

## Whole of Government Critical Success Factors towards Integrated E-Government Services: A Preliminary Review

*Faktor Kejayaan Kritikal Keseluruhan Kerajaan ke arah Perkhidmatan E-Kerajaan Bersepadu: Kajian Awal*

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### ABSTRACT

*Electronic Government (E-government) becomes one of the key elements for sustainable development of the country. Previous studies on E-government indicate that most governments are performing well in E-government implementation. However, the issues of process duplication and bureaucracy in services should be addressed to build trust and increase citizens' satisfaction. Currently, there is a necessity to focus on the development of integrated and tailored-made services that suit with citizens' needs. This initiative entails high commitment and collaboration from agencies, which can be achieved through the whole of government (WoG) approach. This study aims to identify the critical success factors of WoG towards the development of integrated E-government services. A preliminary review was conducted on previous studies and reports to get some insights of the subject being studied. The identified data were coded and analysed using content analysis method. The findings demonstrate that there are a number of critical success factors for WoG, which consist of technical and non-technical aspects. The findings act as a theoretical framework for better understanding about WoG approach for integrated E-government services.*

*Keywords: E-government; integrated services; whole of government (WoG); connected government; joined-up government*

### ABSTRAK

*Kerajaan Elektronik (Kerajaan-E) merupakan antara elemen utama bagi mengukur kestabilan pembangunan dan sosio-ekonomi sesebuah negara. Kajian terdahulu berkaitan Kerajaan-E menunjukkan peningkatan prestasi pembangunan Kerajaan-E di kebanyakan negara. Namun pun begitu, isu berkaitan pertindanan proses di antara organisasi dan birokrasi perkhidmatan perlu ditangani bagi meningkatkan tahap kepercayaan dan penerimaan rakyat terhadap perkhidmatan Kerajaan-E. Pada masa kini, keutamaan perlu diberikan kepada membangunkan perkhidmatan yang bersepadu dan berorientasikan rakyat. Inisiatif ini memerlukan kerjasama erat dalam kalangan agensi yang hanya akan dapat dicapai menerusi pendekatan keseluruhan kerajaan. Kajian ini bertujuan mengenalpasti faktor kejayaan kritikal di dalam pendekatan keseluruhan kerajaan yang menyokong kepada pembentukan perkhidmatan Kerajaan-E bersepadu. Sorotan susastera dilaksana terhadap kajian terdahulu dan laporan berkaitan. Data yang telah dikenalpasti dikod dan dianalisis menggunakan kaedah analisis kandungan. Dapatan kajian menunjukkan terdapat beberapa faktor kejayaan kritikal untuk pendekatan keseluruhan kerajaan yang merangkumi dimensi teknikal dan bukan teknikal. Dapatan ini bertindak sebagai kerangka teoretikal untuk memahami pendekatan keseluruhan kerajaan bagi pembentukan perkhidmatan Kerajaan-E bersepadu dengan lebih baik.*

*Kata kunci: Perkhidmatan bersepadu; perkhidmatan kerajaan-e; pendekatan keseluruhan kerajaan; platform bersepadu; interoperabiliti*

### INTRODUCTION

E-government can be defined as the use of information and communication technology (ICT) to achieve a better government (OECD 2007) by improving the business processes and service delivery to citizens, businesses and among agencies (Zhao, José Scavarda & Waxin 2012; Grönlund 2010). It is viewed as the organizational changes that require transformation of public administrations in order to improve public services and democratic processes. E-government transforms government services delivery from paper-based conventional methods to become more

effective and efficient by embracing ICT capabilities particularly the Internet. The use of ICT improves public access to the information and increases government services performance through the digital platform.

E-government has emerged from the transactional stage to the transformation stage. E-government comprises three elements; publish, interact and transact, which are not dependent on each other (Obi & Iwasaki 2015). It starts with the dissemination of government information through the static websites towards more enhanced website features during the interact phase such as email contact, feedback form and online responses as well as transact websites

that offers dedicated E-government services directly to the citizens for better performance (Bannister & Connolly 2015). There are few stages for quantifying the progress of E-government. During emerging stage, only limited information is presented in the static web pages. Internet technology has increased information and digital content publications in the enhanced stage. For the interactive stage, citizens can interact with the government through portals by sending feedback, making appointments and accessing to services via online forms.

Transformation and seamless online services can be achieved through an integrated E-government services (Adachi et al. 2016). Integrated E-government services is a platform that consolidates E-government systems from across departmental agencies. It encompasses of integration and standardization of government resources that can be shared across agencies (Henning 2013; Janssen et al. 2011). The aim is to prevent redundant systems and duplication of tasks where in fact, some processes do not comply with the industry standards and policies (Al-Shboul et al. 2014). Thus, it is essential to overcome these issues through integrated government services. However, previous studies have found that this initiative remains one of the biggest challenges through the entire government administration. This is because most government departments are still working in silos and isolated from one another (Berger & Rose 2015; Paramashivaiah & Suresh 2016). Therefore, there is a need to tighten up of government organization and increase the collaboration among departments by imposing the importance of integrated E-government services to the citizens and businesses (Christensen & Laegreid 2007). Whole of Government concept can be adopted to coordinate the heterogeneous E-government services and enable collaboration across organisational boundaries (Christensen & Laegreid 2007; Colgan, Kennedy & Doherty 2014; Halligan 2004; Ojo 2012).

Whole of Government (WoG) previously known as joined-up government was introduced by Tony Blair cabinet's in 1997 during a New Public Management reform (Christensen & Laegreid 2007; Halligan 2004). Meanwhile, WoG has emerged in Australia, articulating the need to break down the departmental silos that confine cross agencies collaboration efforts. WoG is not a new term in public administration. It has been undertaken by various sectors such as national security, defence and finance particularly among the developed countries in order to decrease fragmentation of the public sector services (Castelnovo 2012). Only in recent years, WoG has been deliberated greatly in ICT industry. This is also advocated by the public services delivery transformation program and the emergence of digital age (Omar & Osmani 2015). Nowadays, WoG becomes a key of the horizontal form of online services coordination across departmental agencies (Stepputat & Greenwood 2013). The concept of WoG has been described as an overarching term to increase organisational collaboration, system integration and process coordination in the digital

transformation strategy (Colgan et al. 2014), which are indeed the substantial thrusts in developing integrated E-government services. As WoG is not a straightforward concept, this paper therefore aims to identify the critical success factors towards integrated E-government services through WoG.

This paper is organised as follows: the first section outlines the emergence of E-government and the importance of WoG together with its critical success factors. The second section is research methodology, which presents the activities involved in this study. The third section explains the results as well as discusses the overall findings. The last section concludes the paper.

## LITERATURE REVIEW

Investment in ICT has given substantial impacts to the government and organizational changes. Many governments today have realised the importance of E-government implementation to increase organisation performance and citizen satisfaction (Dudley et al. 2015; Nambisan & Nambisan 2013). Previous studies have mentioned that better governments need to be aligned with citizens and business needs (OECD 2013). This is also supported by the advancement of technology that raises citizens' demands and expectations of better services by the governments (Ramli 2017). E-government therefore must shift from being a disruptive change to be an essential mechanism to pave the way how governments work. This can increase efficiency in government and online presence to preserve information and service quality (El Benany & El Beqqali 2017; Lagzian & Pourbagheri 2014; Novakouski & Lewis 2012). Nonetheless, this is not automatically generated. It is a process of organizational and institutional arrangements that must be adopted by the governments to mediate the changes (Bannister & Connolly 2015; Zhao et al. 2012).

The implementation of E-government reduces cost and bureaucracy by streamlining the processes and re-organising operating procedures (Alshehri & Drew 2010). Moreover, E-government has great benefits to the economic growth and sustainable development by improving government service operations, reducing costs and increasing the transparency and services quality (OECD 2007). Besides, E-government improves agencies' performance and increases public services effectively for all customers (Colgan et al. 2014; Corrêa & Paula 2017; Park 2015; Stepputat & Greenwood 2013). It also covers the spectrum of democratic processes including public interaction with government, public discourse on government budgetary system, political topics, and public consultation (Dawes 2008).

The emergence of communications and mobile technologies have cultivated the citizens' demands towards E-government services (Fan, Gao & Gao 2016; Thalanay 2013). In Malaysia, the statistics show that

the total internet use by individuals has increased by 9.0 percentage points from 71.1 per cent in 2015 to 80.1 per cent in 2017. Meanwhile, the percentage of individuals using computers and mobile phones also have increased to 69.8 percent and 97.7 percent respectively in 2017 as compared to 68.7 percent and 97.5 percent in 2015. From total population, 80.4% users actively use internet to access online services (Department of Statistics Malaysia 2017). These figures reflect that government online presence should be more responsive and available in multi platforms. Therefore, citizen can use services that are really required by them as well as performing online transactions through seamless E-government services. This involves total integration across administrative and departmental boundaries instead of improbability of agencies to work in silos (World Bank 2016).

There are several studies on how E-government evolves. In general, e-government model comprises four development stages (Laney 2016). The first stage is known as presence stage where citizen can get information from the static government websites. More interactive features are introduced in the second phase, which involves interaction between government to business, government to citizen and government to government (Bertot, Jaeger & Grimes 2012; Gorla & Chiravuri 2016). In the interaction stage, websites are provided with email contacts and interactive forms that generate two-way responses between government and the citizens. In the third stage that is also recognised as transactional, citizen can perform online transactions for license renewal, paying fees or taxes, as well as procurement contracts bidding. The highest stage is transformation, which is important to organize heterogeneous E-government services that enable the innovation of their entire government business and operations (Janowski 2015). Meanwhile, seamless services require inter-organizations collaboration and coordination of business processes according to the mutually agreed standards and regulations. This initiative can be adopted through WoG concept (Colgan et al. 2014).

Although there are many perspectives of WoG, the most accepted definition is WoG as a concept that emphasises the need for greater collaboration and coordination across departmental boundaries to eliminate duplication, optimize resources, create synergies among agencies, and deliver seamless services to the citizens and businesses (Christensen & Laegreid 2007). WoG is increasingly seen as an imperative mechanism for delivering coherent and integrated policies including effective alignment of top-down policies (Ojo 2012). Furthermore, WoG creates comprehensive shared resources and established seamless services, encompasses communication, information sharing and decision-making processes (Efficiency Unit 2009; Zainal 2011). This requires cross-boundary government structure to build the reciprocal cooperation between government agencies that respond to the needs, capabilities, and

limitations of organization in all levels (Halligan, Buick & O'Flynn 2012).

A few countries have adopted WoG as a central part of public sector reform (Colgan et al. 2014). Meanwhile, some other countries strongly emphasise on the integrated service delivery driven by WoG policy. In this case, WoG concept is used as a formal guidance for policy makers. WoG is needed to simplify and integrate E-government services with a focus on the quality improvement through the connected government. WoG collaboration requires agencies to make their vertical organisational structures visible. Through WoG, decision making processes can be made in a central point for all agencies to help eliminate duplication, monitor on-going collaborations and serve as an institutional unit to embark on the collaborative strategies (Zainal 2011).

Previous studies have highlighted some benefits of implementing WoG. Some of the salient points are optimizing outcomes with extensive collaboration to deliver services that are tailored made to citizens and business's needs (Kumar, Sachan & Mukherjee 2017), simplifying processes by coordinating the needs of the public authorities involved, reducing duplication and integrating services (Davies 2015), eliminating the bureaucratic model and fragmented services to allow more integrated approach (Maweu & Karani 2016), breaking the information 'silos' that are created by departmentalism and lack of coordination (Buyle et al. 2016), nurturing partnerships with various agencies for delivering seamless government services, and on supplanting the vertical sectoral boundaries of traditional bureaucracy with collaborative structures (Henning 2013). These studies focus on the non-technical elements ranging from the strategic management, planning, and business process realignment as well as coordination efforts towards the establishment of integrated services.

On the other hand, other studies mention about the technical factors to support the success of WoG initiative. The factors include standardization of requirements in the implementation of integration processes (Castelnovo 2012; Xu, Ling & Xu 2016), interoperability (Bekkers, Hartley & Dawes 2015; Henning 2013), big data (Archenaa & Mary Anita 2015; Wamba et al. 2016) and security (Alzahrani, Al-Karaghoulis & Weerakkody 2015). Meanwhile, United Nations Department of Economic and Social Affairs (UNDESA) has outlined WoG characteristics as the key contributors to E-government development. These characteristics are structured as dimensions with multi-dimensional constructs (UNDESA 2016). The dimensions include citizen centricity, common infrastructure and interoperability, collaborative services, governance, networked organizational model, social inclusion as well as transparent and open government.

Despite the increase in research on WoG, they have not adequately discussed strategies particularly to support cross boundaries collaborations to enable E-government

services integration. As a result, collaboration and integration cannot be achieved among agencies due to lack of understanding and appropriate guidance. Therefore, further work needs to be done to develop such guidelines for the agencies (Laycock & Tothill 2014). The effectiveness of joined-up approaches may be improved by proposing a framework for engaging WoG initiatives. (OECD 2016). The contributing key factors in every level of organization including both technical and non-technical need to be considered as one holistic view.

## METHODOLOGY

The main objective of this study is to identify the WoG critical success factors towards integrated E-government services through literature review. The following steps were taken to achieve the objective:

### 1. Selection of papers

The reviews were made on the published or unpublished documents about E-government and WoG between years 2012 to present. The documents comprise journals, proceedings, research documentation, established reports, governments' unpublished documents, paperwork and official web portals. In addition, secondary data were also collected from the published reports and statistical data of E-government surveys across the regions conducted by the United Nations and Waseda Institute of E-government from years 2010 to 2016.

### 2. Searching criteria

The queries were performed on online databases as well as e-journal repositories such as ACM Digital Library, IEEE Xplore, Springer, Emerald, Science Direct, Cambridge Books Online and OECD iLibrary. The governments' web portals of the developed countries and news articles were also explored to get their perspectives and progress on the subject being studied. The keywords such as "integrated services", "integrated E-government services", "whole of government", "whole of government for integrated E-government", "connected government", "joined up government", "integrated platform", "E-government", "interoperability", "digital government" and "digital transformation" were used during the searching.

### 3. Data analysis

The data were then examined and analysed using content analysis method. The process of analysis involves the identification and coding of data into categories as well as analysis and interpretation (Krippendorff 2012). During the identification process, the appropriate units or levels of categories are determined. The purpose is to develop a coding system that enables the conversion of the data into meaningful and specific units of information. The defined categories known as codes are used to classify the content into explicative categories. Once the data is organized and coded, the qualitative analysis is conducted,

followed by the interpretation of the results. To maintain precision, these processes are carried out continuously. The following section discusses the results.

## RESULTS

There are multiple facets of WoG including E-government development strategies, issues and best practices. This study found 12 WoG critical success factors for the development of integrated E-government services, comprising both technical and non-technical elements. Table 1 outlines briefly those factors and the related studies that support them.

The following paragraphs elaborate in detail each factor:

*Citizen Centered Services* The citizens' expectation of E-government services quality has increased dramatically. The services are expected to be efficient, effective and be able to reduce red tape dealings with multiple service providers (Efficiency Unit 2009; Lonn & Uppstrom 2016). Citizen-centered services is a key to successful E-government initiatives particularly to support WoG implementation (Al-Shboul et al. 2014). E-government services shall be developed based on the citizens' real needs and incorporate their requirements (Abdelhakim & Idoughi 2015; Boon et al. 2017). This can be achieved through continuous research on citizens to investigate their true experiences while interacting with the government services (Kumar et al. 2017). This would ensure acceptance and continuous engagement among the citizens towards E-government services (Dwi & Goodwin 2013).

*Leadership & CIO* A high level of leadership at the political and administrative level is essential for WoG to work. This includes the important roles of Chief Information Officer (CIO) in supporting WoG initiatives. Generally, CIO is an executive position at an organisation, who is responsible of planning information technology (IT) strategies, capabilities and resources as well as managing the computer systems required to accomplish the organisational objectives and goals (Li & Tan 2013). The authority of CIO is crucial to realise the organisational strategy and performance. The CIO's leadership and strategies would enhance government agencies' business performance through strategic opportunities and challenges discovery (Tuya et al. 2017). In addition, CIO should learn how to support the organization in the E-government implementation. There is a need to ensure online services are successfully integrated and avoid duplication of tasks (Al-Shboul et al. 2014)

*Integrated Services and Policy* WoG enabling policies includes the principles, rules and guidelines that are formulated or adopted by the government agencies. The policies lay down the basic framework for government operations and provide a clear picture to stakeholders about the expected outcomes and related responsibilities (Chauhan & Estevez 2008; Estevez Ojo & Janowski

TABLE 1. WoG critical success factors

WoG Critical Success Factors	Definition	Related Studies
Citizen Centered Services	Services that are tailor-made to citizen needs, which increase user's participation and satisfaction levels towards E-government services.	Abdelhakim & Idoughi (2015); Boon et al. (2017); Dwi & Goodwin (2013); Kumar, Sachan & Mukherjee (2017); Lonn & Uppstorm (2016).
Leadership & CIO	A person who has the highest level of responsibility and political commitment in the organization.	Colgan et al. (2014); Li & Tan (2013); Olumoye Govender & Africa (2016); Tuya et al. (2017).
Integrated Services & Policy	Consolidated services and policy integration to eliminate fragmentation of services and breaking the silos in the organization.	Chauhan & Estevez (2008); Misuraca Broster & Centeno (2010), Zhao & Waxin (2012).
Interoperability	A process of exchanging data from one to another, particularly computer systems or software. The transformation process must follow the standards that are mutually agreed by both parties.	Bekkers, Hartley & Dawes (2015); Boudjelida, Mellouli & Lee (2016); Henning & Trigo (2013); Navarrete et al. (2010); Othman & Razali (2017).
Security & Trust	Security requirements and levels of trust that assign specific responsibilities to adequately protect infrastructure, data and information that may inhibit technical collaboration.	Alzahrani, Al-Karaghoulis & Weerakkody (2015); Janssen et al. (2011); Sideridis (2013); Xu, Ling & Xu (2016); Zammani & Razali (2016).
Big Data & Analytics Tool	The large volume of data from the heterogeneous systems and tools for monitoring big data performance.	Archenaa & Mary Anita (2015); Wamba et al. (2016).
Politics	The actions or activities concerned with achieving and using powers in organization to make decisions and support collaboration.	Carey & Crammond (2015); Halligan et al. (2012); Novakouski & Lewis (2012).
Budget	A dedicated funding for organization that specially constitutes to performing such decisions.	Halligan et al. (2012); Lonn & Uppstorm (2016).
Organisation	A body of administrative officials that is required to manage WoG initiatives and cultivate collaboration efforts among agencies.	Christensen & Laegreid (2007); Halligan et al. (2012); Institute of Public Administration (2009); Ojo (2012).
Coordination	The process of organizing activities among agencies to incorporate other sources and eliminate redundant tasks through business processes realignment.	Colgan et al. (2014); Carey & Crammond (2015); Lonn & Uppstorm (2016); Stepputat & Greenwood (2013); Zainal (2011).
Collaboration	The act of working together to achieve mutually agreed benefits across organization boundaries.	Bhunia (2016); Christensen & Laegreid (2007); Ku Gil-Garcia & Zhang (2016); Lee & Park (2015); Pan & Mao (2016).
Infrastructure	Technical requirements that are needed to support transactions of data and information across agencies.	Al-Shboul et al. (2014); Janssen et al. (2011); Jasmin & Hasan (2018); Ramli (2012); World Bank Group (2016); Yahya & Razali (2015).

2011). These policies are essential to govern the citizen centric E-government service delivery integration across various agencies and could eventually improve services integration efforts in future (Misuraca, Broster & Centeno 2010; Zhao et al. 2012). In addition, promoting a regulatory process that is effective, efficient and accountable will achieve greater coherence among the policy objectives of government.

**Interoperability** Interoperability is defined as the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals (Othman & Razali 2017). Interoperability involves information and knowledge sharing between organisations through business

processes they support by means of data exchange between the respective ICT systems (European Commission 2017). It concerns the capability of organisations to "talk to each other" based on a set of standards and agreements (Henning 2013) to ensure seamless communication across organisations (Henning 2013). This requires various partner organisations to be compatible with each other (Bekkers et al. 2015; Boudjelida, Mellouli & Lee 2016).

**Security and Trust** Security is an attribute that cannot be neglected for E-government service delivery (Sideridis 2013; Zammani & Razali 2016). It focuses on secured generation and distribution of electronic public documents across various government agencies.

A secured E-government service delivery will build trust and confidence among citizens (Alzahrani et al. 2015). In addition, quality of data may increase public trust and efficient resource allocation (Lim, Yusof & Sivasampu 2018). Therefore, security should be taken into consideration in the WoG strategy (UNDESA 2014). Moreover, interoperability should deal with security aspects and ensure a proper interpretation of the results, to avoid illegal intrusion and strictly control the operational authority between different entities (Janssen et al. 2011; Xu et al. 2016).

*Big Data and Analytics Tool* Big Data Analysis (BDA) is the act of examining large and varied data sets to uncover hidden patterns, unknown correlations and other useful information that can help government agencies for better decision-making process. BDA provides strategic competitive advantage and improves operational efficiency and effectiveness (Wamba et al. 2016). It involves strategic alliance among several firms or agencies. Integration among government agencies indirectly enables the benefits of BDA to be harnessed. BDA utilises the abundant data that are available among government agencies to improve decision making process (Archenaa & Mary Anita 2015).

*Politics* The politics and administrative leadership is homogeneous and in agreement about the use of WoG measures (Christensen & Laegreid 2007). Political influences underpin the cooperative efforts; get people, organisations and other institutions to work together. These are particularly important to promote WoG initiatives. There is a normative bias in much political and policy discourse, where joined-up working is viewed as wholly positive (Carey & Crammond 2016). Nevertheless, political barriers must be managed wisely to prevent jeopardizing collaboration efforts towards the development of integrated E-government services (Halligan et al. 2012).

*Budget* Another barrier to WoG initiatives include the lack of dedicated funding by institutions (Efficiency Unit 2009; Halligan et al. 2012). Sufficient budget must be allocated in order to realise this initiative (Lonn & Uppstrom 2016). Therefore, considering the citizens' needs as the top priority, this action mitigates adverse effects in future. This is also important to build trust among them.

*Organisation* WoG requires not only transcending boundaries collaboration, but also between internal organizations (Christensen & Laegreid 2007; Efficiency Unit 2009). Some methods can be used to cultivate the interactions between partners and organisational processes including flexibility to work and think across boundaries as well as system dynamics model for socio-technical processes (Ojo 2012). A few countries have established organizational units or interagency collaborative units with the aim to work better together (Halligan et al. 2012).

*Coordination* Coordination involves multiple organisational units that do not have hierarchical controls over each other to generate outcomes that cannot be achieved by working in silos (Colgan et al. 2014). Coordination can increase strategic leadership roles of the organization and help in decisions making process in a centralised form. In addition, it helps to eliminate process duplication, increase organisational performance, and serve as a dedicated platform to initialise the coordination strategies (Zainal 2011). Furthermore, through the coordination strategies, the ideas of collaboration become more effective (Stepputat & Greenwood 2013).

*Collaboration* Collaboration requires agencies to make their vertical organizational structures and technological structures to be permeable (Zainal 2011). It is about working pragmatically and smartly with one another to build reciprocity, trust and therefore better relationships among the organizational entities (Christensen & Laegreid 2007). High quality services certainly need breadth collaboration from other stakeholders, including citizens to help in decision making processes (Pan & Mao 2016). Moreover, there is a demand for integrated E-government platforms to consolidate the government services in a single window. Technically, collaboration becomes an important step towards integration of heterogeneous E-government services (Bhunia 2016). In addition, collaboration can improve services quality through the effective communication within organization (Dauwed, Yahaya & Mansor 2018).

*Infrastructure* Infrastructure refers to the current structure used by many organizations to collaborate and support interoperability across agencies (Janssen et al. 2011). Infrastructures provide secure, reliable connectivity and embedded facilities to support shared resources across multiple organizations to build an online presence (Al-Shboul et al. 2014; Jasmin & Hasan 2018; Yahya & Razali 2015). Some countries have invested in high quality infrastructure to be successful in implementing E-government strategies including the establishment of integrated E-government services platform (Ramli 2012). This includes high-speed broadband networks, hardware, application server and development tools to support acquisition, storage and interoperability across departmental boundaries (World Bank 2016).

## DISCUSSION

This study discusses WoG approach towards integrated E-government services. Although there are several interpretations of WoG, the main objective is to nurture the collaboration efforts across portfolio boundaries that will bring the high-quality online services to citizens and businesses. WoG is a vital dimension towards integrated E-government with the aim to provide seamless services when dealing with multiple government departments. Despite previous studies have highlighted various salient

factors to support WoG implementation as shown in Table 1, those factors are isolated. In addition, the high number of difficulties encountered in collaboration activities occurred due to incomplete requirements for implementing the WoG approach (Estevez et al. 2011). Therefore, further work needs to be done in this field to develop a comprehensive baseline for WoG (Laycock & Tothill 2014).

Few studies have also mentioned the importance of technical and non-technical factors for building an integrated E-government services through WoG approach (Carey & Crammond 2016; Grönlund 2010). In addition, according to Carey & Crammond (2015), both factors are required at creating organizational cultural and institutional change associated with technological improvements for cross-boundary collaboration. Since the universally accepted framework or method for WoG is still unavailable (Carey & Crammond 2015; Laycock & Tothill 2014), using the grounded theory approach this study aims to combine the influencing factors of WoG from previous studies and best practices of WoG implementations in several countries (UNDESA 2016). The result has been consolidated and conceptualized ranging from 12 critical factors. Figure 1 depicts the identified critical factors as a theoretical framework that constitutes of eight non-technical and four technical. By combining those factors in a framework, this will be more useful to help government agencies to understand the important factors that are required in delivering integrated E-government services.

Referring to the theoretical framework, the non-technical factors are constituted of user centered services, CIO and leadership, integrated services and policy, CIO and leadership, integrated services and policy,

political, budget, organisation, coordination as well as collaboration. Government needs to understand the needs of the users or citizens in order to build services that work for them. Therefore, user centered is about connecting with citizens and encouraging them to participate in public affairs. Meanwhile, the role of a central and inter-departmental CIO is vital to form the e-governance structure. CIO is responsible to the ministries and the government’s top management. CIO’s roles include planning strategies and managing organisational operations; encouraging knowledge and resources sharing; as well as improving coordination among agencies. To encourage cross-government collaboration, integrated services and policies are required to eliminate unintended duplications in processes and procedures. The ultimate purpose of service integration effort is to increase user’s satisfaction level. To support the WoG strategy, political involvements from the ministerial level and departmental are required. This factor underpins the budget allocation. On the other hand, organisation, coordination and collaboration are required for inter-departmental and cross-boundaries communications.

From the technical points of view, there are four factors namely infrastructure, interoperability, security and analytic tools. Infrastructure provides hardware and software resources to support information access and sharing. A complete infrastructure ensures successful interoperability implementation. Interoperable information systems and processes enable sharing of information, improving information quality, reducing unnecessary duplications and the impacts of structural changes in government as well as less costly. Furthermore, interoperability must be supported by secured transactions.

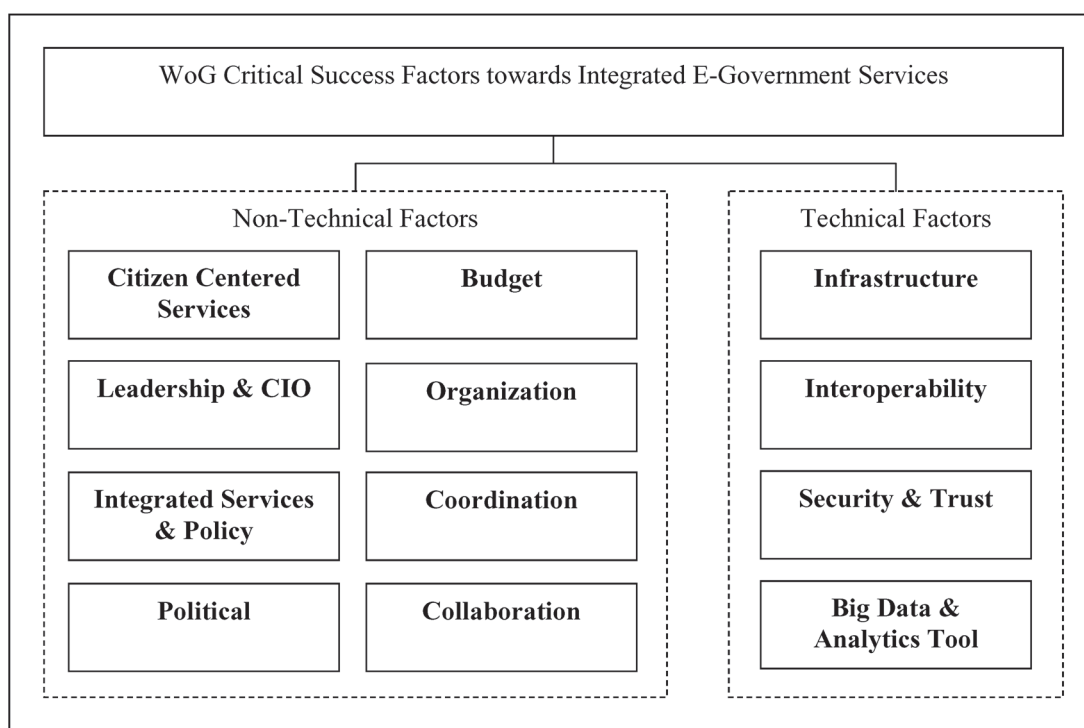


FIGURE 1. Theoretical framework of WoG critical success factors

Therefore, security must be considered when designing, developing and deploying every online services components and platforms. In addition, security is needed to build trusts among public towards the government and the services it provides. Meanwhile, the use of digital analytic tools is essential to understand the users' experience towards the services. By adopting business-user generated data discovery and advanced analytics, organisations can reduce the time and complexity of preparing data for analysis. This enables decision makers to make more informed and timely business decisions.

#### MANAGERIAL IMPLICATION

From managerial perspective, this study contributes to the enhancement of public services delivery by empowering E-government services that are tailored towards the citizens' needs. Cross departmental collaboration eliminates work in silo administration that leads to bureaucracy in services. Through the integrated E-government services, the government is able to increase efficiency in services, increase cost-effectiveness and provide customer-centric support deliveries. These three elements are required to ensure the success in the public sector transformation agenda.

#### CONCLUSION

The paper has discussed the WoG critical success factors towards integrated E-government services. Most governments are looking forward to developing integrated services that are tailor-made to citizen and business needs. This leads to business transformation and mutual benefits transferred from the stakeholders to the citizens. The theoretical framework provided in this paper could be used for designing integrated E-government services in future in order to increase the performance of public service delivery and citizen satisfaction.

#### REFERENCES

- Abdelhakim & Idoughi. 2015. A user centered ubiquitous government design framework basic concepts. *Proceedings of the International Conference on Intelligent Information Processing, Security and Advanced Communication*, edited by D.Boubiche, F.Hidoussi & H.Cruz, 23-25 November. Batna, Algeria, 1-5.
- Adachi, K., Takazawa, R., Shibata, H., Yato, A. & Yamamoto, D. 2016. Infrastructure for multilayer interoperability to encourage use of heterogeneous data and information sharing between government systems. *Hitachi Review* 65: 729-734.
- Al-Shboul, M., Rababah, O., Al-Shboul, M., Ghnemat, R. & Al-Saqqa, S. 2014. Challenges and factors affecting the implementation of e-government in Jordan. *Journal of Software Engineering and Applications* 7(13): 1111-1127.
- Alshehri, M.A. & Drew, S. 2010. Implementation of e-government: Advantages and challenges. *International Conference E-Activity and Leading Technologies 2010*, 29 November-1 December. Seville, Spain, 79-86.
- Alzahrani, L., Al-Karaghoul, W. & Weerakkody, V. 2015. Analysing the critical factors influencing trust in e-government adoption from citizens' perspective: A systematic review and a conceptual framework. *International Business Review* 26(1): 164-175.
- Archena, J. & Mary Anita, E. A. 2015. A survey of big data analytics in healthcare and government. *Procedia Computer Science* 50(1): 408-413.
- Bannister, F. & Connolly, R. 2015. The great theory hunt: Does e-government really have a problem? *Government Information Quarterly* 32(1): 1-11.
- Bekkers, V.J.J.M., Hartley, J. & Dawes, S.S. 2015. Innovation and the public sector. In *Electronic Government and Electronic Participation*, edited by E.Tambouris, H.Scholl & M.Janssen, 295-303. Netherlands: IOS Press BV.
- Berger, J.B. & Rose, J. 2015. Nine challenges for e-government action researchers. *International Journal of Electronic Government Research (IJEGR)* 11(3): 57-75.
- Bertot, J.C., Jaeger, P.T. & Grimes, J.M. 2012. Promoting transparency and accountability through ICTs, social media, and collaborative e-government. *Transforming Government: People, Process and Policy* 6(1): 78-91.
- Bhunia, P. 2016. Exclusive - The UN E-government survey - Past and future themes, selected trends from 2016. Available at <http://www.opengovasia.com/articles/7239-exclusive---the-un-e-government-survey---past-and-future-themes-selected-trends-from-2016>
- Boon, L.S., Malek, J.A., Hussain, M.Y. & Tahir, Z. 2017. Citizen participation in realising the citizen-centric vision for smart city. *Social, Environmental and Developmental Sustainability Research Centre International Conference*, 20-21 November. Selangor, Malaysia, 165-172.
- Boudjelida, A., Mellouli, S. & Lee, J. 2016. Electronic citizens participation: Systematic review. *9th International Conference on Theory and Practice of Electronic Governance (ICEGOV '15-16)*, 1-3 March. Montevideo, Uruguay, 31-39.
- Buyle, R., De Vocht, L., Van Compennolle, M., De Paepe, D., Verborgh, R., Vanlissout, Z., De Vidts, B. et al. 2016. OSLO: Open Standards for linked organizations. *Proceedings of the International Conference on Electronic Governance and Open Society*, 22-23 November. St.Petersburg, Russian Federation, 126-134.
- Carey, G. & Crammond, B. 2015. What works in joined-up government? An evidence synthesis. *International Journal of Public Administration* 38(13-14): 1020-1029.
- Castelnovo, W. 2012. An architecture driven methodology for transforming from fragmented to connected government: A case of a local government in Italy. In *Enterprise Architecture for Connected E-Government: Practices and Innovations*, edited by P. Saha, 350-373. United States of America: IGI Global.
- Chauhan, R. & Estevez, E. 2008. A model for policy interventions in support of electronic governance. *2nd International Conference on Theory and Practice of Electronic Governance (ICEGOV 2008)*, 1-4 December. Cairo, Egypt, 199-205.
- Christensen, T. & Lægreid, P. 2007. The whole-of-government approach to public sector reform. *Public Administration Review* 67(6): 1059-1066.



- Colgan, A., Kennedy, L.A. & Doherty, N. 2014. *A Primer on Implementing Whole of Government Approaches*. Dublin: Centre for Effective Services.
- Corrêa, A.S. & Paula, E.C.de. 2017. Transparency and open government data: A wide national assessment of data openness in Brazilian local governments. *Transforming Government: People, Process and Policy* 11(1): 58-78.
- Dauwed, M.A., Yahaya, J. & Mansor, Z. 2018. Human factors for IoT services utilization for health information exchange. *Journal of Theoretical and Applied Information Technology* 96(8): 2095-2105.
- Davies, R. 2015. *E-Government Using Technology to Improve Public Services and Democratic Participation*. European Union: EPRS.
- Dawes, S.S. 2008. The evolution and continuing challenges of E-governance. *Public Administration Review* 68(SUPPL. 1): 86-102.
- Department of Statistics Malaysia. 2017. *ICT Use and Access by Individuals and Households Survey Report*. Putrajaya: DOSM.
- Dudley, E., Lin, D., Mancini, M. & Ng, J. 2015. Implementing a citizen-centric approach to delivering government services. Available at <http://www.mckinsey.com/industries/public-sector/our-insights/implementing-a-citizen-centric-approach-to-delivering-government-services>
- Dwi, T. & Goodwin, R. 2013. User acceptance of SMS-based e-government services: Differences between adopters and non-adopters. *Government Information Quarterly* 30(4): 486-497.
- El Benany, M.M. & El Beqqali, O. 2017. Cross-organizational orchestrator for e-government interoperability. *Proceedings of IEEE/ACS International Conference on Computer Systems and Applications*, 29 November-2 December. Agadir, Morocco, 1-6.
- Enis, M. 2013. *Mobile Evolution: Insights on Connectivity and Service*. Boca Raton: CRC Press.
- Estevez, E., Ojo, A. & Janowski, T. 2011. Whole-of-government approach to information technology strategy management: Building a sustainable collaborative technology environment in government. *Information Polity* 16(3): 243-260.
- European Commission. 2017. *European Interoperability Framework - Implementation Strategy*. Brussels.
- Fan, J., Gao, L. & Gao, J. 2016. Study on the diffusion performance of standard e-government information systems. *China Communications* 13(5): 182-202.
- Florian & Henning. 2013. Adoption of interoperability standards in government information networks: An initial framework of influence factors. *International Conference on Theory and Practice of Electronic Governance*, 22-25 November. Seoul, Republic of Korea, 250-259.
- Gorla, N. & Chiravuri, A. 2016. Developing electronic government success models for G2C and G2B scenarios. *Proceedings of 2016 International Conference on Information Management*, 7-8 May. London, UK, 2-5.
- Grönlund, Å. 2010. Ten Years of E-Government: The "end of history" and new beginning. *Electronic Government* 6228: 13-24.
- Halligan, J., Buick, F. & O'Flynn, J. 2012. Experiments with joined-up, horizontal and whole-of-government in Anglophone countries. In *International Handbook on Civil Service Systems*, edited by A. Massey, 74-99, Cheltenham: Edward Elgar Publishing.
- Institute of Public Administration. 2009. *Joined-Up Government*. Hong Kong: Efficiency Office.
- Janowski, T. 2015. Digital government evolution: From transformation to contextualization. *Government Information Quarterly* 32(3): 221-236.
- Janssen, M., Charalabibis, Y., Kuk, G. & Cresswell, T. 2011. E-government interoperability, infrastructure and architecture: State-of-the-art and challenges. *Journal of Theoretical and Applied Electronic Commerce Research* 6(1): 1-8.
- Jasmin, N.E. & Hasan, M.K. 2018. Framework for the implementation of e-government system based on cloud computing for Malaysian Public Sector. *Asia-Pacific Journal of Information Technology and Multimedia* 7(1): 1-18.
- Krippendorff, K. 2012. *Content Analysis: An Introduction to its Methodology*. 3rd edition. California: Sage Publications.
- Kumar, R., Sachan, A. & Mukherjee, A. 2017. Qualitative approach to determine user experience of e-government services. *Computers in Human Behavior* 71: 299-306.
- Lagzian, M. & Pourbagheri, M. 2014. An investigation into affecting factors on acceptance of e-government service counters as a service delivery channel: A case of developing country. *8th International Conference on Theory and Practice of Electronic Governance (ICEGOV 2014)*, 27-30 October. Guimaraes, Portugal, 11-19.
- Laycock, N. & Tothill, N. 2014. Whole of government benefits framework - Standard business reporting case study. Available at <http://www.treasury.gov.au/PublicationsAndMedia/Publications/2014/Economic-Roundup-Issue-1/Economic-Roundup-Issue-1>.
- Li, Y. & Tan, C.H. 2013. Matching business strategy and CIO characteristics: The impact on organizational performance. *Journal of Business Research* 66(2): 248-259.
- Lim, Y.M.F., Yusof, M. & Sivasampu, S. 2018. Assessing primary care data quality. *International Journal of Health Care Quality Assurance* 31(3): 203-213.
- Lonn, C.M. & Uppstrom, E. 2016. Understanding public sector collaboration through boundary object theory: A case study of an e-government initiative in Sweden. *2016 49th Hawaii International Conference on System Sciences*, 5-8 January. Koloa, HI, USA, 2687-2696.
- Maweu, F.K. & Karani, J. 2016. An E-government-integration framework for county governments in Kenya. *International Journal of Science and Research* 5(2), 2014-2016.
- Misuraca, G., Broster, D. & Centeno, C. 2010. Envisioning digital Europe 2030: Scenario design on ict for governance and policy modelling. *International Conference on Theory and Practice of Electronic Governance*, 25-28 October. Beijing, China, 347-356.
- Nambisan, S. & Nambisan, P. 2013. Engaging citizens in co-creation in public services - Lessons learned and best practices. *IBM Center for The Business of Government* 1-52.
- Navarrete, C., Gil-Garcia, J.R., Mellouli, S., Pardo, T.A. & Scholl, J. 2010. Multinational e-government collaboration, information sharing, and interoperability: An integrative model. *43rd Hawaii International Conference on System Sciences*, 5-8 January. HI, USA, 1-10.
- Novakouski, M. & Lewis, G.G.A. 2012. *Interoperability in the E-Government Context*. Software Engineering Institute. Pittsburgh: Carnegie Mellon.
- Obi, T. & Iwasaki, N. 2015. *A Decade of World E-Government Rankings*. 7th edition. Amsterdam: IOS Press.
- OECD. 2007. *Implementing E-Government in OECD Countries: Experiences and Challenges*. Paris: OECD.Org.

- OECD. 2013. *OECD e-Government Studies: Egypt 2013*. Paris: OECD Publishing.
- OECD. 2016. *Digital Government Strategies for Transforming Public Services in the Welfare Areas*. Paris: OECD.Org.
- OECD. 2017. *Implementing Good Regulatory Practice in Malaysia*. Paris: OECD Publishing.
- Ojo, A. 2012. The whole of government approach: Models and tools for egov strategy and alignment. Available at <https://www.w3.org/egov/IG/slides/2012-03-20/Ojo-slides-v4.pdf>
- Omar, A. & Osmani, M. 2015. Digitally enabled service transformations in public sector: A review of institutionalisation and structuration theories. *International Journal of Electronic Government Research* 11(3): 76-94.
- Othman, M.H. & Razali, R. 2017. Electronic government systems interoperability model. *Journal of Telecommunication, Electronic and Computer Engineering* 9(3-4): 1-9.
- Pan, M. Z. & Mao, J.Y. 2016. Cross boundary mechanisms for knowledge management by user representatives in enterprise systems implementation. *IEEE Transactions on Engineering Management* 63(4): 438-450.
- Paramashivaiah, P. & Suresh, B.K. 2016. E-governance: Issues and challenges in India. *International Journal of Sustainable Development* 9(8): 11-16.
- Park, H.M. 2015. Should e-government be transformational and participatory? An essay on e-government in the utilitarian mode of information technology use. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 5-8 January. HI, USA, 2476-2485.
- Ramli, R.M. 2012. Malaysian e-government: Issues and challenges in public administration. *International Proceedings of Economics Development and Research* 48: 44-49.
- Ramli, R.M. 2017. E-government implementation challenges in Malaysia and South Korea: A comparative study. *The Electronic Journal of Information Systems in Developing Countries* 13(3): 1-26.
- Sideridis, A.B. 2013. E-Government research and services at an era of economic crisis. *Procedia Technology* 8: 9-12.
- Stepputat, F. & Greenwood, L. 2013. *Whole of Government Approaches to Fragile States and Situations*. Copenhagen: DIIS ReCom Publication.
- Tuya, M. De, Cook, M., Sutherland, M. & Luna-reyes, L.F. 2017. The leading role of the government CIO at the local level: Strategic opportunities and challenges. *Government Information Quarterly* 1(2): 1-9.
- UNDESA. 2014. *UN E-Government Survey 2014: E-Government for the Future We Want*. New York: United Nations.
- UNDESA. 2016. *UN E-Government Survey 2016: E-Government in Support of Sustainable Development*. New York: United Nations.
- Wamba, S.F., Gunasekaran, A., Akter, S., Ren, S.J., Dubey, R. & Childe, S.J. 2016. Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research* 70: 356-365.
- World Bank. 2016. *World Development Report 2016: Digital Dividends*. New York: World Bank Group.
- Xu, A., Ling, G. & Xu, W. 2016. Research on automation integration technology of application systems based on web services. *International Conference on Natural Computation, Fuzzy System and Knowledge Discovery*, 13-15 August. Changsha, China, 2210-2215.
- Yahya, H. & Razali, R. 2015. A usability-based framework for electronic government systems development. *ARPJ Journal of Engineering and Applied Sciences* 10(20): 9414-9423.
- Zainal, K. 2011. Reviewing Wholeof-Government Collaboration in the Singapore Public Service. Singapore.
- Zammani, M. & Razali, R. 2016. Information security management success factors. *Advanced Science Letters* 22(8): 1924-1929.
- Zhao, F., José Scavarda, A. & Waxin, M. 2012. Key issues and challenges in e-government development. *Information Technology & People* 25(4): 395-422.

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