Methodology for Determining E-government Success Factors with Foresight Approach

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ABSTRACT: The aim of this paper is to determine the appropriate method for identifying the success factors in electronic government. First, various methods for determining the critical success factors have been extracted by reviewing the related papers in 12 recent years and have been categorized based on their characteristics. Then, functionalities and methods of foresight have been reviewed and the appropriate methods for identifying the critical success factors based on objectives in e-government from stakeholder’s point of view have been presented. Then with a primary screening, 6 top methods were selected based on their general criteria. In the second step, using the literature review, 10 criteria were identified for ranking of the methods and a panel of experts has confirmed these criteria. Then, 6 above mentioned methods were ranked using the fuzzy TOPSIS method and finally a roadmap for measuring the critical success factors from foresight point of view for different countries have been proposed. The results show that the value focused thinking method possesses the first ranking. The value thinking method enables us to identify the tangible and intangible needs of the stakeholders with foresight approach and additionally, provides creativity in the goal setting process. On the other hand, provides us with measures and outcomes for measurement purposes.

Keywords: e-government, Foresight, Fuzzy TOPSIS, Critical success factor.

INTRODUCTION

The effectiveness of e-government strategies depends heavily on the cause-and-effect relationships among strategic objectives based on foresight approach, as well as performance outcomes identified by critical success factors that indicated during the objective determination, project implementation, and performance measurement processes. The most important functionalities of the foresight include creating novel ideas, paradigms, scenarios and technology priorities. This lays a foundation for visions that represent the future strategic opportunities and with an accurate planning could result in the creation of novel technologies, more market share and even social transformations. Several countries such as Bulgaria, India, Malaysia, EU and OECD have implemented the electronic government foresight (Saghafi, F., Zarei, B and et. al., 2009). This also highlights the significance of the foresight and rapid changes and developments in the electronic government field. This paper focuses on determining the critical success factors for obtaining the electronic government objectives from stakeholders' point of view and with emphasis on foresight vision.

Many scholars have determined the critical success factors in different areas by their methodology. However, there isn't any reference model for determining CSF and the topics are still under-controversial. In this paper, critical success factors determination methods have been reviewed. Additionally, determining the critical factors has been conducted with regard to the ultimate objective and validity of these objectives has been considered regarding the foresight concept. The appropriate methods for determining the critical success have been ranked and finally and roadmap for measuring the critical success factors from foresight point of view for different countries have been proposed.

Problem statement and methodology

Future technologies and developments may change our world. In the recent years, the concept of foresight has been applied in modern fields such as electronic government. This implies that electronic government will also change like other areas. In an European foresight study it's been shown that the complete list of the information and communications technologies will be accomplished up to 2020 in Europe. Then,
using the experts’ opinions and participation of several countries, the affordable government services using these technologies have been examined. The results of the research indicate that future technologies improve the user clarification and this makes the clarification and democracy as a requirement (Fris sen, V. et al., 2007). Therefore, governments that implement their strategies and programs based on the future paradigms and needs of the electronic government. In order to accomplish this, there must be a clear definition of the corporate vision and values with which the strategic and stakeholder objectives are aligned. Several studies have analyzed success factors in different areas. Nevertheless, no study has identified the success factors of e-government (Carter, L and Belanger, F., 2005) that focuses particularly on future values of stakeholders. On the other hand, there isn’t any reference method for extracting the success factors. So in this research, reviews all related papers for identifying the appropriate method. The purpose of this paper is to determine the appropriate method for identifying the success factors in electronic government. These factors must be based on the electronic government objectives determined through the foresight concept. The emphasis is put on finding a method to define the objectives and effective factors from different e-government stakeholder’s point of view.

The framework illustrated in Figure (1) has been used to conduct the research. First, extensive studies have been conducted in the fields of foresight, foresight methods, electronic government, stakeholder analysis, effective methods for determining the electronic government objectives using the library and internet references. Six methods out of 16 methods have been chosen, and utilizing the foresight functions, focusing on future opportunities and electronic government goals, 10 criteria were determined for selecting the appropriate goals for the future electronic government from stakeholders’ point of view. Then using five experts’ opinions and fuzzy TOPSIS method, the best method has been chosen and analyzed.

Multi-criteria decision-making (MCDM) is one of the most important branches of decision-making aimed at supporting decision makers who are faced with making numerous and conflicting evaluations. (Pohekar S.D. and Ramachandran M.,2004). Since there are several methods for determining the electronic government goals with a futuristic vision, thus the best option must be chosen using the most appropriate method. Methods such as SAW, LINMAP, ELECTRE, TOPSIS, AHP, ANP, etc have been introduced in multi-criteria decision-making problem solving books and references. Each method represents its own advantages and disadvantages and it can be said for sure that none of them is perfect. Accordingly, these methods have been evaluated and compared against each other based on the criteria related to the decision-makers analysts (decision-maker knowledge level, decision-makers tendency to communicate with others, ...), the problem (number of options, number of criteria, ...), the algorithm (usage convenience, applicability for group decision-making, ...) and the final solution (results consistency, confidence of the decision-maker, ...) (Rolander, N. and Ceci, A. and Berdugo, M., 2003; Tarik, A.S. and Bashar, A.K. and Alan, P., 1997). According to the comparisons between these methods, fuzzy TOPSIS method has been chosen as the best option.

**Foresight and introducing the methods for determining the futurist electronic government goals**

Foresight, more than anything else is a policy making tool (Slaughter, R., 2004). Therefore, this tool can be used to overcome the challenges and problems in different countries. Some of the major functions and objectives for the foresight effort are as follows:

Networking and communications reinforcement: gathering the craftsman, academics, decision-makers, futurists, stakeholders and others engaged in the future of the science, technology and innovation throughout the process (UNIDO, 2005; Loveridge, D., 2001; Keenan, M., 2003); steering the data gathering process for informing the decision-makers and economic enterprises (Miles, I. and Keenan, M., 2000); strategic analysis of the future scenarios for formulating the opportunities and generating the future options (Georgiou, L., 2003; Cuhls, K., 1997); developing a common vision of the future (Voros, J., 2003; Loveridge, D., 2001; United nations industrial development organization, 2004); steering the strategic and forward thinking (Voros, J., 2003; Irvine, J. and Martin, B., 1989; Miles, I. and Keenan, M., 2003); identifying the future opportunities and potentials (Reger, G., 2001; United nations industrial development organization, 2004); forecasting the emergence of the novel technologies (Keeney, R. L., 1992; Miles, I. and Keenan, M., 2003; Voros, J., 2003); prioritizing technology and R&D strategies according to the market requirements and organizational capabilities (possibility and attractiveness criteria) (Cuhls, K., 1997; Loveridge, D., 2001); clear and explicit decisions for initialization, development or shift of the research programs (Loveridge, D., 2001); formulating the operational plans (Loveridge, D., 2001); coordination: coordinating the R&D strategies and programs (Loveridge, D., 2001); consensus on multi-stakeholder decisions: consensus on research priorities and developing a common vision (Loveridge, D., 2001).

Foresight is a process from which the most important outcome is adjusting the priorities for scientific. Determining the success factors in this area must be based on the determined objectives with futuristic view. Thus, the methods must be chosen that consider the futuristic goal setting. Using the foresight process, organizations or countries can develop a common point of view and consensus.
The significance of this cooperation in country or organization levels and alignment with all of the influencing agencies lies within a common goal. Thus, with proper identification of the capabilities of each method they have to be applied in proper steps. Various methods such as Delphi, Scenario making, environmental scanning, brainstorming, patent and registration analysis, relevance tree, morphological analysis, cross impact analysis, cycle future, experts panel, wild cards, critical technology and technology road mapping are included in foresight concept (Miles, I. and Keenan, M., 2003). Review results of the past 12 years show that majority of them have used the literature review, interview or questionnaire methods. These three tools are used in some way in all of the foresight methods. Therefore, these methods are applicable for determining the critical success factors. On the other hand, methods such as value focused thinking, grounded theory and environmental scanning are also applicable for determining the electronic government goals. While the grounded theory results in a developed theory but other methods compile the practical results and the outcome of the method may not be a theory. Hence, 16 above mentioned methods have been selected as the primary methods and next, the best methods will be chosen and ranked based on the proper and suitable criteria. Here, for the sake of contraction, the finally chosen methods are described as follows.

1- Determining the characteristics of the methods used for identifying the critical success factors through the literature review in the 12 recent years
2- Study of the different multi-criteria decision-making methods and choosing the conjunctive satisfying method and fuzzy TOPSIS methods as the best option

Fuzzy set theory was first introduced by Professor Lotfi Zadeh in 1965 (Zadeh, L. A., 1965). This theory deals with imprecise and ambiguous modes of sets and has been applied in many theoretical and empirical
fields. Triangular fuzzy numbers are used more commonly in theoretical and empirical studies because of the use simplicity and convenience (Taho, Y. and Chih, C.H., 2006). So this research is used of triangular fuzzy numbers. The main goal of this paper is to choose the best option with minimum difference with the positive optimum option and maximum difference with the negative optimum one. Decision matrix and criteria weights are the inputs of this algorithm. In order to choose the best method for determining the critical success factors, the fuzzy TOPSIS and group decision-making methods have been used. The systematical and well-developed TOPSIS methods proposed by Chen (Chen C.T., 2000) is very effective for solving the group decision-making problems in fuzzy environments. In this method, weights of the criteria and each options value are defined and considered qualitatively. These linguistic variables can be represented as triangular fuzzy numbers.

Weights and importance of the criteria are determined by direct allocation of the values or indirectly using the pair wise comparisons (Hsu H.M., Chen C.T., 1994). In this method, decision-makers are encouraged to use the linguistic variables (Table 1) for evaluating the criteria and determining their values. If we assume that group of decision-makers consists of K people, then, weight and importance of each criterion are calculated as follows:

\[
\tilde{x}_{ij} = \frac{1}{K} \left[ w_i^j + x_{ij}^+ \cdot \ldots \cdot x_{ij}^+ \right] \\
\tilde{w}_j = \frac{1}{K} \left[ w_j^j + \tilde{w}_j^+ + \ldots + \tilde{w}_j^+ \right]
\]

Where \( \tilde{x}_{ij} \) and \( \tilde{w}_j \) are the importance and weight proposed by the \( K^{th} \) decision-maker. Thus, multi-criteria decision-making problem can be formulated as decision-matrix and weighting matrix.

\[
\begin{align*}
D &= \begin{bmatrix}
\tilde{x}_{11} & \tilde{x}_{12} & \ldots & \tilde{x}_{1n} \\
\tilde{x}_{21} & \tilde{x}_{22} & \ldots & \tilde{x}_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
\tilde{x}_{m1} & \tilde{x}_{m2} & \ldots & \tilde{x}_{mn}
\end{bmatrix} \\
\tilde{W} &= [\tilde{w}_1, \tilde{w}_2, \ldots, \tilde{w}_n]
\end{align*}
\]

Where \( \tilde{x}_{ij} \) and \( \tilde{w}_j \) represent the linguistic variables. These variables can be represented as \( \tilde{x}_{ij} = (a_{ij}, b_{ij}, c_{ij}) \) and \( \tilde{w}_j = (w_{j1}, w_{j2}, w_{j3}) \) fuzzy numbers (Table 1).

In order to compare the criteria, they are de-scaled. This results in a normalized fuzzy decision matrix \( \tilde{R} = [r_{ij}]_{m \times n} \). If B and C represent the cost and profit criteria sets respectively then:

\[
\begin{align*}
r_{ij} &= \left( a_{ij}, b_{ij}, c_{ij} \right), \quad j \in B; \\
r_{ij} &= \left( a_{ij}^+, b_{ij}^+, c_{ij}^+ \right), \quad j \in C; \\
c_{ij}^+ &= \max_i c_{ij} \quad \text{if} \quad j \in B; \\
a_{ij}^+ &= \min_i a_{ij} \quad \text{if} \quad j \in C;
\end{align*}
\]

In order to consider the weighted importance of each criterion, normalized fuzzy weighted decision matrix is constructed as below:

\[
\tilde{V} = \left[ \tilde{v}_{ij} \right]_{m \times n}, \quad i = 1,2,\ldots,m, \quad j = 1,2,\ldots,n
\]

where \( \tilde{v}_{ij} = \tilde{r}_{ij}(\tilde{w}_j) \).

In this method, ideal positive \( (A^+) \) and ideal negative \( (A^-) \) values are defined as below:

\[
A^+ = (\tilde{v}_{1}^+, \tilde{v}_{2}^+, \ldots, \tilde{v}_{n}^+) \quad \text{where} \quad \tilde{v}_{j}^+ = (1,1,1) \quad j = 1,2,\ldots,n
\]

\[
A^- = (\tilde{v}_{1}^-, \tilde{v}_{2}^-, \ldots, \tilde{v}_{n}^-) \quad \text{where} \quad \tilde{v}_{j}^- = (0,0,0) \quad j = 1,2,\ldots,n
\]

Distance from ideal positive \( (A^+) \) and ideal negative \( (A^-) \) values is calculated as below:
A Review of the methods used for determining the critical success factors

In order to determine the critical success factors for the electronic government effort, authentic papers and articles in the context of determining the critical success factors in different scientific fields from 1996 to 2009 have been obtained and reviewed from Science Direct website. Then, these papers have been categorized based on the method used for determining the critical success factors (Table 1).

This categorization implies that most of the papers have used interview and questionnaire methods. Some of them have gathered the data based on the literature review method and then have analyzed the results using the methods such as factor analysis, ISM, AHP or researchers’ judgment. In these papers, hypothesis tests were used for statistical analysis. Some other has used case studies and methods such as inferential statistics, descriptive statistics or regression have been used for result analysis. In this research, since the under the study society is Iran and electronic government has not yet been implemented in Iran, the case study method is eliminated from the comparisons. Value thinking and factor analysis methods also have been used in authentic papers. Finally, Delphi and Value thinking methods are chosen for extracting the critical success factors by reviewing the papers of the recent 12 years.

<table>
<thead>
<tr>
<th>Method</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview (may include questionnaire) and content analysis or hypothesis test</td>
<td>1</td>
</tr>
<tr>
<td>Literature review and Analytical Hierarchy Process</td>
<td>2</td>
</tr>
<tr>
<td>Case Study or empirical studies and analysis with descriptive statistics or regression</td>
<td>3</td>
</tr>
<tr>
<td>Literature Review and Factor Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Value Thinking and Factor Analysis</td>
<td>5</td>
</tr>
<tr>
<td>Delphi</td>
<td>6</td>
</tr>
<tr>
<td>Literature Review and researcher judgment</td>
<td>7</td>
</tr>
<tr>
<td>Literature Review and Interpretative Structural Model</td>
<td>8</td>
</tr>
</tbody>
</table>

If \(CC_i = 1\) then, \(i\) is the ideal positive value and if \(CC_i = 0\) then \(i\) is the ideal negative value. Therefore, the option with the most \(CC\) value is the optimum value.

### Table 1. methods for extracting the critical success factors by reviewing the papers of the recent 12 years

<table>
<thead>
<tr>
<th>frequency</th>
<th>References 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sun, H., and Wing, W.C., 2005.</td>
</tr>
<tr>
<td>1</td>
<td>Cherry, J., and Weiler, E.D., 1998</td>
</tr>
</tbody>
</table>
Delphi method

is one of the most common and well-known foresight methods. This method is used to organize the inter-member communication problems and also to provide interaction between people’s actual opinions. Anonymity of the experts and feedback are two indispensable elements of the Delphi method (Knut, B. et. al., 2001; Cuhls, K., 2000).

Value Focused Thinking

in this method, the emphasis is to discover the nature and presenting the values and determining a network of goals and objectives. Value focused thinking is applicable in all decision-making fields. Value focused thinking tries to create new options instead of examining the existing and determined ones. The process includes interviews with stakeholders, describing their points of view, communicating them, comparing them and interaction between stakeholders to obtain more consensus and interpreting the concepts and principles to a scientific and more understandable language. Next, relationships between concepts and goals are determined. Afterwards, options are developed. Objectives and the related metrics are formulated. Risk and unreliability are also calculable (Keeney, R. L., 1992).

Grounded theory

the aim of the method is to extract a theory from the conducted researches to transform those points of view to the common theories is the social sciences. This requires the study and examination of the processes and their bilateral effects. Researchers use the historical documents, interviews and observation methods for data gathering. Typically, data are gathered from different units to study the differences and similarities. Data analysis is performed in three stages: open coding, axial coding and selective coding. (Strauss, A. and Glaser, B., 1967).

Relevance tree

relevance tree is a method for representing the details of a problem and the relationships between these details under the current and future situations. Relevance tree is a diagram that has a form of a hierarchical structure that begins with a high level of abstraction and moves down with greater degree of detail in the following levels. In other words, it is a method for identifying the correlation between needs and goals of the future and determining the required conditions to accomplish the goal (Strauss, A. and Glaser, B., 1967; Tidd, J.; Bessant, J. and Pavitt, K., 2005).

Future wheel

Future wheel is a method aimed at organizing the ideas and questions about the future and actually, is a form of a structured brainstorming. This technique has three phases. First, brainstorming is performed on the future events and processes. Then, impacts and consequences of the predetermined set are identified in different fields and at the end, past impacts and consequences that resulted to the current impacts are provided (Keeney, R. L., 1992; Strauss, A. and Glaser, B., 1967).

Brainstorming(mind mapping)

This technique can be used for supporting the production and development of new ideas in a group process. The aim of this technique is focusing the thinking, getting beyond the evident ideas and structuring ideas. It supports creative, innovative and exploratory thinking and can be used in combination with many foresight methods.

Determining the suitable criteria for electronic government goal setting and implementing the research methodology

Due to variety and diversity of the methods, a primary screening is performed. In order to do this, conjunctive satisfying method (Asgharpour, M.J., 2004) has been used to reduce the number of the options. In this method, a standard level is specified for each option by decision-maker and each option must obtain the minimum required score to be accepted. If an option does not meet even one of the determined measures, it will be eliminated. The primary measures for screening were determined through the literature review: Possibility to use the method (cost, time, required information, ...) Possibility to include different stakeholders' perspectives Consensus Possibility to utilize different expertise Possibility to hold face-to-face or remote meetings Little correlation between the results and the person who implements the method
According to the above criteria, six methods (Delphi, Brainstorming, Grounded Theory, Future Wheels, Value Focused Thinking, and Correlation Tree) were accepted.

In the second phase since the assessment criteria must indicate the level of futuristic goals accomplishment, the following criteria have been determined based on the reviewed references. In order to determine the criteria, foresight functions and the stakeholder analysis concepts have been used. Relevance of the criteria has been determined by an expert panel. An expert panel of 10 electronic government and foresight experts have examined and confirmed these criteria (Table 2).

The decision matrix is to formulate the multi-criteria decision-making problems and to construct decision matrix information such as criteria; criteria weights (importance) and relative ranking of the criteria are required. So first the criteria weights matrix and the options comparison matrix for linguistic variables determined by a group of 5 experts with more than 3 years of experience in foresight field and participation in national projects and 10 years of experience in the information technology context. Then an integrated comparison matrix of the translation of the linguistic variables to fuzzy numbers and solution method is calculated. At the end the results of the normalized comparison matrix and the weighted comparison matrix is provided. Table (3) provides the calculation of the vicinity and ranking of the selected options.

Table 2. Introducing the decision making criteria’s for selecting the appropriate method with fuzzy TOPSIS

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Notes</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)Ability of data gathering from stakeholders</td>
<td>Each stakeholder’s values represent the important information that he/she considers in his/her decisions. Thus, this information must be gathered to provide a foundation for judgments of the stakeholders.</td>
<td>Giorgi, L. and Hauptman, A.,(2007); Jonas, D. K. (2000); Damvakeraki, T., (2006); Janssen, M., et. al.,(2007); Millard et al.,(2006); Frissen, V. et. al.,(2007)</td>
</tr>
<tr>
<td>(2)Ability to improve the relations</td>
<td>Communication with stakeholders requires some ways for all people to easily participate in decision-making process. Therefore, a method must be used that provide a common language for goal determination and identify priorities and preferences of different groups of people and facilitate the evaluation of the options for stakeholders.</td>
<td>Giorgi, L. and Hauptman, A.,(2007); Jonas, D. K. (2000); Millard et al.,(2006); Frissen, V. et. al.,(2007)</td>
</tr>
<tr>
<td>(3)Facilitating the participation in multi-stakeholder decisions</td>
<td>Variety and diversity of stakeholders’ needs that are classified in bargaining or negotiation groups require a interaction among all stakeholders. Therefore, the chosen method must enable us to satisfy all stakeholders based on their influence on the electronic government. Sometimes, people represent their goals with ambiguity. If the reason of the ambiguity is examined, it is shown that these goals are hidden in the back of their mind. In this case, they highlight some points that are not important to them but are not able to eliminate them. The chosen method must be able to reveal these hidden goals.</td>
<td>Giorgi, L. and Hauptman, A.,(2007); Jonas, D. K. (2000); Millard et al.,(2006); Frissen, V. et. al.,(2007)</td>
</tr>
<tr>
<td>(4)Revealing the hidden goals</td>
<td>One of the major phases of decision-making in goal determination depends on the quantification of the personal value judgments in order to evaluate the related goal. If goals are incomplete and ambiguous then, the information used for the evaluation will be useless. If value judgments are not based on the logic and reasoning, the generated insights will not be logic. In order to have futuristic point of view, it is not sufficient to only consider the current needs but future needs and goals of the stakeholders’ must also be considered. Thus, creating futuristic goals is more important than evaluating the existing options. Often, decision-making methodologies neglect the necessity of creativity in goal determination. When the thinking process is restricted to the existing options, there is no creativity in developing the options.</td>
<td>Eurgelman, J.C., et.al.(2004); Millard et al.,(2006)</td>
</tr>
<tr>
<td>(6)Ability to create and innovate the options</td>
<td>Since the strategic objectives do not change in short time, a method must be used to determine the goals that are capable of forecasting the long-term goals.</td>
<td>Eurgelman, J.C., et al.(2004); Giorgi, L. and Hauptman, A.,(2007); Radosvec, S.,(2007); Damvakeraki, T.,(2006); Janssen, M., et. al.,(2007); Frissen, V. et. al.,(2007)</td>
</tr>
<tr>
<td>(7)Identifying the future new opportunities</td>
<td>Plenty of electronic government goals are interrelated. The chosen method must be able to determine a hierarchy of goals and to reveal the relationships between different decisions and show the effects and interactions between them.</td>
<td>Damvakeraki, T.,(2006); Frissen, V. et. al.,(2007)</td>
</tr>
<tr>
<td>(8)Strategic thinking governance</td>
<td>Strategic objectives form the principal foundation of human values but in order to accomplish these objectives, there are short-term goals. The mentioned model must be able to make distinction between short-term and long-term goals.</td>
<td>Damvakeraki, T.,(2006); Janssen, M., et. al.,(2007); Millard et al.,(2006); Frissen, V. et. al.,(2007)</td>
</tr>
</tbody>
</table>

**Analysis of the findings**

It is obvious that in the previous section, Delphi, future wheel, brainstorming, value focused thinking; grounded theory and correlation tree have been evaluated regarding the criteria such as ability of stakeholders’
opinion gathering, ability to reveal hidden goals, goals hierarchy by a group of 5 foresight experts. Due to the ambiguity of scores, the triangular fuzzy numbers were used for the survey and the results of the technology foresight methods were prioritized by fuzzy TOPSIS method. In this ranking, the value focused thinking method was the first ranked method and correlation tree and future wheel were respectively next. Therefore, value focused thinking is the most suitable method for determining the goals. Literature review and efforts made in this context also confirm this since plenty of papers and articles emphasize on the application of this method for goal determination. For example, Keeney (Keeney, R. L.,1999) and Dadashzadeh (Torkzadeh, G., & Dhillon, G., 2002) applied this method for to determine the electronic commerce goals. Yoo et al (2001) used this method for determining the frequency range goals in Korea (Yoo, S., Kim, J. and Kim, T., 2001). Failing et al (2007) used this method to integrate the local knowledge and science to determine the environmental risks (Failing, L., Gregory, R. and Harstone, M., 2007). Drevin et al. used this method to determine the information and communication technology security goals (Drevin, L., Kruger, H.A. and Steyn, T., 2007). Value focused thinking is a creative method that builds an appropriate relationship between stakeholders and based on their opinions, delineates their subjectivity patterns. One of the most important advantages of this method is that goal determination is not dependant on the expertise and education of the stakeholders and facilitates their participation in goals determination process. This results in more idea exchange and creation, which in turn may reveal more opportunities. Value focused thinking makes a distinction between long-term and short-term goals and is capable to draw a long-term goals hierarchy. Short-term goals are determined with the aid of experts. Drawing a goals network enables us to document what is on the minds of the stakeholders and facilitate the focused and strategic thinking. Therefore, this method is recommended for determining the electronic government goals. With respect to the results mentioned above, a roadmap is required for determining the critical success factors in electronic government with foresight perspective.

Two important contexts hidden in electronic government term i.e. government and electronic may change with the development of the technology and time. For sure, recognizing the future of the electronic government and inclusion of it in the electronic government implementation roadmap may increase the effectiveness of the performance and cost reduction. On the other hand, considering the stakeholders' opinions and obtaining their satisfaction results in the success of the planning. Thus, following steps have been proposed for determining the critical success factors in the electronic government with foresight perspective:

**Step 1:** Study of the world's electronic government future: here two activities are conducted:

Firstly, foresight studies in other countries are reviewed to avoid reworks in this field and experiences close to country's situation and condition are chosen. Since the aim of this paper is to determine the critical success factors in electronic government with foresight perspective then and implementation of the foresight method is not the aim of this paper. Implementation of the foresight process requires more time and money. There are several models for the implementation of the foresight in electronic government context (Saghafi, F., Zarei, B and et. al., 2009).

Trends of the future world are reviewed and analyzed and their impact on the future of the electronic government will be studied. For this purpose, the mutual effects analysis methodology can be used (Saghafi, F., Aliahmadi, A. and Azadmia, M., 2009).

Using the above results, strategies of the future electronic government in a country and with the participation and consensus of all stakeholders are formulated.

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Vicinity coefficient</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delphi</td>
<td>0.5040</td>
<td>6</td>
</tr>
<tr>
<td>Brainstorming</td>
<td>0.5952</td>
<td>5</td>
</tr>
<tr>
<td>Grounded Theory</td>
<td>0.6314</td>
<td>4</td>
</tr>
<tr>
<td>Future Wheels</td>
<td>0.6322</td>
<td>3</td>
</tr>
<tr>
<td>VFT</td>
<td>0.7702</td>
<td>1</td>
</tr>
<tr>
<td>Correlation Tree</td>
<td>0.6359</td>
<td>2</td>
</tr>
</tbody>
</table>

**Step 2:** determining the short-term and long-term electronic government goals based on the future strategies of the electronic government: here, three activities are performed:

First, the short-term and long-term goals of the electronic government that are based on the resulted strategies from the previous phase are evaluated from different stakeholders’ points of view and are determined based on a consensus. For this purpose, value focused thinking method is suitable.

In the next step, critical success factors of the electronic government are determined based on the identified goals.

In the next step, status of the country is measured and controlled using these metrics. If the results are not satisfactory, programs and even strategies must be reviewed.
CONCLUSION

Governments all around the world have implemented the e-government for different purposes. One of the most important issues for the success of these projects is the tendency of them to utilize the e-government. This depends on the level of motivation and value of the new system compared to the existing system. Thus, determining the e-government implementation goals is of a great importance from stakeholders’ point of view. With respect to technology developments, these goals have to be futuristic. There are several methods for determining stakeholders’ goals. In this paper, by reviewing the references and asking experts’ opinion, Delphi, future wheel, brainstorming, and value focused thinking, grounded theory and relevance tree methods have been assessed using 10 appropriate measures such as ability of opinion gathering, ability of revealing the hidden goals, goals hierarchy. In order to capture experts’ opinion and determining each methods’ score and ultimately, ranking the foresight methods, it was necessary to ask experts opinion and based on the captures opinions, these foresight methods have been ranked. Due to imprecise and ambiguous scores, triangular fuzzy numbers have been used for the survey and final ranking of the technology foresight methods is done using fuzzy TOPSIS method. In this ranking, value focused thinking method ranks the first and relevance tree and future wheel are respectively the next methods. Therefore, value focused thinking method is the proper method for determining the goals and consequently, the critical success factors. Some of the results of this paper are:

Classifying the methods for determining the critical success factors by reviewing the papers of the recent 12 years.

Determining the proper criteria based on the literature review for determining the suitable methods for identifying the critical success factors.

Ranking the goal and critical success factors determination methods with futuristic perspective.

Proposing a roadmap for countries to determine the electronic government success factors from foresight point of view.

For the future researches, it is recommended to examine other research methods and use groups with greater number of experts. Additionally, it is possible to extend the foresight methods by combining and integrating several methods for the future works.

REFERENCES


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