

Towards Integrated E-Government Services: Key Contributing Factors from a Whole-of-Government Perspective

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Abstract

Despite various initiatives introduced to ensure electronic government (e-government) services remain relevant, there are still unresolved issues in its implementation that bring negative perceptions towards the government. One common issue is the existence of duplicated as well as unintegrated services between agencies that mislead citizens and cause bureaucratic red tape. This issue could be resolved by establishing integrated e-government services, which nevertheless require strong collaboration from multiple agencies. One strategy to strengthen cross-agency collaboration is through the Whole-of-Government (WoG) approach. However, studies concerning the WoG approach that specifically focus on collaboration strategies to address service integration issues in e-government are scarce. This study therefore aimed to identify the WoG factors that are important for strengthening cross-agency collaboration, as the effort for establishing integrated e-government services. It adopted the qualitative method approach, consisting of theoretical and empirical studies. The theoretical study was conducted through literature reviews, whereas the empirical study involved semi-structured interviews with relevant informants from public and private sectors as well as statutory body. Both theoretical and empirical data were analysed using thematic analysis. The identified WoG factors were categorised into people, process and technology aspects, which can act as a guideline towards integrated e-government services through cross-agency collaboration.

Keywords: E-government; Integration; Whole of Government.

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1. Introduction

Nowadays, electronic government (e-government) becomes a key channel for connecting government services to citizens and businesses (Blackman et al., 2017; Kirchherr et al., 2015). Through e-government, most previously provided services at the counters have turned to online services (Abdullah et al., 2013; Othman & Razali, 2018). Studies show that e-government services become the most popular option for citizens and businesses than conventional services as they are more accessible, faster and less time consuming (Alhusban, 2015; OECD, 2016; Sanchez-Torres, & Miles, 2017; Ziemba et al., 2015).

Due to high demands for e-government services, the government has implemented various initiatives to ensure that they remain relevant and accepted by the citizens. Today, the focus is to transform e-government into more responsive and transparent services to meet citizens' real needs (Abdulraheem et al., 2017; Nielsen, 2019; UNDESA, 2018). The intention is accomplished by opening up opportunities for citizens to participate in e-government development through consultative and transitional approach (Alshetewi et al., 2018; Boon et al., 2017; Dudley et al., 2015; OECD, 2016). By this way, the services are developed by fulfilling the citizens' needs rather than following the government conventional practices (Alhusban, 2015; Sorn-In et al., 2015; Lim et al., 2020). As a result, better services are served to the citizens (Sorn-In et al., 2015).

Although citizens' participation in e-government is increasing, their level of satisfaction with e-government services remains low (Dudley et al., 2015; Li, & Shang, 2019, Ayob et al., 2021). One reason is the existence of too many unintegrated services that cumbersome the citizens and the duplication of tasks between agencies that lead to

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bureaucratic red tape (Abdullah et al., 2016; Carey & Crammond, 2016; Othman & Razali, 2018). This issue can be resolved by introducing integrated e-government services (Domingues et al., 2017; Olumoye & Govender, 2016). However, this idea could only be achieved if coordination between agencies is successfully reformed (Al-Shboul et al., 2014; Ku et al., 2016; Lonn, & Uppstrom, 2016).

Coordination between agencies is required to enhance the efficacy of e-government services. Coordination can prevent overlapping processes and procedures caused by unintegrated services (Narducci et al., 2016). Lack of coordination has led most agencies to practise work in silos (Berger & Rose, 2015; Paramashivaiah & Suresh, 2016; Pushpak Sarkar, 2015). Without coordination, information cannot be maintained consistently and effectively, thus impeding e-government services transformation initiatives. To enable coordination, cross-agency collaboration should be introduced (Colgan et al., 2014; Lonn, & Uppstrom, 2016). However, collaboration is very complex and requires a unified commitment between the collaborating parties (Vangen & McGuire, 2017). One strategy to strengthen cross-agency collaboration is to adopt the Whole-of-Government (WoG) approach (Colgan et al., 2014; Ojo, 2012).

The WoG approach is not a new concept in public administration. It has been used in a number of critical sectors such as defence, security and finance to strengthen coordination and prevent work in silo practices among government agencies (Lonn, & Uppstrom 2016; Stepputat, & Greenwood, 2013). The United Nations Department of Economic and Social Affairs (UNDESA), which is responsible for conducting e-government development surveys, has introduced the WoG approach as a transformation component (UNDESA, 2014). The main idea of WoG is to enhance cross-agency collaboration strategy as a critical element in promoting integrated services development and achieving sustainable development goals (Othman & Razali, 2020). As such, various studies have been conducted to specifically address best practices (Friesen & Kelsey, 2017; Mcintyre, 2015), policies (DTA, 2016; Laycock, & Tohill, 2014) and processes of WoG (Carey & Crammond, 2016; Devasena & Balraj, 2014).

Despite vast attention on the WoG approach, some of its aspects on e-government services are overlooked, leading to collaboration failures (Berger & Rose, 2015; Dudley et al., 2015; Wiseman, 2017). In order to ensure that the collaboration can be realised smoothly, this study aimed to consolidate the WoG factors from various aspects in a holistic view. The view can be used as a guide for the government to strengthen cross-agency collaboration, particularly to solve integration issues and establish integrated e-government services.

2. Literature Review

This section discusses the WoG approach based on the findings from previous studies. Generally, WoG entails both technical and non-technical factors. From the technical viewpoint, WoG is defined as a specific strategy to establish cross-agency collaboration through service integration (Colgan et al., 2014; Xu et al., 2016). In contrast, non-technical factors outline cross-agency collaboration as a strategy for achieving consensus and mutual understanding among agencies to establish integrated e-government services (Halligan et al., 2012). Besides, WoG has also been described as a model that defines collaborative strategies in a unified way by combining these two factors (Alhusban, 2015).

To explore the factors theoretically, literature reviews were performed by searching the relevant articles using WoG-related keywords (Colgan et al., 2014; Halligan et al., 2012; Ojo, 2012). In total, 13 factors were identified, which comprise 10 non-technical factors and three technical factors. These factors contribute to the formation of integrated e-government services. Table 1 outlines the identified factors and related studies that support them.

3. Methodology

The main objective of the study was to identify the key contributing factors for establishing integrated e-government services from the WoG perspective, particularly concerning cross-agency collaboration. The WoG technical and non-technical factors were gathered holistically from both theoretical and empirical studies. The theoretical study in the form of literature reviews provided some insights into WoG and the requirements of integrated e-government services. By exploring them further empirically, this study aimed to answer the following research questions (RQs):

RQ1: What are the WoG factors for strengthening cross-agency collaboration?

RQ2: How can these factors be merged as one holistic view for establishing integrated e-government services?

To answer the above RQs, the qualitative method was adopted. It consisted of two consecutive studies, namely theoretical and empirical studies. The theoretical study aimed to identify the WoG factors through literature reviews. On the other hand, semi-structured interviews were carried out in the empirical study to explore further the factors from

the field. There were five cycles of interview sessions with three informants in each cycle. Both theoretical as well as empirical data were analysed and interpreted by using thematic analysis.

Table 1. WoG factors gathered from theoretical study

Factor	Definition	Prior study
Research Team	A group that is responsible for conducting specific research to identify the citizen and organisational needs before the collaboration initiatives are made.	Abdulraheem et al. (2017); Boudjelida et al. (2016); Chanzas et al. (2019); Meiyanti et al. (2017); Pan & Mao (2016); Pretorius (2017); UNDESA (2014).
Chief Information Officer	A special position in the top management of the organisation that is responsible for ensuring the agency's core services through digital platforms are in line with the transformation agenda of the e-government services.	Beresford & Ferreira (2017); Domingues et al. (2017); Estevez, & Fillotrani (2012); Kim (2015); Ku et al. (2016); Lee, & Park (2016); Li, & Tan (2013); Obi, & Iwasaki (2015); Saha (2010); Tuya et al. (2017).
Policymaker	The parties that are responsible for reviewing and evaluating policies on e-government services implementation to ensure collaboration initiatives can be executed as planned.	Alshetewi et al. (2018); Erfurth (2016); Estevez et al. (2011); Musafir (2018); Novakouski & Lewis (2012); Saha (2010); Parycek et al. (2016); Tseng & Hu (2012); UNDESA (2014).
Requirements Study	The activities carried out at the beginning of the project to help agencies identify citizens and organisations real needs. The information gained enables agencies to identify the resources needed to plan and implement cross-agency collaboration initiatives more effectively.	Alhusban (2015); Chun et al. (2012); Ku et al. (2016); Obi & Iwasaki (2015); Saha (2010); Sung (2012).
Political Consolidation	The process needed to form a consensus among agencies on policy decisions and collaboration direction. This decision is a mandate to determine budget allocation and establish authorities in the strategic collaboration agreement.	Alhusban (2015); Buyle et al. (2016); Carey, & Crammond (2016); Colgan et al. (2014); Millard, & Ojo (2017); Nielsen (2019); Saha (2010); Tseng & Hu (2012); UNDESA (2018).
Budget Allocation	The financial allocation to carry out cross-agency collaboration activities, including organisational development, infrastructure, technology, human capital, business governance programmes, culture transformation as well as re-engineering of work processes and procedures to overcome the redundancy between agencies.	Friesen & Kelsey (2017); Halligan et al. (2012); Stepputat & Greenwood (2013).
Legislative Assessment	The process required in reviewing the legal aspects to ensure that the law is in line with current needs and national strategic directions. It includes setting controls and legal procedures that outline activities related to the alignment of work processes and procedures at the planning stage as well as data sharing and data transfer activities at the implementation stage.	El Benany & El Beqqali (2017); Friesen & Kelsey (2017); Nielsen (2019); Sharma & Panigrahi (2015).

Factor	Definition	Prior study
Policy Formulation	The process needed to ensure the organisation's policies comply with current government policies and are tailor-made to the citizens' real needs. Policies should support cross-agency collaboration initiatives.	Andreasson (2012); Carey, & Crammond (2016); Devasena & Balraj (2014); Erfurth (2016); Marzuki & Arshad (2016); Misuraca et al. (2010); Musafir (2018); Parycek et al. (2016)
Organisational Development	The process that manages collaboration initiatives and agency core services in order to strengthen collaboration and to resolve conflicts that hinder cross-agency collaboration.	Bretschneider & Parker (2016); Chaniyas et al. (2019); Chun et al. (2012); Colgan et al. (2014); El Benany & El Beqqali (2017), Ojo (2012).
Coordination	The process needed to overcome overlapping processes and procedures between agencies that result in bureaucracy.	Chun et al. (2012); Colgan et al. (2014); Domingues et al. (2017); Estevez et al. (2011); Friesen & Kelsey (2017); Halligan et al. (2012); Ku et al. (2016); Narducci et al. (2016); Nielsen (2019); Ojo (2012); Saha (2010).
Integration Hub	The supporting technology required to ensure the integration process runs smoothly.	Adachi et al. (2016); Alhusban (2015); Buyle et al. (2016); Chun et al. (2012); Domingues et al. (2017); Lu et al. (2015); Patil & Kulkarni (2013); Sedek, Omar & Sulaiman (2013); Saha (2010); Xu et al. (2016); Lonn & Uppstrom (2016).
Infrastructure	The infrastructure encompasses hardware and software that are needed to bridge integration across agencies.	Diamond (2014); Hashmi & Khanna (2016); Jasmin & Hasan (2018); Lu et al. (2015); Obi & Iwasaki (2015); Omar et al. (2015); Sarrayrih & Sriram (2015); Tseng & Hu (2012), UNDESA (2018).
Security	The technological components and guidelines that are required to safeguard data and information during the integration process.	Chun et al. (2012); Lotte (2017); Rack Blogger (2015); Rouse (2017); Scholz (2013); Sarrayrih & Sriram (2015); Omat et al. (2015); Terada et al. (2016); Xu et al. (2016); Jamil & Yusof (2018).

For the theoretical study, several queries were performed on multiple databases such as Scopus and Web of Science, IEEE Xplore, Google Scholar, ACM Digital Library, Springer, Science Direct, Emerald, and Cambridge Books Online. The search keywords such as “whole of government”, “wog”, “joined-up government”, “connected government”, “inter-government”, “integrated government”, “integrated services”, “cross boundary” and “e-government” were used for selecting the articles. In addition, other references such as books and public reports were also reviewed to maintain a chain of evidence. The gathered data were examined and interpreted using thematic analysis, carried out continuously throughout the study. Consequently, some insights about the WoG factors that influence the establishment of integrated e-government services were obtained. The theoretical study was then followed by the empirical study. There was a total of 15 informants interviewed, mainly from public sector, with one representative from private sector and statutory body respectively. The informants were selected based on specific criteria to represent the study population. The key criteria considered in the sampling process included the informants' knowledge, their experience related to the area in terms of

the duration of involvement in relevant projects, and the diversity of the service domains in which they were involved. Table 2 provides brief information about the informants involved in the empirical study.

Table 2. Informants' profiles

Informant Code	Organisation	Background	Position	Experience in E-government projects (Year)
Inf1	Public Sector	Application and Security	Senior Assistant Principal Director	5
Inf2	Public Sector	Project Management	Senior Assistant Principal Director	8
Inf3	Public Sector	Strategic & Policy	Deputy Director	6
Inf4	Public Sector	System Development	Deputy Director	5
Inf5	Public Sector	Management & Integration	Senior Assistant Principal Director	10
Inf6	Public Sector	Project Management	Assistant Principal Director	5
Inf7	Public Sector	System Development	Assistant Principal Director	12
Inf8	Statutory Body	Strategic & Management	Deputy Director	8
Inf9	Private Sector	Integration & Security	Project Manager	10
Inf10	Public Sector	Management	Deputy Director	9
Inf11	Public Sector	System Development	Assistant Principal Director	5
Inf12	Public Sector	Strategic & Management	Assistant Principal Director	8
Inf13	Public Sector	Management	Deputy Director	10
Inf14	Public Sector	Strategic & Management	Deputy Director	8
Inf15	Public Sector	Strategic & Management	Director	10

Based on the theoretical findings, a set of interview questions was developed. The questions concerned the key WoG factors that contribute to the formation of integrated e-government services through cross-agency collaboration. Semi-structured questions that incorporated structured and open-ended questions were used as the main instrument of the study. Structured questions aimed to explore in-depth the factors gathered from the theoretical study. Meanwhile, open-ended questions were intended to identify new factors and the relationships between factors based on the informants' knowledge and real experience. To confirm the questions' reliability and validity, a pilot test was conducted as a focus group discussion (Alhusban 2015; Patton 2015). The pilot test involved experts consisting of project managers, project leaders, systems developers and researchers. The entire session took about 90 minutes. The comments and suggestions obtained during the pilot test were recorded, which were then used to improve the instrument before the actual interview sessions.

An invitation for participation was made informally to the potential informants before the interview sessions. The objectives and goals of the interview were explained during the invitation. Once the informants accepted the invitation, an official invitation letter and the consent form were sent via email. Appointments for the interview sessions were then arranged based on the informants' schedule. During the interview sessions, a brief explanation about the study was provided. Voice recordings and written notes were obtained with the informants' consent. Each interview session took an average of 60 to 90 minutes.

After completed the interview sessions, the data were analysed using thematic analysis. Thematic analysis is a technique used to analyse textual data and elucidate themes (Creswell 2013). The analysis was conducted to examine factors from both studies and identify the relationships among them. The thematic analysis coding procedure consisted of three stages: initial coding, advanced coding and theoretical coding. The initial coding stage aimed to capture general ideas emerging from the data. This was followed by advanced coding, which involved identifying, categorising and connecting the main ideas within the data. Finally, theoretical coding was conducted to refine the results of the advanced coding, helping to address any overlaps or anomalies within the generated codes. The codes were segmented according to significant factors, existence, frequency and relationships between keywords. In order to verify the codes and reach true logical conclusions, inductive and deductive reasoning were used. The deductive reasoning was conducted from the factors identified in the theoretical study. Meanwhile, the inductive reasoning was performed to discover factors from the informants in the empirical study. The processes were carried out continuously by triangulating the empirical findings and the insights collected from the literature (Domingues, Sampaio & Arezes 2016). As a result, the factors

were merged to form one holistic view as outlined in RQ2. The view combines and relates the WoG factors together as one narrative for establishing integrated e-government services through cross-agency collaboration.

4. Results & Discussion

Based on the analysis, 18 contributing factors were identified in total. The 13 factors were originated from the theoretical study, which were then further refined in the empirical study. The other five factors were discovered from the empirical study. The 18 factors include Research Team, Chief Information Officer, Policymaker, Domain Expert, Legal Advisor, Project Team, Auditor, Requirements Study, Political Consolidation, Budget Allocation, Legislative Assessment, Policy Formulation, Organisational Development, Coordination, Auditing, Integration Hub, Infrastructure and Security. The five newly identified factors are Domain Expert, Legal Advisor, Project Team, Auditor and Auditing. Table 3 explains these newly identified factors.

Table 3. Additional WoG factors gathered from empirical study

Factor	Definition
Legal Advisor	A specialised officer who is entrusted to provide legal advice to the organisation and address legal issues regarding the collaboration initiatives.
Domain Expert	The individuals with specialised knowledge of the organisation’s core business who ensure services are in line with the organisation’s digital transformation plan.
Project Team	The individuals or groups who are directly involved in the implementation by mainly providing technical advice and supports.
Auditor	A party who is responsible for conducting audits to ensure that collaboration activities are adhered to at every level of the organisation.
Auditing	The assessment process that is conducted continuously to ensure that the collaboration activities run smoothly according to the plan.

Table 4 lists the factors according to which studies that they were identified. Those factors were refined into their respective elements, which were grouped into three aspects, namely people, process and technology, as shown in Table 5. They are indeed the WoG factors with their respective elements, which are necessary for strengthening cross-agency collaboration in order to establish integrated e-government services. The factors within the three aspects are interrelated as people refers to individuals or groups involved in the collaboration; process refers to how the collaboration initiatives are implemented; and technology refers to the technological tools or systems required to support collaboration and service integration efforts. The elements within the factors delineate the characteristics, roles, activities and items involved. The factors together with the elements contribute to the narrative for establishing integrated e-government services through cross-agency collaboration.

The requirements study aims to gather the needs of developing e-government services from the perspectives of citizens, agencies and organisations. Among the three, the citizen needs are considered the most critical, as they are the primary users of the services. The agency needs are captured to coordinate and resolve process overlaps among agencies, whereas the organisational needs concern readiness and resources required for cross-agency collaboration. The party that is responsible for this process is the research team. To execute the study, the team members must possess four key elements, namely knowledge, experience, communication and analytical skills. Knowledge about the research process and the organisation's core functions are essential for effective requirements capturing. Experienced researchers normally produce more accurate and reliable results. Good communication with consulting capability is crucial for engaging and ensuring honest feedback, while strong analytical skills are necessary for producing precise and trustworthy reports that could aid agencies in making informed decisions regarding collaboration.

Political consolidation is essential for gaining consensus among decision-makers regarding the collaboration direction. Three elements for enhancing political consolidation include roadmap, governance and diplomatic relationships. Establishing a clear roadmap ensures that each agency understands the collaboration priorities and aligns them with the organisational needs. Effective governance clarifies agency jurisdiction and decision-making policy for collaboration agreements, while diplomatic relationships secure support and agreement from the parties involved in a harmonious manner. In addition, sufficient funding is essential for implementing cross-agency collaboration activities, which includes incentives, specialised budgets, strategic partnership funding and budget restructuring. Collaboration incentives are typically offered to small agencies without specific budgets, while large-scale projects that support key collaboration activities require specialised budgets. Additional funding can be sourced through strategic partnerships

with the private sector. Budget restructuring serves as an alternative for agencies that are lacking supporting funds, which allow the existing budgets to be reorganised based on current priorities and needs. Both political and budget matters particularly require the involvement of the Chief Information Officer (CIO). To ensure the success, the CIO must possess elements such as leadership, knowledge, commitment, communication and dynamic thinking. Effective leadership fosters collective agreement among stakeholders and strengthens political relationships to enhance collaboration. Knowledge includes understanding organisational governance to align with service transformation goals, while commitment is crucial for promoting collaboration practices and resource sharing. Additionally, the CIO must be able to communicate effectively besides being a dynamic thinker in order to address challenges and constraints, while prioritising the citizens needs as well as ensuring the services remain relevant.

Table 4. Mapping of identified factors across theoretical and empirical studies

Code	Factor	Theoretical Study	Empirical Study					
			Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	
F1	Research Team	✓	✗	✗	✓	✗	✓	
F2	Chief Information Officer	✓	✓	✓	✓	✓	✓	
F3	Legal Advisor	✗	✗	✗	✗	✓	✗	
F4	Policymaker	✓	✓	✓	✗	✓	✓	
F5	Domain Expert	✗	✓	✗	✗	✗	✓	
F6	Project Team	✗	✗	✓	✓	✗	✓	
F7	Auditor	✗	✗	✗	✓	✗	✗	
F8	Requirements Study	✓	✓	✓	✓	✓	✓	
F9	Political Consolidation	✓	✗	✓	✓	✓	✓	
F10	Budget Allocation	✓	✓	✓	✓	✓	✗	
F11	Legislative Assessment	✓	✓	✗	✓	✓	✓	
F12	Policy Formulation	✓	✓	✓	✓	✓	✓	
F13	Organisational Development	✓	✓	✓	✓	✗	✓	
F14	Coordination	✓	✓	✓	✓	✓	✓	
F15	Auditing	✗	✗	✗	✓	✓	✓	
F16	Integration Hub	✓	✓	✓	✓	✗	✓	
F17	Infrastructure	✓	✓	✓	✓	✓	✗	
F18	Security	✓	✓	✗	✓	✓	✓	
Total		13				18		

Table 5. WoG factors and elements towards integrated e-government services

Aspect	Factor	Elements
People	Research Team	Knowledge; Experience; Communication; Analytical
	Chief Information Officer	Leadership; Knowledge; Commitment; Communication; Dynamic Thinking
	Legal Advisor	Knowledge; Commitment; Accountability
	Policymaker	Knowledge; Proactive; Accountability
	Domain Expert	Knowledge; Communication; Commitment
	Project Team	Leadership; Technical Skills; Confidence; Commitment
Process	Auditor	Knowledge; Commitment; Communication
	Requirements Study	Citizen Needs; Agency Needs; Organisational Needs
	Political Consolidation	Roadmap; Governance; Diplomatic Relationships
	Budget Allocation	Incentives; Specialised Budget; Strategic Partnership Funding; Budget Restructuring

Aspect	Factor	Elements
Technology	Legislative Assessment	Legislative Review; Legislative Drafting; Legal Framework
	Policy Formulation	Policy Reassessment; Policy Alignment; Integrated Policy
	Organisational Development	Organisational Unit; Culture Development; Change Management
	Coordination	Coordination Unit; Gap Analyses; Process Alignment; Procedure Coordination; Resource Sharing; Multi-tier Agreements
	Auditing	Controlling; Monitoring
Technology	Integration Hub	Interoperability Standards; Data Sharing Platform; Open Data Platform; Service Directory
	Infrastructure	Cloud Computing; Integrated Database; Hardware and Software
	Security	Confidentiality; Encryption; Authentication; Security Policy; Access Control; Security Audits

Legislation serves as a key authority for public sector agencies. It is designed to support the current direction and policies of the government, primarily guiding and controlling stakeholders in service delivery. To maintain the relevancy of services, laws must be periodically reviewed, particularly to address the outdated ones that hinder e-government modernisation and cross-agency collaboration. Citizen and organisational needs are highly referred to in reviewing laws to ensure they align with the collaboration goals. Besides, political support and mandate are essential for reviewing existing and drafting new laws, as they require cabinet approval before enforcement. It is also necessary to have a uniform legal framework, which can guide agencies by defining the legal procedures to follow from the early stages of service development, to ensure compliance and prevent issues after implementation. Legal advisors play a crucial role in this process. To achieve cross-agency collaboration, they must manage internal legal resources and provide recommendations based on current needs. The review process should align with the organisation's goals and new policies, ensuring that laws governing collaboration are adjusted to national requirements. Key elements for legal advisors include knowledge, commitment and accountability. They need to be well-versed in legal matters and the agency's core functions to assess existing laws and their implications, ensuring that no legal barriers hinder the collaboration initiatives.

Government policies must align with current environments and needs to ensure services meet the actual demands of the public and businesses. Outdated policies that no longer address these needs lead to functional overlaps and bureaucratic inefficiencies. A policy reassessment is thus essential, requiring strong commitment from senior management and domain experts, as well as stakeholder engagement. Policy alignment is necessary to coordinate diverse policies across agencies, fostering consensus on collaborative agreements that prioritise the citizen needs. This alignment not only helps resolve cross-agency collaboration issues but also serves as a foundation for creating integrated policies, addressing inconsistencies and facilitating smoother collaboration efforts. Policymakers play a crucial role in these matters, thus must possess the key elements, namely knowledge, proactive and accountability. Knowledge of core services and current technologies enables policymakers to make informed decisions and ensure smooth collaboration with external stakeholders. Being proactive and accountable helps policymakers align organisational policies with citizen needs and technological advancements.

Organisational development is crucial for aligning core agency services and facilitating seamless cross-agency collaboration, involving elements, namely organisational units, culture development, and change management. Decision-makers establish organisational units to ensure control and compliance, guiding agencies in collaboration initiatives while monitoring their effectiveness. Culture development fosters a collaborative environment, initiated by the top management, and should be established as a core practice before introducing new initiatives. Change management addresses reluctance from agencies to collaborate, emphasising the importance of collaboration in service design and ensuring senior leadership involvement for comprehensive implementation at all organisational levels. On the other hand, the main goal of coordination is to resolve overlapping processes and procedures among agencies in order to reduce bureaucratic issues. This is achieved through six elements, which are establishing coordination units, conducting gap analyses, coordinating procedures, aligning processes, sharing resources and creating multi-tier agreements. The coordination units facilitate collaboration and address obstacles, while gap analyses help to identify issues by comparing current practices with collaboration objectives. Coordinating procedures involve establishing service classifications according to relevant domains and setting specific integration standards as a reference for agencies to initiate cross-agency collaboration initiatives. Aligning processes enhance efficiency and resource sharing addresses disparities, particularly for small agencies. Finally, Service Level Agreements (SLAs) specify service details and criteria to ensure the services operate according to agreed terms, besides supporting effective integration planning. Domain representatives, as key individuals with specialised knowledge about the agencies' core services, play an

important role in these processes. Three main elements for domain representatives include knowledge, communication and commitment. Knowledge serves as the foundation for translating organisational needs and making decisions in cross-agency collaboration, as well as strengthening coordination through the alignment of processes and procedures. Effective communication builds good relationships between agencies, facilitating consensus in decision-making. Domain representatives' commitment to understand the needs of other agencies is essential for developing comprehensive planning that takes into account various aspects influencing collaboration.

Auditing evaluates collaboration activities within organisations through two main elements, namely controlling and monitoring. Controlling assesses the effectiveness of cross-agency collaboration by focusing on interoperability and resolving bureaucratic issues, while monitoring ensures compliance with guidelines throughout various phases. Monitoring includes checklists and periodic audits by independent parties to identify issues early and minimise risks. This process also provides insights into agency performance, aiding in the development of contingency plans and guiding other agencies in service integration. Auditors are essential for monitoring collaboration performance within organisations, requiring knowledge of core services and structure as well as commitment to ensure responsibilities are met. They can be internal, with familiarity but potential bias, or external, which may take longer to understand processes. Effective communication is vital for gathering detailed information and ensuring transparency in decision-making. Continuous auditing helps identify weaknesses and prevent issues that could hinder cross-agency collaboration, ensuring that organisational goals are achieved.

The project team is responsible for ensuring effective cross-agency collaboration from the technical standpoint. Key elements for success include leadership, technical skills, confidence and commitment. Leadership ensures project activities align with organisational goals, while technical skills are crucial for integration efforts. Team commitment and confidence in consulting as well as communicating with management and suppliers help to mitigate risks of integration failures. A well-coordinated project team is essential for smooth and successful service integration. The project team is particularly in-charge of handling the technical factors, namely integration hub, infrastructure and security. The integration hub connects services and can be strengthened by providing an open digital workspace for agencies. The factor consists of four key elements, namely interoperability standards, a data sharing platform, an open data platform and a service directory. Interoperability involves semantic standards for data meanings and technical standards for communication. The data sharing platform integrates generic and specific data from various agencies, with storage solutions tailored to the sensitivity of the data. The service directory helps agencies to optimise resources and reduce redundancies, while enhancing the open data platform aids to align with government goals for more responsive services. Comprehensive infrastructure consists of cloud computing, integrated databases, hardware and software. Cloud computing is flexible and cost-effective, allowing for scalable services tailored to current needs. Integrated databases centralise data from various agencies, with storage methods chosen based on capabilities and specifications. Supporting hardware and software are essential for managing virtual infrastructure, facilitating centralised resource administration and performance monitoring during integration activities. Security focuses on protecting communications and ensuring smooth operations. Key elements include confidentiality, which safeguards sensitive data from unauthorised access, often enhanced by encryption. Authentication is crucial for ensuring that only authorised users can access data, utilising various methods such as single, two, or multi-factor authentication. Security policies that are aligned with international standards define the necessary components for a secure communication environment. Access control regulates who can access specific data, while regular security audits ensure compliance with security measures, maintaining a safe environment for collaboration. These measures help agencies to assess their security performance and inform future strategies.

Based on the above facts, it can be implied that the implementation of integrated e-government services through the WoG approach could be challenging if there are issues of weak political commitment, siloed organisational cultures and unequal access to resources. Inconsistent policies, fragmented technologies, and misaligned stakeholder interests could further complicate cross-agency collaboration. Overcoming these barriers requires coordinated efforts, clear leadership, and standardised frameworks.

5. Conclusion

This paper has explored the essential factors that contribute to integrated e-government services from the Whole-of-Government perspective, with a strong emphasis on cross-agency collaboration. Drawing from both theoretical insights and empirical findings, these factors with their respective elements are categorised into three key aspects, namely people, processes and technology. By leveraging these factors, agencies can foster collaboration and break down silos, paving the way for truly integrated e-government services. Implementing these integrated services has the potential to

address common bureaucratic challenges, such as task duplication and service redundancy. Furthermore, these factors serve as a roadmap for government agencies to enhance process efficiency and improve data coordination across diverse systems. Policymakers could support by implementing standardised processes and shared technology, besides investing in training for personnel and engaging stakeholders to ensure e-government services effectively meet the needs of citizens. The effort does not only accelerate the digital transformation agenda but also delivers significant benefits to citizens, creating a more responsive and streamlined government.

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