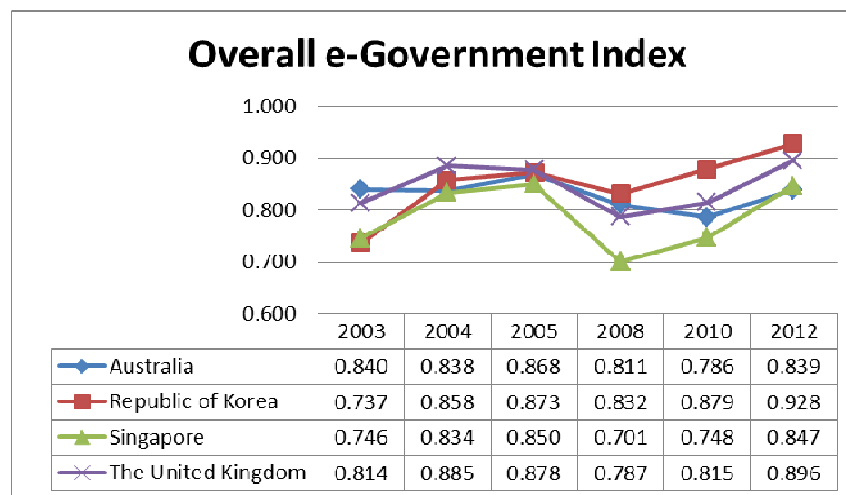


Figure 1. Overall e-Government Index among observed countries

In the web measure / online service index, the most vibrant variable out of the three variables used to measure e-Government index, shows similar results to the overall e-Government index as can be seen in **Error! Reference source not found.** Not only the Republic of Korea achieved the maximum mark, 1.000 for this variable since 2010, but also in the last published e-Government index Singapore achieved the same figure. The other two observed countries have not yet gained similar results but they are showing similar trends to the Republic of Korea and Singapore experiences. The Australian and the UK's e-Governments' online service indexes have been gradually increasing since 2008.

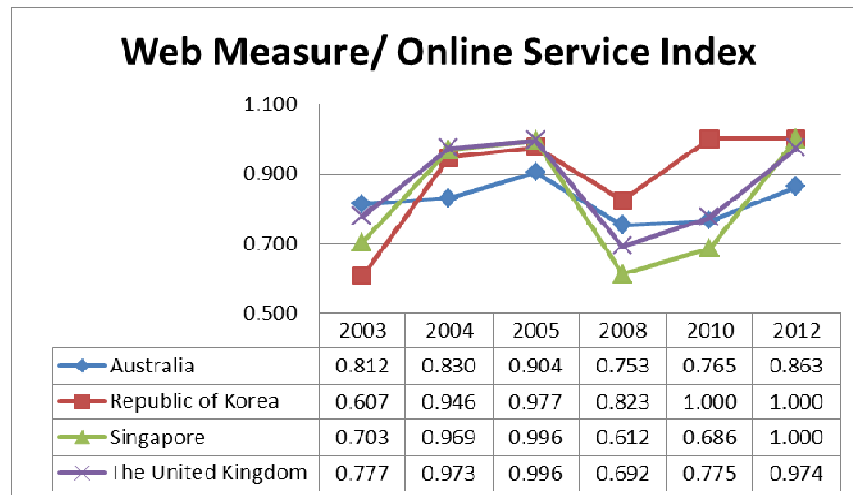


Figure 2. Web Measure/Online Service Index

The achievements in the e-Government development indexes are in line with the achievements in EA development. The Republic of Korea started their EA development in 2003. Then they successfully enacted EA law in 2005 and merged their EA law into the e-Government act in 2009. Australia accomplished their EA in 2009 and started to gain steady growth in their e-Government index in 2010. Although Singapore and the UK were experiencing a decline in the indexes after they enabled EA in their e-Government in 2007 and 2005, they have gained gradual incremental growth for their overall e-Government index since 2008. In addition, the Singapore e-Government experience shows that they have positively minimized government interoperability issue. Saha [20] argues that since adopting EA, the Singaporean government was able to develop whole e-Government solution which comprises of modular services. Similarly, the Republic of Korea positively reduced fragmented government services in their e-Government system since the adoption of EA [32].

5. SUMMARY

In light of the above, similar to the findings of research by Shekkerman [8], it can be perceived that there is a strong correlation between EA activities and e-Government system development. Thus EA may have contributed a substantial value to the development of e-Government in the observed countries. As stated earlier the development of EA in the four observed countries is in line with the achievement in their e-Government services. Although the UN modified the models and variables to generate the e-Government index, the observed countries managed to gain or to retain their position and value of e-Government. It is evident that e-Government in developed countries has benefited from adopting EA. In order to determine how valuable EA is, further research is needed by using more data from countries who have adopted EA in their e-Government. In contrast, it will be beneficial to investigate the top 20 countries in the UN e-Government index who have not adopted EA in their e-Government strategies. Consequently a more sound recommendation in relation to EA adoption may be made to help developing countries in improving their e-Government systems.

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