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Importance of service integration in e-government implementations

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Abstract— **Service integration is one of the most critical issues affecting e-government implementations all over the world. Providing integrated services to citizens, businesses, and all other stakeholders involved in e-government at "one stop portal" is considered to be a big opportunity for governments to improve their services' efficiency and effectiveness. This paper aims to provide a general background and theoretical foundation towards understanding the importance of service integration in e-government implementations. To achieve this aim, a comprehensive literature review on e-government, in general, and service integration issue in particular, has been conducted. The paper has shed a new light on the main concepts, definitions, objectives, benefits, challenges, explanations and analytical bases for the topic. As a result of the comprehensive literature review, a model that clarifies the importance of service integration in e-government implementations is proposed.**

Keywords— E-government Implementation; Service Integration; Maturity models; One Stop Portal;

I. INTRODUCTION

The revolution in information and communication technologies, in general, and the internet in particular, has attracted the private sector to exploit these benefits by adopting what is known as electronic commerce with the goal of affording better services to the customer in much faster and easier procedures without any kind of consideration of the time and place. This boosts the demands of the citizens that their governments should follow the steps of the private sector to provide public services with the same level of services' effectiveness and efficiency [1] [2] [3]. Nevertheless, it is clear that the citizens' requests in addition to the need of governments to improve their services to the same level of the private sector encouraged governments to adapt the ready-made models implemented by the private sector and reapply them to the public sector to bring what is known as electronic government to life [4] [5]. Many researchers have dealt with e-government subject in order to understand and explain its definitions, objectives, benefits, challenges, and the principles of successful implementation. Therefore, the focus of this paper is to understand the importance of service integration and its role in e-government implementations. The subjects of the paper are structured under the following major headings: e-government definitions, e-government objectives, successful e-government, service integration, maturity models and role of service integration in e-government. Finally, a model that clarifies the importance of service integration in e-government implementations is proposed.

II. E-GOVERNMENT DEFINITIONS

Many definitions for the concept of e-government have been presented in order to understand exactly what e-government means. Some definitions are narrow and only focus on one or two aspects of e-government such as technological or managerial aspects, while others are broad and focus on a wide variety of aspects. Moreover, some definitions consider only one or two stakeholders' perspectives while other definitions consider more comprehensive and multi-view perspective. Examples of e-government definitions are shown in table 1.

TABLE I.   DEFINITIONS OF E-GOVERNMENT

E-government Definitions	Author
The use of information and communication technologies, particularly the Internet, as a tool to achieve better government [12].	OECD
The delivery of government information and services online through the Internet or other digital means [13].	West
The public sector's use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective [14].	UNESCO
A broad-based transformation initiative, enabled by leveraging the capabilities of information and communication technology, to develop and deliver high quality seamless and integrated public services; to enable effective constituent relationship management; and to support the economic and social development goals of citizens, businesses and civil society at local, state, national and international level [15].	Grant and Chau

However, there is no plain definition that, in particular, covers the range or the content which e-government has. In an attempt to offer a comprehensive definition of 'e-government'; World Bank Group defined e-government as the term that refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions [16].

III. E-GOVERNMENT OBJECTIVES

Many researchers have suggested a wide range of objectives that e-government seeks to achieve. However, researchers such as [17] [18] argue that a distinction between the internal and external objectives of e-government can be made. The external objective of e-government is gaining users' satisfaction by meeting their needs and expectations on the front office side. This can be realized through efficient and effective services to the citizens, businesses and other stakeholders. On the other hand, the internal objective of e-government is performing government administration processes and activities in more efficient and effective procedures on the back office side. However, service integration can be seen as a key factor that supports external objectives and processes of e-government on one hand and a key factor that supports internal objectives and processes of e-government on the other. One can see service integration as a major goal of implementing e-government successfully. The main objectives of e-government are presented in table 2.

TABLE II.   OBJECTIVES OF E-GOVERNMENT

E-government Objectives	Reference
Transforming the shape of government from the traditional into electronic.	[19]
Modernization of the administrations and supporting economic policy.	[12]
Improving relationship between government and citizens or businesses.	[20]
Value-added delivery of government services to citizens, enhanced interactions with business and industry, improved citizen empowerment through access to information, and more efficient government management.	[16]
Improving government processes through e-administration initiatives, connecting citizens through e-citizens and e-services initiatives, and building interactions with and within civil society through e-society initiatives.	[21]

IV. SUCCESSFUL E-GOVERNMENT

All governments around the world are hoping to reach the major objectives of e-government by starting an e-government programs that are responsible for developing a successful e-government. By reviewing the literature and previous studies regarding e-government, a set of principles and criteria for implementing successful e-government can be suggested.

Successful e-government based on two critical factors, the first is availability which means that e-government websites and services should be available all the time not only during the standard government office hours, and the second is accessibility which means that e-government websites and services should be accessible to the intended target users regardless of their place or any other conditions [18].

According to [22] and [23], successful e-governments are those achieving multiple values like efficiency in administration, innovation in organization, effectiveness of public services, transparency, enhancement of economic development, improvement of service delivery, redefining of communities and strengthening democracy through citizens'

empowerment and participation, improvement of policy formulation and global interconnectivity.

Reference [24] called the main principles for successful e-government pillars. They suggested the following seven pillars for successful e-government: appropriate and fixed infrastructure; necessary appropriate technology channels in order to access the e-government services such as computers and switches; adequate level of education for users; adequate level of training; specialized ministers should have the leadership spirit and vision; appropriate level of funding for the government and the last is confidentiality and security of personal information.

Moreover, [25] have proposed a similar set of principles that should be presented in successful e-government but they added more significant issues such as methods and means for information dissemination, kind of services provided, usability, and service integration.

In order to reach a successful implementation of e-government, the main aims and objectives of e-government need to be achieved. Hence, a successful e-government will provide many benefits to all involved stakeholders in e-government activities which include delivering electronic and integrated services in one stop portal, bridging the digital divide to use e-government services, achieving lifelong learning by the widespread of e-learning tools, rebuilding government-citizen relationship, increasing economic development and creating more participative form of government [26]. Reference [27] studied the benefits of e-government and concluded that the main benefits are providing more accessible, more convenient, more responsive and more cost effective services; making governments more open, more accountable, more inclusive and better able to lead their communities; promoting local economy vitality through a modern communications infrastructure, a skilled workforce and improved employability of the citizens. Reference [16] Identified different categories of e-government benefits such as less corruption, increased transparency, greater convenience, revenue growth, and cost reductions.

Correspondingly, a successful e-government will overcome many obstacles and challenges such as Infrastructure development, law, digital divide, e-literacy, accessibility, trust, privacy, security, transparency, interoperability, record management, permanent availability, education, marketing, public-private competition or collaboration, workforce shortage, cost structure, and benchmarking [28] [29]. Reference [30] [31] identified different categories of e-government challenges such as information and data, technical and technological, organizational and managerial, legal and regulatory, and institutional and environmental. A new study by [11] points out that governments lag behind when compared to businesses and individual readiness to participate in electronic services due to a number of significant obstacles and weaknesses that hinder the expansion of e-government services to becoming fully integrated. These weaknesses can be categorized into strategic, technological, organizational, policy, legal, human factors, security threats, volume of online users and online payment methods. Moreover, financial aspects can be seen as major challenges facing e-government development

[1] [32], while other researchers such as [33] [9] [10] focus on service integration as one of the most critical issues affecting e-government.

As with objective classification into internal which is relevant to government administration processes and activities, and external which is relevant to the environment surrounding government services; many researchers such as [34] noted a significant distinction between the internal and external benefits of e-government. Similarly, a significant distinction between the internal and external challenges of e-government can be made according to researchers such as [35]. It can be seen from the above that service integration is a key factor that is able to increase both internal and external benefits of e-government on one hand and a key factor that is able to overcome both internal and external challenges of e-government. Today, it is clear that e-government applications are designed based on the aforementioned principles and successful implementations of e-government are those achieving more benefits and overcoming more challenges where service integration role is critical.

V. SERVICE INTEGRATION

In the context of this study, a service refers to a set of activities that is delivered by government organizations into all related stakeholders including other government departments, businesses and citizens. These services can be delivered through a variety of traditional and electronic channels.

The term service integration consists of two parts: service and integration. Many researchers in the e-government domain stated a wide range of definitions for electronic services [36] [37] [38], but one of the most interesting definitions of e-service is the one suggested by [39] when he defines e- services as: "…deeds, efforts or performances whose delivery is mediated by information technology. Such e-service includes the service element of e-tailing, customer support, and service delivery". This definition reveals the following three main components: service provider, service receiver and the channel to deliver the service. For example, concerning public e-service, government organizations and agencies are the service providers and citizens as well as businesses are the service receivers. The main channel of e-service delivery is the internet while other traditional channels such as telephone, call center, public kiosk, mobile phone, and television are also considered.

However, providing more effective and efficient e-services requires the integration of e-services across levels and branches in collaborating government organizations and agencies [40]. In a broad sense, integration is a popular term meaning greater efficiency, effectiveness and competitiveness in organizations [42]. According to the [41], the word 'integration' means "combining parts so that they work together or form a whole". So, the word 'integration' would have many definitions according to the field that deals with it (sociology, economy, biology, mathematics, electronics, engineering, and others).

Therefore, the term "Integration" can also be applied to e-government literature in order to define service integration. Reference [43] defines service integration as the most sophisticated level of e-government in which government

services are integrated together. The required services are accessible from citizens and businesses irrespective of the organization or department offering them. As a result, a single portal entry service is established.

Another definition introduced by [9] defines service integration as the combination of different services from separate departments; this may range from clustering of common services to become one unified service to a seamless service oriented around user services, where a "one-stop" portal offering a comprehensive menu of services specifically tailored to the profile of the individual user. This will need aligned systems and some level of intra-departmental collaboration. This definition throws lights on many key issues that need to be taken into consideration when applying service integration to e-government implementation through main portal in order to ensure efficient, effective, competitive and integrated services. Major issues in this regard might include availability, accessibility, personalization and customization, cooperation and coordination, and 'one stop' portal [44].

From the above, service integration can be classified under a variety of labels including collaboration, coordination, 'one stop' shopping, and many others. While these labels may signify different levels of intensity or different focus, they all refer to those efforts to remove or eliminate boundaries between provided services from multiple divisions. Efforts at service integration can take place within a single organization providing multiple services or between separate organizations and agencies providing related services [45].

VI. MATURITY MODELS

In order to achieve the overall goals of successful e-government, governments need a road map to implement e-services efficiently, and to evaluate its progress. Many models have been developed by researchers and practitioners in the field as a way to show the stages of e-government's growth from the immature to the mature. These models are known as 'maturity models' [6].

Generally, e-government implementation goes through different stages of growth from the immature to the mature. The first stage is publishing where governments provide information to citizens through static web pages (one way communication), and the second stage is transaction where government exchange information with citizens through dynamic web pages (two way communication), and the final stage is integration where all information and services are provided online at 'one stop' [6] [7]. Therefore, the ultimate goal of e-government is providing citizens and other stakeholders with full integrated services at one stop shop through service integration [8]. Table 3 shows the most well-known maturity models according to the number of stages, the year of introduction and researchers who designed or adapted the model. It can be seen from the table that no new models have been presented in the literature after the year 2009. However, researchers are still adapting and presenting these models as a foundation for conducting research in their specific context.

Despite the fact that the various maturity models have suggested different numbers of stages for e-government

development lifecycle, the ultimate goal of all these models is the integration of government services provided by different government agencies for different functions and at different levels of the government system [4]. Reference [51] argues that the objectives of e-government will be realized only when full service integration is achieved. Therefore, service integration is considered as a critical success factor to attain a mature level of e-government.

TABLE III.   MATURITY MODELS

Model Name	No of Stages	Year	Source	Referenced By
World Bank	3	2002	[28]	[46]
Howard	3	2001	[47]	[48]
Gartner	4	2000	[49]	[32] [50]
Layne and Lee	4	2001	[51]	[52] [38]
West	4	2004	[13]	[53]
Chandler and Emanuels	4	2002	[54]	[48]
Public Process Rebuilding (PPR)	4	2006	[46]	[55] [56]
Siau and Long	4	2005	[57]	[53] [58]
Moon	5	2002	[59]	[56] [53]
Accenture	5	2003	[60]	[61] [48]
United Nations (UN)	5	2001	[62]	[48]
National Audit Office (NAO)	5	2002	[63]	[64]
Deloitte	6	2001	[65]	[66] [67]
Asia Pacific	6	2002	[68]	[50] [67]
6I	6	2008	[6]	[9]
Klievink and Janssen	5	2009	[56]	[48]

VII. ROLE OF SERVICE INTEGRATION IN E-GOVERNMENT

It is important to give more attention to the role of service integration when making plans and decisions regarding e-government strategies and implementations. E-government policy makers need to consider the importance of service integration through understanding its multifaceted roles in e-government implementations and also need to consider the overall objectives, benefits, challenges and maturity stages of e-government to highlight the location of service integration on e-government map and how it can supports the overall development and progress of e-government.

By reviewing the literature and previous studies regarding service integration in e-government, a set of principles and criteria for successfully implementing service integration in e-

government implementations can be suggested. According to [69], a successful implementation of service integration should be based on availability of integrated services from 'one stop' portal to all stakeholders any time of the day or night, without having to understand which part of government is providing the service they require. This means that cooperation and coordination between all government departments and agencies is guaranteed. Many other important issues to ensure efficient delivery of integrated services at 'one stop' portal have been suggested by [44]. For example, accessibility to all kind of users regardless of their education or knowledge in computers, reliability without degradation or failure to provide required functions and services consistently, privacy through restricted use of data to certain authorities, personalization and customization with ability to automatically filling in parts of forms and collecting additional certifications which are required and available elsewhere when sending applications online and security as in details of payment and identification [47]. Reference [70] mentioned efficiency, effectiveness and usability as major principles for achieving successful service integration.

It is clear that all the above principles and criteria have critical impacts on the implementation of service integration in e-government and they must be taken into consideration in order to achieve successful service integration in e-government implementations.

Since the previous studies in the literature investigated the role of service integration in e-government implementations from multi-view perspective of researchers and practitioners in the domain of e-government, the model in figure 1 is developed to achieve the main aim of this study through understanding the role of service integration in e-government implementations. This model aims to illustrate associations between potential roles of service integration in e-government implementations as an objective of e-government, benefit of e-government, challenge of e-government and an advanced stage of e-government maturity.

Implementing service integration is a major **objective** of successful e-government which supports achieving its internal and external objectives at the same time.

Implementing service integration is a major **benefit** of successful e-government which supports gaining its internal and external benefits at the same time.

Implementing service integration is a major **challenge** of successful e-government which supports overcoming its internal and external challenges at the same time.

Implementing service integration is a major **maturity stage** of successful e-government which supports providing all involved stakeholders with full integrated services at one stop portal.

It is clear that service integration is a critical success factor affecting e-government implementations and playing multifaceted roles at the same time. Figure 1 shows the research model which is constructed based on suggested research aim and presented literature.
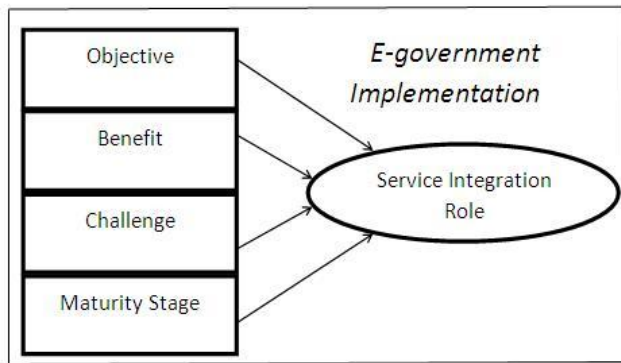
Fig. 1.   Role of service integration in e-government implementations

VIII. CONCLUSION

In this paper, a general background and theoretical foundation towards understanding the importance of service integration in e-government implementations is provided based on a comprehensive literature review of e-government in general and service integration in particular. The paper has shed a new light on the main concepts, definitions, objectives, benefits, challenges, explanations and analytical bases for the topic. As a result, the main contribution to knowledge is proposing a model that clarifies the role of service integration in e-government implementations and explains its importance.

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