

A Novel DSS Framework for E-government

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Abstract

There are various frameworks for decision support system (DSS) that have been formulated. Such frameworks describe the characteristics of DSS. In this paper a proposed effectiveness DSS framework for e-government is presented. This is done by integrating DSS components to support managers and decision makers in e-government. The structure of the proposed DSS framework is discussed. It is expected that the performance of proposed framework will be more effective than existing e-government systems.

Keywords: *Decision Support Systems (DSS), Frameworks, electronic-government (e-government)*

1. Introduction

A variety of DSS have been postulated for describing the characteristics of DSS. These frameworks are helpful in organizing and identifying the relationships of DSS. The identification of DSS applications is important in planning organization strategy for the deployment of information technology. DSS is defined as the use of computer to: (i) Assist managers with their decision process in semi-structure tasks; (ii) To support, rather than replace managerial judgment, and (iii) To improve the effectiveness of decision making rather than its efficiency [1,3].

While definitions of e-government by various sources may vary widely, there is a common theme. E-government involves using information technology, and especially the Internet, to improve the delivery of government services to citizens, businesses, and other government agencies to interact and receive services from the federal, state or local governments twenty four hours a day, seven days a week [7,8].

E-government involves the use of information and communication technologies (ICTs) to support government operations and provide government services [5]. There is a relation between E-government and DSS where E-government encourages citizen participation in the decision- making process and making government more accountable, transparent and effective [3]. The problem focuses on where is the decision support system into the e-government components/ layers and how to utilize the useful of DSS into e-government. No explicit e-government framework includes DSS into its components. So the proposed framework used to solve this problem.

In this work, a novel proposed DSS framework for e-government is presented by integrating its components into the e-government framework layers. The aim is to utilize its components to help decision-makers within the e-government.

This paper is organized as follows. Section 2 presents an overview about DSS and its framework. Section 3 reviews e-government in general while section 4 describes its partnerships. Section 5 shows the e-government layers. The discussion of the proposed framework layers is given in section 6. Finally the conclusion is presented in section 7.

2. Decision Support System an Overview

DSS is an interactive, flexible, and adaptable computer based information system. It has been developed for supporting the solution of a non-structured management problem and improving decision making. It utilizes data,

provides easy user interface, and allows for the decision maker's own insights [1,2].

DSS provides support in semi-structured and unstructured situations, includes human judgment and computerized information. DSS supports various managerial levels as in Fig.1 [3].

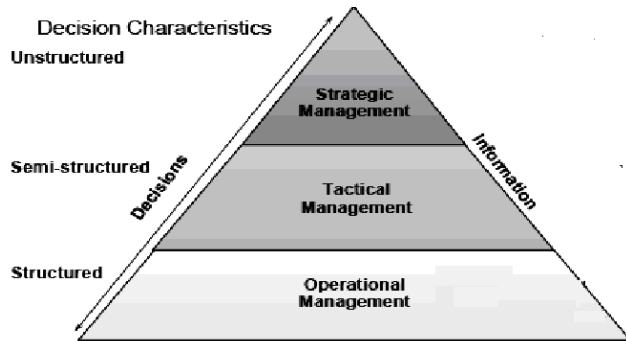


Fig. 1 Decisions in Management Levels [3].

DSS components are: (i) database management subsystem (DBMS), (ii) model base management subsystem (MBMS), (iii) knowledge-based (Management) Subsystem, and (iv) User interface subsystem (Dialogue). Fig.2 [4] shows the components of the DSS. DSS is a problem-solving tool and is frequently used to address ad hoc and unexpected problems. DSS is one of information system types, so any computerize application indeed is a DSS as e-government services where available on the Internet daily 24 hours.

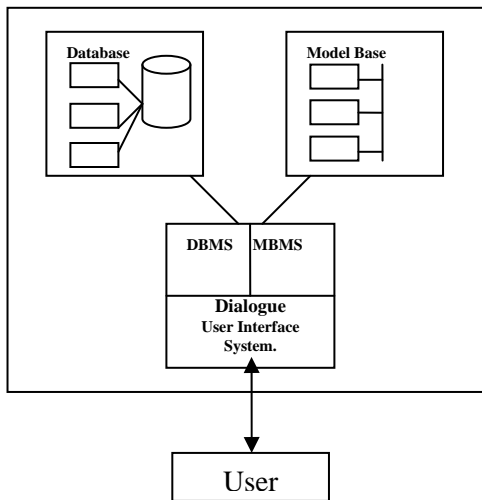


Fig.2 Components of the DSS [4].

3. Definitions of E-Government

To understand E-government, it must understand administrative development and reform on government in general. During two decades, administrative reform and development have experienced total quality management (TQM) in 1980s, and reengineering and reinventing government in 1990s [6]. Government reinvention make us realized that government is actually a dynamic mixture of goals, structures and functions. E-government initiatives are complex change efforts intended to use new and emerging technologies to support a transformation in the operation and effectiveness of government derived from government reinvention. New challenge of public administration in 2000s or 21st century is to create an E-government. E-government is defined as: government activities that take place over electronic communications among all levels of government, citizens, and the business community, including: acquiring and providing products and services; placing and receiving orders; providing and obtaining information; and completing financial transactions [8]. E-government is the continuous optimization of service delivery, constituency participation and governance by transforming internal and external relationships through technology, the Internet and new media. This includes government to citizen, government to employee, government to business, and government to government.

4. Types of E-Government Partnerships

Summarized from our research on e-Government, normally, government identifies and drives implementation of eight types of E-government which can bring significant benefits to the Government, citizens, business, employees and other nonprofit organizations and political and social organizations. Types of E-Government can be classified into 8 categories, are as follows: (i) *Government-to-Citizen (G2C)*: Provide the momentum to put public services online, in particular through the electronic service delivery for offering information and communications; (ii) *Citizen-to-Government (C2G)*: Provide the momentum to put public services online, in particular through the electronic service delivery for exchange of information and communication; (iii) *Government-to-Business (G2B)*: Actively drive E-transactions initiatives such as e-procurement and the development of an electronic marketplace for government purchases; and carry out Government procurement tenders through electronic means for exchange of information and commodities; (iv) *Business -to-Government (B2G)*: Actively drive E-transactions initiatives such as e-procurement and the

development of an electronic marketplace for government purchases; and carry out government procurement tenders through electronic means for sale of goods and services; (v) *Government-to-Employee (G2E)*: Embark on initiatives that will facilitate the management of the civil service and internal communication with governmental employees in order to make e-career applications and processing system paperless in E-office; (vi) *Government-to-Government (G2G)*: Provide the Government's departments or agencies cooperation and communication online base on mega database of government to have an impact on efficiency and effectiveness. It also includes internal exchange of information and commodities; (vii) *Government-to-Nonprofit (G2N)*: Government provides information and communication to nonprofit organizations, political parties and social organizations, Legislature, etc, and (viii) *Nonprofit-to-Government (N2G)*: Exchange of information and communication between government and nonprofit organizations, political parties and social organizations, Legislature, etc. from the above categories of E-government, we can sum up that E-Government initiatives should focus on five consumer-to-government relationships: Citizen-to-Government, Business-to-Government, Government-to-Nonprofit, Government-to-Government and Government-to-Employee. First, Citizen-to-Government refers to the direct consumption of public services by the individual consumer for personal use. These services include licensing and permitting for hunting, fishing, and driving privileges. This will not only include the payment of taxes, fines, and fees to state and local governments, but also the payment of refunds to taxpayers. Second, the Business-to-Government relationship model refers to those services consumed by entrepreneurs, businesses, and corporations, for a commercial purpose (profit or nonprofit). These include filing statements of incorporation, obtaining business licenses, assistance with site locations, and obtaining workforce information. Finally, Government-to-Nonprofit, Government-to-Government and Government-to-Employee refer to the coordination of both inter- and intra- agency cooperation and employees to improve services inside or outside governments. This includes travel requests, purchasing requisitions, payroll processing, intergovernmental fund transfers, and position applications, etc [8, 9].

5. E-Government Layers

Fig.3 [7] gives an overview of the system architecture. The security layer is based on a public key infrastructure (PKI) that provides a nation wide electronic identity. The interface layer comprises all components needed to interact either with human or non-human users (other systems). The actual business logic (e.g. logic for

document and form management, signature verification, plausibility checks) is contained in the function layer. The transaction layer forms an abstraction of all possible underlying backend-system [6, 7, and 10].

It provides a uniform application programming interface (API) that is implemented by different backend-system adapters. Every service is, depending on the underlying business process, bound to a specific backend-system. The transaction manager automatically selects the appropriate adapter, thus all systems can be treated uniformly. The range of supported backend-systems ranges from ordinary email to sophisticated workflow-management solutions. To further support the scalability of the system and to minimize the impact of changes on the entire system, individual components had to be decoupled as far as possible. This was achieved by using technologies and data formats that had originally been introduced to support the communication between different e-Government systems also for the internal data representation. The platform provides the following basic functionality: (i) Start of new procedures by the submission of electronic application forms (including attachments). Depending on the specific use case forms might have to be digitally signed; (ii) Electronic notification service concerning the progress of the underlying business process; (iii) Electronic payment; (iv) Overview of the current state of all procedures (requires login using the PKI card), and (v) Electronic delivery.

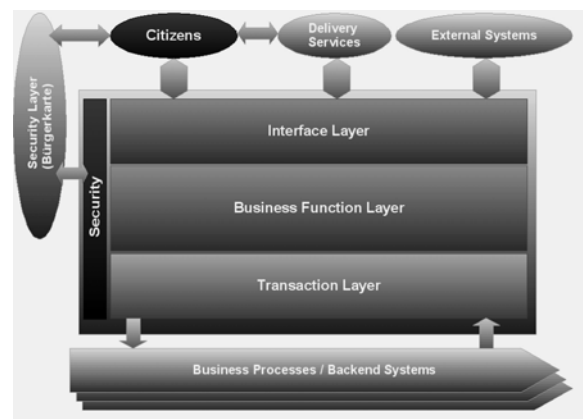


Fig.3 E-government layers [7].

The question now is "Where is DSS in e-government framework?". So if we make a combination between DSS framework and e-government framework, the result will be integrated platform that satisfies the managers' requirements. Moreover, the decision making process will satisfy the user requirements. The proposed framework of e-government is shown in Fig. 4.

6. Structure of the Proposed Framework

The Structure of the proposed system can be summarized as: (i) *Access channels*: It means the way a user visits E-government portal. Users can use different kinds of terminal devices, and enjoy the personalized E-government services permitted any time and any place. This can be done by using different access channels. The terminal devices that users can utilize include: PCs, portable computers, cell-phones, common telephones, PDAs. The access channels mainly include: Internet, government private network, information kiosk, telephone, TV, digital TV, e-mail and mobile communication, etc; (ii) *E-government portal*: is the uniform entry-point for the entire E-government system. It has an interactive main entrance for all kinds of users to find the services they need; (iii) *Applications layer*: The particular E-government systems are constructed by functional departments mainly include vertical systems of functional departments, cross-departmental systems and comprehensive decision support systems for decision-makers within the e-government that imbed DSS. Components of DSS are based on the data that stored in the DB and also data models that generated from the manager experience in taking the decisions; (iv) *Unified application support platform*: Between the application and resource layers, the unified support platform plays a significant role in forming a connection in the E-government overall technical framework. It is an open infrastructure independent from the networks and its applications; (v) *Information resources of government affairs*: Built on top of the network infrastructure, the information resources layer offers various kinds of information resources of government affairs in its upper layer, the unified application support platform layer. The government information resources are mainly composed of shared information resources, catalogue resources and the internal thematic information resources of each department, where shared information resources is combined with basic information resources, shared business information resources and comprehensive information resources while catalogue resources are made up of data catalogue, service catalogue and user directory, and (vi) *Government network layer*: It facilities an important infrastructure level to support E-government which includes wired as well as wireless private networks at municipal, district and county levels, vertical departmental private networks constructed by departments of different functions according to departmental characteristics and needs, and various public website resources. Table (1) shows a comparison between the previous e-government framework and our proposed framework. During many different interviews for e-government offices; the managers asked for clear DSS

tools in e-government. This is prove that the performance of our proposed framework is more effective than existing e-government systems. The majors in table (1) clarify that the proposed framework is very useful for decision makers in e-government. Top Managers in e-government need accurate decisions quickly. The proposed framework helps top manager to do all supervision tasks in e-government efficiently.

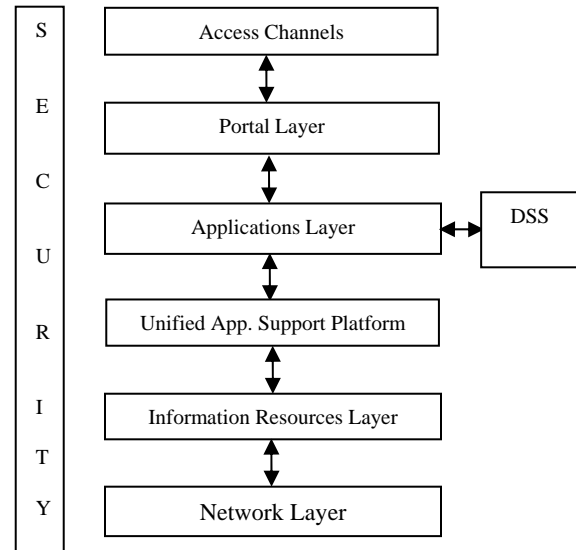


Fig.4 The proposed integrated DSS with e-government framework.

Table 1: Comparison between previous and our proposed e-government framework.

<i>Majors</i>	<i>Top management</i>	<i>Accurate decisions</i>	<i>Provision of decision</i>	<i>Supervision in e-gov</i>
Previous Framework	Low	Moderate	Low assurance	Less effective
Proposed framework	High	High	High assurance	More effective

7. Conclusions

We have shown that the movement to e-government is very important for government to interact with people and business transactions. E-government offers a huge potential to find innovative way to reach the satisfaction of people. Progress of new technologies allows electronic services to be applied in e-government. So DSS must be integrated with e-government managerial levels. We have clarified that DSS is a very helpful tool for all e-government partnerships. It was known that DSS

frameworks are not included into e-government framework layers. Here, it has been proved that the application layer should be combined with DSS framework to make use of its benefits for top managers.

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