A Foresight based Framework for E-government Strategic Planning

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Abstract—**to implement e-government successfully, it is important to have appropriate strategies. According to this, at first, different models of e-government are reviewed and the important parameters and key issues for e-government strategic planning are extracted. Secondly, as foresight is a suitable tool to determine appropriate strategies, different foresight frameworks are reviewed. Finally, a conceptual framework for e-government strategic planning based on foresight concept is presented.**

Index Terms— **E-government, Foresight, Strategic planning,**

I. INTRODUCTION

Information Technology (IT) developments are changing all aspects of societies. One of the most important ones is the e-government services. This technological revolution has also been enabling the introduction of new services, better and faster delivery of existing ones and cheaper and more effective communications between different parties. Nearly all developed nations regard developing e-government as a key strategy for ensuring their success in the 21st century, and are rapidly implementing major initiatives in this area. E-government presents challenges and opportunities to transform both the operational process of government, and the nature of governance itself. It impacts on most functions in government and agencies, the private sector and civil society. In the long term, it has the potential to positively change the government operations and the interaction of citizens and businesses with government [1]. Therefore, each government needs appropriate strategy and planning in order to implement e-government successfully.

According to the aim of research, the paper is structured as follows. Firstly, definitions and different models of e-government are presented. In the next section foresight and its functionality is investigated. Finally, the proposed framework for e-government strategic planning based on foresight is suggested.

II. RESEARCH METHODOLOGY

Proposing an e-government strategic planning framework based on foresight is the objective of this paper. According to this, the main steps of research methodology are as follows:

1- Identification of main factors in e-government strategies: to find key parameters in e-government strategies planning, meta-synthesis approach and seven-step Meta –ethnography of Nobilt and Hare approach [2,3] are applied. Nobilt and Hare's approach includes seven steps as following:

A. Getting started: The aim of first part of research is to study different e-government models.

B. Select relevant studies: Different models were identified based on literature survey related to e-government.

C. Reading the studies: 9 e-government models were reviewed and details of each model were investigated.

D. Determining how the studies are related: relationship between different studies is presented. Analysis of these models has shown that their developing trends are similar, although they are based on various perspectives.

E. Translating the studies into one another: different models are compared and their relationships are found. The main parameters of models can be translated to each other.

F. Synthesizing translations: this step, presents relationship of different models in a table. Table I shows this relationship.

G. Expressing the synthesis and presenting the finding: in this stage, result of research and finding organized into text and diagram as Shown in Figure1.

2- Investigation of foresight definition and frameworks: After finding critical factors for e-government strategic planning, Foresight definition, its applications and different foresight models are reviewed.

3- Proposition of framework: Finally, a conceptual framework for e-government strategic planning based on foresight is proposed by synthesizing e-government strategic planning framework and Voros foresight framework.

III. FRAMEWORK FOR E-GOVERNMENT STRATEGIC PLANNING

As mentioned in research methodology in first step, meta-synthesis approach is used to determine e-government strategic planning factors. All steps to achieve main factors in e-government strategic planning are investigated in the following steps:

A. Literature review of e-government

There are a number of definitions for e-government in the literature. Turban et al. [4] defined e-government as: "The use of information technology in general and e-commerce in particular, to provide citizens and organizations with more convenient access to government information and services, and to provide delivery of public services to citizens, business partners and suppliers, and those working in the public sector". David McClure's [5] defined: "Electronic government refers to government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies and entities". Also Milford considers e-government as any way technology is used to help simplify and automate transactions between government and constituents, businesses, or other governments [6].

B. Select of different e-government models

C. Reading the studies

D. Determining how the studies are related

In this section steps B to D of meta-synthesis approach are summarized.

There are different models for e-government development. These models were developed by international companies or expert people who have experience in e-government. These models are categorized in four groups [7]: described models, maturity models, process models and e-government frameworks. Described models are models that describe e-government such as Broadcasting/Wider-Dissemination Model and Interactive-Service Model [8]. Maturity models present stages of e-government development. These models are used to evaluate e-government implementation such as Delloite Model [4] and Gartner Model [9]. Process models present process of e-government planning. These models show parameters and procedure of e-government development in planning levels such as Misra & Dingra Model [10] and Heeks Model [11]. Also, some e-government frameworks such as Wimmer framework [12], Bhatia framework [13] and Garcia & Pardo [14] was reviewed.

E. Translating the studies into one another

After reviewing of different models and translating them to each others, main factors in e-government strategic planning are identified. Table I shows relation of different models to each others.

There are a number of definitions for strategic planning. One of them are: "Strategic Planning is a long-term, future-oriented process of assessment, goal-setting, and decision-making that maps an explicit path between the present and a vision of the future. It relies on careful consideration of an organization's capabilities and environment, and leads to priority-based resource allocation and other decisions[15]."

F. Synthesizing translations

G. Expressing the synthesis and presenting the finding

By synthesizing factors in different models, parameters of e-government strategic planning are derived which are management, technology, culture, information & data, marketing, finance, logistics, human resource, legality, security and technical infrastructure. These factors are shown in figure1 as a finding and described as bellow.

TABLE I.
COMPARISION THE E-GOVERNMENT MODELS THROUGH DIFFERENT DIMENSIONS [7].

Dimension \ Model	Broadcasting	Interactive -Service	Delloite	Gartner	Misra & Dingra	Heeks	Wimmer	Bhatia	Garcia & pardo
Strategy					√	√	√	√	√
Human Resource					√	√		√	
Information& data		√	√	√		√	√		√
Technology	√	√	√	√	√		√	√	√
Technical Infrastructure	√	√	√	√		√	√		
Legality						√	√	√	√
Security		√	√	√			√		
Finance					√		√	√	
Logistics							√		√
Culture					√	√	√		√
Management					√			√	√
Marketing							√	√	

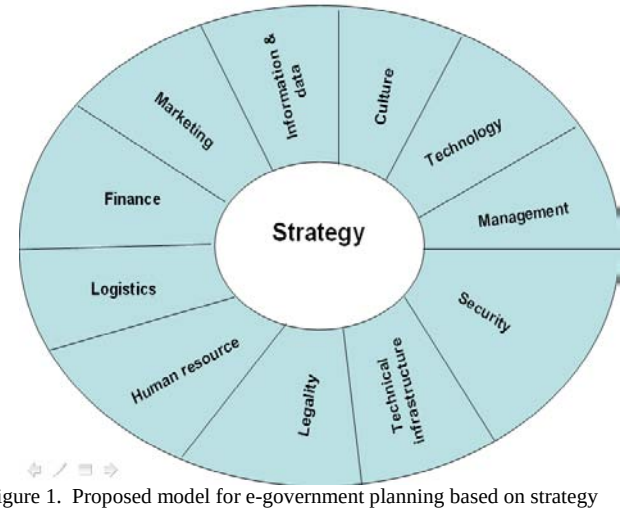

Figure 1. Proposed model for e-government planning based on strategy [7].

- *Strategy:* To implement e-government successfully, appropriate strategies are needed. Problems in e-government implementation arise when an organization does not support a consistent strategy for both its traditional and its e-government operations. Therefore-government must be changed at the strategic level for successful implementation.
- *Finance:* It should be noted that e-government is not necessarily a cheap way of providing services to citizens particularly in the short-term; although, it is expected to be cost-effective in the long term. Therefore, appropriate strategies for e-government budgeting can help to e-government implementation successfully.
- *Management:* Implementing an effective national e-government program begins with empowered, centralized leadership with a framework for decision making .In the transaction and transformation stages of developing e-government, many agencies and departments are related together. Different departments may need to follow the same standards in designing their database systems and website. Therefore, a central leadership is needed to set a common standard and language, appropriate framework and etc to achieve e-government successfully.
- *Legal issue:* legal responsibility for content and collection of data and jurisdiction for protection of infractions are some of the legal issues in e-government. In e-government planning, strategy of legal issue should be considered.
- *Logistics:* Logistics include the plans, implements and controls the efficient, effective flow and storage of services and related information from the point of origin to the customers' requirements. Then, appropriate strategies for logistics should be considered.
- *Security:* Lack of trust in the security of electronic communication is defined as an e-government obstacle. Security threats arise from attacks against information in transit or site storing information .Therefore, both physical and logical security measures should be considered.
- *Technology:* Two technology-related factors that can promote the success of information systems are system usefulness and ease of use. As some technologies are complex and new, a strategy for responding to information technology-related challenges should organize to build awareness and to focus early efforts on developing system and process prototypes. Strong technical skills and expertise of the project leader and some team members is critical.
- *Marketing:* marketing of online government services[16] can help to: 1- Develop or redevelop services to better meet user needs.2- Change the behaviors of clients using alternative service delivery mechanisms by providing them with information online, 3- Reduce organizational costs by reducing user traffic in other service delivery channels, 4- Empower users by informing them of alternative service delivery channels. Users can then choose the most appropriate service delivery channel. Then appropriate strategies for e-government marketing can be helpful.
- C*ulture:* Culture is the most important parameters in e-government planning. Organizations should change the culture of staff, customers and organization in order to implement e-government.
- *Human resource:* Government cannot implement e-government without expert staff. This means human resource is one the main issues in e-government.
- *Technical infrastructure:* e-government implementation without appropriate infrastructure is not available. Therefore, appropriate strategies for development of technical infrastructure are critical.
- *Information & data:* Dealing with information and data challenges requires an overall plan for managing data and information products. Developing appropriate data structures and definitions is critical to the success of e-government initiatives. Managers have attempted to minimize data-related problems by sharing standards, definitions and meta-data with their partners. Getting continual feedback from users is also an important strategy to maintain data quality. However, having qualitative and homogenous information is an important success factor.

IV. FORESIGHT AND ITS APPLICATIONS

According to second step of research methodology, in this section, foresight and its different models are reviewed.

Technology foresight identifies emerging generic technologies that give the greatest economic and social benefits. There are a number of definitions for foresight which two main and popular of them are described.

Martin [17] defined foresight as "the process involved in systematically attempting to look into the longer-term future of science, technology, the economy and society with the aim of identifying the areas of strategic research and the emerging generic technologies likely to yield the greatest economic and social benefits". Also, Luke Georghiou [18] describes technology foresight as "a systematic means of assessing those scientific and technological developments which could have a strong impact on industrial competitiveness, wealth creation and quality of life".

There are five important aspects to these definitions: systematic look into the future, concern with the longer term, and balance between Science/technology push and market pull, concentrate on emerging generic technologies and attention to social impacts and wealth creation [18].

Some common application for foresight are: Exploring future opportunities to set priorities for investment in science and innovation activities, Reorienting the science and innovation system, Demonstrating the vitality of the science and innovation system, Bringing new actors into the strategic debate, Building new networks and linkages across fields, sectors and markets or around problems[18].

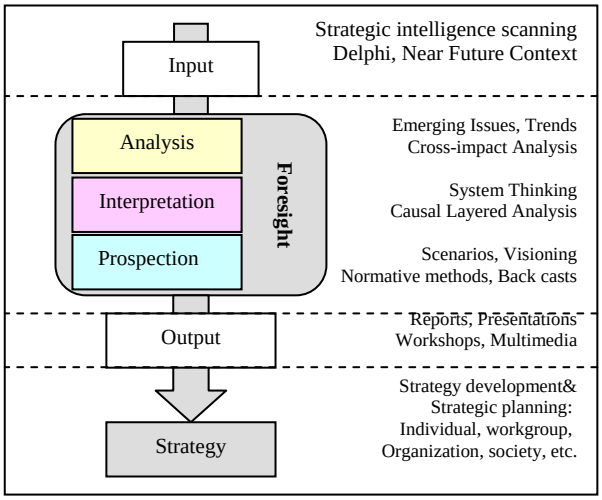

Figure 2: foresight framework presented by Voros [21]

Martin [17] summarized main aspects of the foresight process as five Cs that are: communication (the process brings together industrialists, academics, policy-makers, forecasters and others concerned with the future of science, technology and innovation), concentration on the longer term, coordination(it enables participants to coordinate their R&D plan), consensus(it helps participants to develop consensus on research priorities, creating a shared vision of the future), commitment(it generates a sense of co-ownership and commitment to the results of the forecasting exercise).

Martin [17], Saritas [19], Horton [20], Voros [21], Miles [22], Reger [23] have presented different frameworks for foresight. Most of them distinguish three main phases in the foresight process, which are: pre-foresight, foresight and post-foresight.

In Each models, perspectives to foresight are different. Voros view on foresight framework is based on strategic thinking.

As Voros view on foresight framework (illustrated in Figure 2) is based on strategic thinking, proposed e-government strategic planning could be enhanced by using Voros's model.

The following section describes Voros framework briefly.

Voros framework [21] consists of four elements that are input, foresight, output and strategy. Input is gathering of information and scanning for strategic intelligence. Foresight work can be conceived as comprising three steps as: analysis, interpretation and prospection. Output is another part of Voros framework and is two-fold: tangible and intangible. Strategy is final part of this framework. Strategy hands over for consideration by decision makers in making decisions and directing strategic actions for implementation. The result of strategy process should be fed back constantly into inputs.

In next section, foresight advantages and functionality is used to design e-government strategic planning framework.

V. A PROPOSED FRAMEWORK FOR E-GOVERNMENT PLANNING BASED ON FORESIGHT

As mentioned in third step of research methodology, in this section, an e-government strategic planning framework is proposed based on Voros foresight framework.

Figure 3 demonstrates the proposed framework for e-government strategic planning based on foresight that consists of different elements.

A. Data Collection: Firstly, data and information on future themes, trends, ideas about e-government is collected from a range of sources such as experts, universities, business networks, personal networks, customers, the literature, government, other foresight and e-government reports, research and surveys of scanning for strategic intelligence. Data and information about the main parameters in the e-government strategy planning that are management, technology, culture, information & data, marketing, finance, logistics, human resource, legality, security and technical infrastructure should be collected and summarized.

B. Foresight: foresight element consists of three stages:
   - Analysis: the knowledge summarized in phase one is in a variety of languages technical, economic, social, legal, environmental, foreign, even incomprehensible. Strategic analysis of the potential benefits associated with different research options is done in this stage. Strategic analysis looks at the main research options and their long-term benefits and costs, based on four sets of criteria: (a) evolving socio-economic needs and threats; (b) emerging research opportunities; (c) comparative advantages and weaknesses associated with economic and other resources; and (d) existing scientific strengths and technological capabilities. These four criteria should be analysis all the main parameters in the e-government strategy planning should be analyzed that includes management, technology, culture, information & data, marketing, finance, logistics, human resource, legality, security and technical infrastructure.

- Interpretation: this is the key step and is the heart of the foresight process. The translated knowledge needs to be converted into understanding. Interpretation is all about teasing out the implications of the various possible future views for a particular organization. Interpretation, the most important step in foresight, is poorly understood and has few theoretical techniques.
- Vision and prospection: This step is where various views of alternative futures are explicitly examined or created. It is where scenarios," visioning" and "normative" methods are located in the broader foresight process.

C. Strategy: this part is about output of e-government foresight. In these stages strategies about management, technology, culture, information & data, marketing, finance, logistics, human resource, legality, security and technical infrastructure are identified.

By using foresight, vision, goals and strategies of e-government planning could be determined. E-government foresight has many advantages such as:

- Systematic: It looks into the future of e-government systematically with the longer term.
- Balance: It balances between Science/technology push and markets pull of e-government.

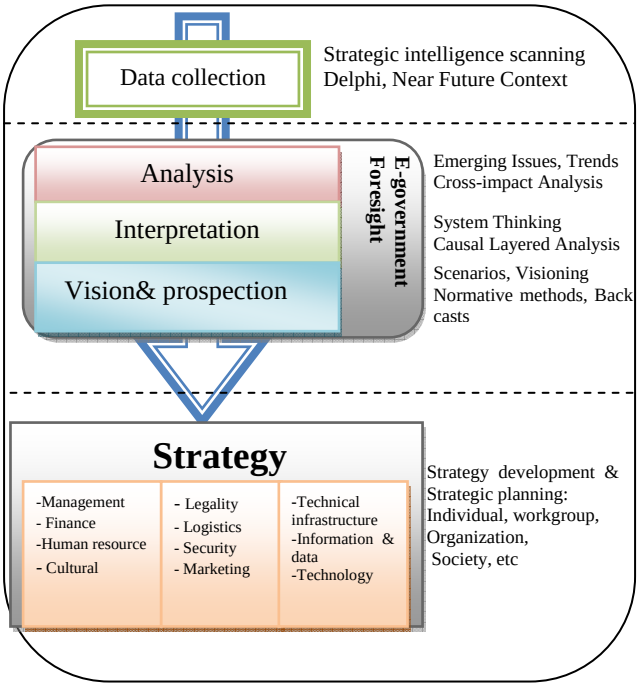

Figure 3. A proposed framework for e-government strategic planning based on foresight

- Exploring: It explores future opportunities to set priorities for investment in e-government projects.
- Building network: It building new networks across fields, sectors and markets related to e-government problems.
- Communication: It brings together industrialists, academics, policy-makers, forecasters and others concerned with the future of science, technology and innovation about e-government.
- Coordination: It enables participants to coordinate in output of strategic planning.
- Consensus: It helps participants to develop consensus on research priorities, creating a shared vision of the future of e-government.
- Commitment: It generates a sense of co-ownership and commitment to the results of the forecasting exercise.

VI. CONCLUSION

For a successful e-government implementation an appropriate strategy design is necessary and therefore a strategic planning framework is needed. This framework should be comprehensive and future oriented.

In this paper, some different models in e-government are reviewed. According to these models, some important parameters which should be considered in the planning stages are extracted. These parameters are Management, Technology, Culture, Information & Data, Marketing, Finance, Logistics, Human Resource, legality, Security and Technical infrastructure.

The foresight applications are used to present a new framework for e-government strategic planning. In the proposed framework, foresight is used to determine vision, goal and strategies of an e-government planning.

The proposed framework considers important e-government parameters. It has a systematic looks into the future and balances the science-technology push and markets pull of e-government.

Developing new networks, effective communication and more commitments are some other results and outcomes of implementing the presented framework.

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