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eGovernment Initiatives and Ex-Ante IT Investment Evaluation

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Abstract
Numerous approaches for the ex-ante rationalization of information systems and technology have been suggested and studied extensively. However, research has not yet questioned the applicability of these approaches as enabling tools and their subsequent applicability in public nonprofit organizations, where social reality in terms of assumptions, theories and purpose, on which these investments are based and developed, plays an important role. Aiming to address this gap, this paper presents a model for analyzing large-scale information systems and e-Government investments in public nonprofit organizations, describes how it was applied and discusses the outcome of its application in the context of one such investment in Greece. We justify why ex-ante evaluation of e-government initiatives may be regarded as futile and meaningless for stakeholders who are not directly involved with the investment, or not given the opportunity to express their concern with regard to its implementability and viability, but nevertheless are obliged to facilitate its successful adoption by the nonprofit organization.

Keywords: Information Systems evaluation, eGovernment

Introduction
Public non-profit organizations are heavily investing on IT investments. Electronic Government (eGov), defined as “…the use of information and communication technologies (ICTs) to improve the activities of public sector organizations” (Heeks, 2003: p.2), has become a priority for developing and developed countries and its successful adoption is a great challenge around the world (Watson and Mundy, 2001). The importance of IT/IS investments, combined with their time-, energy- and resource- consuming characteristics, leads organizations to adopt lengthy, expensive and complex analyses to determine their value (Gunasekaran et al., 2006). However, in the public nonprofits domain, financial measures are questionable with regard to their relevance and applicability as they do not embody intangible benefits, hidden costs and risks, ignore the human and organizational
dimensions, and isolate the project from its stakeholders\textsuperscript{1} and future users (Irani et al., 2005; Jones and Hughes, 2001). As a solution, public organizations seek methods, which incorporate context-specific metrics of ‘value’ and ‘risk’. For any such appraisal method, stakeholders’ views and their consensus play a vital role in its viability and sustainability (e.g., Avgerou, 1995). Nevertheless, there has been very little research on defining tools for carrying out ex-ante evaluation and verifying their practical applicability for strategic and large-scale public IT projects. In this paper we look firstly for a definition and establishment of an IS evaluation tool for strategic and large-scale IT projects and then we question its applicability in the public context. We designed and applied such a model for an eGov IS, aiming to rationally justify an IS investment for the Hellenic Ministry of Transport and Communications. The next two are devoted to the theoretical background, the description of the context and research approach and the application of the model. The last section presents a discussion and concludes the paper.

**Creating the Model**

Information Systems in nonprofit organizations involve complex social and political entities (Jones and Hughes, 2001). Being socio-technical systems, they must be in alignment with the prevailing social, political and cultural issues (Walsham, 1993). Consequently, an extensive rationalization of IT investments in nonprofits should emphasize their social, political and cultural impact.

In this vein, an interpretive stance towards IT/IS evaluation aims at grasping this particular nature by including content, context and process (Symons, 1991). We adopt an interpretive – participative approach to public IT investments’ evaluation where the views, concerns and consensus of stakeholders are central to the evaluation process (Avgerou, 1995). As such, evaluation can serve as “a form of communication”, in which the evaluator acts as an organizer and facilitator of the evaluation process (Kanellis et al., 1999; Stamoulis et al., 2002). Following the interpretive stance (e.g. Walsham, 1993), the proposed model relies on ‘subjective’ assessment of value and risk. In this perspective, the evaluator facilitates the evaluation discourse, and shapes reality, contributing to its view as socially constructed and subjective (ibid). In our case, the evaluator shapes the process by creating the model and consequently by assigning the score scales to the categories of the model’s factors.

According to our model (Figure 1) –which builds on Stewart and Mohamed (2002)– the verdict on the investment depends on the estimations of organizational stakeholders, regarding two axes, namely ‘Value’ and ‘Risk’. This is because organizations always try to choose the investment that will yield the best value in the lowest risk (Stewart and Mohamed, 2002). In this vein, ‘Value’ is defined as equal to the investment’s benefits minus its total cost (Renkema and Berghout, 1997). The investment’s benefits are then classified as strategic, tactical and operational, whereas the costs as direct and indirect, and they can be “Low”, “Medium” or “High” (Irani and Love, 2002). In appraising cost, the financial method used depends on the characteristics of the large-scale project (Farbey et al., 1993). The “Risk” of the investment is defined as “…the product of probability of the event and the associated severity (loss)” (Stewart and Mohamed, 2002).

Figure 1 illustrates the hierarchical structure of our model. At the last level (Level 5) the investment’s outcome is determined by different stakeholder perceptions (Level 4) of ‘Value’ and ‘Risk’ (Level 3). In Level 2 ‘Value’ and ‘Risk’ are further decomposed to types of benefits, cost, and risk categories. The first level (Level 1) sets the criteria for the categories of benefits and risks. ‘Risk’ is differentiated from ‘cost’, as it expresses the possibility of the cost of a failure and not pure cost (hidden or not), which has already been incorporated in the model.

\textsuperscript{1} Stakeholders are defined as any group or individual who can affect or is affected by the achievement of the organization’s objectives (Freeman, 1984)
Weights and Estimations

In order to assign weights to the criteria of the model, we rank them in order of importance on a scale of 0 to 1 and then do the assignment, so that the sum of all weights that belong to the same level of the model is ‘1’ (Stewart and Mohamed, 2002). Aiming to classify and rank stakeholders in terms of importance, we argue that (Agle et al., 1999; Mitchell et al., 1997; Page, 2002):

- ‘Power’ is the capability of a stakeholder to ‘impose’ his demands on the organization.
- ‘Legitimacy’ is the ability of the stakeholders’ demands to be regarded as proper, according to their organizational role.
- ‘Urgency’ is the importance or criticality the stakeholders themselves give to their demands and how fast they wish to be satisfied.

Following Page (2002), we assign the stakeholder weights on a scale of 1 (low important- only one attribute) to 3 (high important- three attributes). All criteria are assessed by the stakeholders according to their views of the investment. The score system uses an eight point scale for the benefits from ‘1’ (unimportant benefit) to ‘8’ (very important benefit). Regarding the cost, we use a three point scale, from ‘1’ to ‘3’ (high, medium, and low); for the risks, the eight point scale used (‘1’ – ‘2’ for high risk, to ‘7’ – ‘8’ for no risk) reflects both the probability that the risk occurs and the impact on the investment (no risk, low, moderate, high) (Stewart and Mohamed, 2002) (appendix 1). The use of these scoring levels is determined by the evaluator and his perception of the investment and its context. This is in accordance with the interpretive paradigm followed and his role as the facilitator of the evaluation process (Stamoulis et al., 2002).

After assigning weights to criteria and receive stakeholder scores, we calculate the scores by using the following equation, where $S_{\text{Value/Risk,Stakeholder}}$ is the score for the value/risk as given by each stakeholder, $w_{Ci}$ the weight of each of the $i$ criteria, $s_{Ci}$ the scores that each stakeholder gives for each of the $i$ criteria and $w_{\text{stakeholder}}$ is the weight assigned to each stakeholder.

$$S_{\text{Value/Risk,Stakeholder}} = \left( \sum_{i} w_{Ci} \cdot s_{Ci} \right) \cdot w_{\text{stakeholder}}$$

The final scores for ‘Value’ and the ‘Risk’ are calculated using the median function. Median function is used to neutralize exaggerated stakeholder views, which stem from their different knowledge, agendas, their direct or indirect involvement and influences from other stakeholders (Pan, 2005). Hence:

$$S_{\text{Value,final}} = \text{median}(S_{\text{Value,Stakeholder}}) \text{ and } S_{\text{Risk,final}} = \text{median}(S_{\text{Risk,Stakeholder}})$$
$S_{Value_{final}}$ and $S_{Risk_{final}}$ are characterized as ‘High’ or ‘Low’ and interpreted in the organizational context of the IS investment.

The Application of the Model

Context and Method

The proposed model was applied in the context of an IT implementation aiming to cover the needs of the transport departments of the 54 Greek prefectures which fall under the jurisdiction of the Hellenic Ministry of Transport and Communications (HMT&C). The specific project was funded by the 3rd European Community Support Framework (2000-2006), which aims at financing IS investments that European member countries can undertake with a view to bring eGov services to the public. Hence, the investment in question is strategic large-scale, multi-stakeholder, high-budget, which aims to help in the providing better services to citizens, through the promotion of eGov and integration with other public IT.

Responsible for the realization of this project is a nonprofit organization that was set up by the Greek Government for assisting public sector organizations in all stages of IT project design, implementation and follow-up. One of the authors is the Director for the specific project.

Action research was chosen as the method for the development and subsequent application of the model (Checkland, 1981), as both authors were members of a collaborative team that carried out all necessary reasoning, action formulation and subsequent action taking for its application. The core idea of action research is that the researcher does not remain just a passive observer outside the subject of investigation, but becomes an active participant influencing the relevant human group and, in turn being influenced by it. By being actively involved in the problem definition and solution generation and implementation, the researchers became participants in the action itself, and the process of change became the subject of the research (Checkland, 1981). Additionally, Baskerville & Myers (2004) were followed in their suggestion of four essential premises for the conduct of action research. Data sources included interviews with stakeholders (appendix 2), which were recorded and later analyzed. In order to validate the results, we made an interdisciplinary triangulation (Janesick, 2000), based on other literature (Ballas and Tsoukas, 2004) and empirical research studies of the same tradition (Farbey et al., 1993) for developing and testing the ideas and findings of this research. However, due to the nature of Action Research and its acceptance that each social setting involves a unique set of interacting human subjects, general statements cannot be made on the basis of the number of observations; generalities must be tempered with an interpretation of the extent of similar settings to which the theory can be expected to apply (Baskerville, 1999) and thus not to other contexts.

Implementing the Model

We applied the model by interviewing various stakeholders across Prefectures and HMT&C, clarifying the goals and benefits of the future system. We focused only on internal stakeholders, but we incorporated the ultimate users of the investment, that is the employees of the Prefectures and HMT&C (appendix 2). These factors were classified by using the model and verified by the team who had significant experience acquired over the last four years through the engagement in large IS projects with Information Society S.A. The final version of the model with the corresponding weights (Figures 2(a), 2(b), 2(c) and 2(d)) is a combined result of experience, collaborative team reasoning, context characteristics, documentation and study of relevant literature (e.g., Avgerou, 2000; Farbey et al. 1993).

2 Information Society S.A.: http://www.ktpae.gr
The allocation of the weights reflects the government’s general perception that every IS benefit is extremely important. The costs are overlooked or ignored, as IS was thought as the pill for alleviating the bureaucracy pains. High-level stakeholders also did not pay attention to the costs, as the project was financed by the 3rd European Community Support Framework. More than enough EU funds – close to 1.4 billion Euros for the specific programme – were available; the systems were designed without the need for ‘hard’ justification. However, the budget of is still finite and in any case not unlimited.

In assigning weights to each of the ‘benefit’ categories (strategic - $w_{SB}$, tactical - $w_{TB}$, operational - $w_{OB}$) we saw that the strategic ones (Figure 2(b)) were the most important, as they assured better citizen services. Tactical benefits (Figure 2(c)) played a supporting role, whereas operational benefits (Figure 2(d)) were deemed of the lowest importance, for the users showed no interest: their tenure resulted in a passive (at best) attitude towards the realization of IS. Thus, $w_{SB} > w_{TB} > w_{OB}$.

When assigning weights to the risks (Figure 2(a)), “Organizational Risk” was of low importance, as it is the sole responsibility of the system’s implementer – in this case a private IT company. “Definitional Uncertainty Risk” was high, as during the conceptualization and design all decisions were taken exclusively by HMT&C officials and high-level managers who were context detached, rendering absurd the project’s future. “Technical Uncertainty Risk” and “Technology Infrastructure Risk” were of equal/high importance, reflecting concerns of the ability to deliver and use and the demand for integration with a large number of other heterogeneous public IS. Thus, $w_{TUR} = w_{TIR} > w_{DUR} > w_{OR}$.

Figure 2 (b). The strategic benefits of the investment
Weights were assigned to the stakeholders, depending on power, legitimacy and urgency. Weights were assigned to the stakeholders, depending on the characteristics presented in the previous section, i.e. power, legitimacy and urgency. Low-level users possessed power, expressed by opposing to the system that perceptibly does not meet their expectations. Their demands may have been regarded as legitimate, but when compared to those of high-level public servants and political leaders were not justifiable to a large extent; for reasons of political exposure the latter were anxious in showing ‘achievements’ to their voters. Additionally, due to the status of permanency in Greek public sector, low-level public servants themselves did not consider their own demands as urgent even if they probably believed that the investment could simplify and improve their working practices. On the other hand, high-level stakeholders possessed power, urgency and legitimacy, as they took advantage of their position in order to simply impose their decisions on subordinates. They saw the investment as a means for political promotion and advancement, trying at the same time to ensure the public of their capability to think of and apply new technologies for serving the public. In other words, they had legitimate demands, being under constant pressure by the political echelon to prepare the fieldwork so that the latter can support their “vote-hunting” activities.

The last step was to conduct interviews with stakeholders to obtain estimations for the benefits and risks. After the interviews were held, data were gathered, processed and the result of the model was calculated (appendix 2). The final score of ‘Value’ ($S_{Value,final}$) was significantly higher than that of ‘Risk’ ($S_{Risk,final}$): $S_{Value,final} > S_{Risk,final}$.
Discussion

The result that the score of ‘Value’ was greater than that of ‘Risk’ was interpreted in the context where the investment is going to be adopted, the Greek public sector, with its highly bureaucratic, legalistic and dysfunctional characteristics (Avgerou, 2000; Ballas and Tsoukas, 2004). Interpreting the stakeholders’ scores regarding the investment’s benefits, we concluded that they have been very high. This stems from the political leaders’ perception (honest or fabricated and as such communicated) that IS is or can be the remedy to cure all public sector administrative dysfunctionalities. They regarded the investment of strategic importance and gave their ‘vote of confidence’ without further discussion, as they did not consider costs, risks and incompatibilities with existing technologies as important. The low- and medium-level public servants believed that the new system was promising, but did not seem to care. Nevertheless, their scores project the same view with the political leaders and they lead us to believe that their answers do not represent their true beliefs (ibid). Consequently, public sector domain is staffed with wrong people in the wrong position, who are unwilling to participate or adopt innovative changes.

Apart from the stakeholders’ perceptions, the time period in which the Information System was planned played also a role. This period—short after the national elections in Greece— is characterized by the new government’s desire to show its capability in bringing eGov to prominence using the specific investment. Government saw no risks compared to the investments’ benefits, but loosing hard-won EU funds that led to a number of stakeholders deliberately omitting to scrutinize the project’s risks.

Hence, the application of the model shows that ex-ante evaluation of public IS initiatives cannot influence any decision regarding whether or not to proceed with its implementation. The reason for this is that it cannot outperform power-politics (Berghout et al., 2005) and culture (Schein, 1992), which have been identified as fundamental in shaping the evaluation activity in general (Irani et al., 2005). More specifically, power and politics, endogenous in every evaluation procedure (Smithson and Hirschheim, 1998), are covert, manifested among echelons, departments and agencies. Politics gives more authorities to the ‘strongest’ public servants and brings them into key-roles (ibid), which is typical n the Greek public sector. Consequently, stakeholder management during rationalization process is hard to be accomplished. The proposed change will be turned down from those who loose power, and accepted immediately by others who gain it. (Del-Val and Martinez-Fuentes, 2003). Additionally, Greek public sector culture can also justify the stakeholders’ exaggerated scorings as it is dominated by bureaucratic clientelism and political populism (Ballas and Tsoukas 2004). This is evident in our study, with the form of supportive or opposite estimations as an exchange of favours inherent in the personalistic relationships derived from kinship, locality and/or party political allegiance.

Taking under consideration the aforementioned cultural and contextual characteristics of the Greek public sector, we conclude that it is very difficult for an interpretive approach to be practically feasible in the case of public IS investments in nonprofits. The application of such an approach rests in change of the mindsets and the worldview of the politicians, high level managers and public servants; however their stance stems from the cultural characteristics of the specific context, which is difficult to change.

A solution could be to follow a critical stance towards IS evaluation in public nonprofits (Klecun and Cornford, 2005), which emphasizes the social, political and historical conditions in which the IS investment is designed and implemented, including power relations and conflicting interests. However, evaluation –especially in the Greek public administration – will always be problematic and political, no matter if the critical stance promotes commitment with the evaluation subject and communication among stakeholders (ibid). Real stakeholder views may not be fully accommodated and communicated towards the investment; they will be subjected to power/political games and influenced by the underlying historically-constituted stagnant culture.

Appendix 1

Table 1: Estimations for the benefits of the investment (scale: 1-8)

<table>
<thead>
<tr>
<th>Benefit (importance)</th>
<th>Definition</th>
<th>Score (1-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No importance</td>
<td>The benefit has no importance for the stakeholder</td>
<td>1-2</td>
</tr>
<tr>
<td>Low importance</td>
<td>The benefit has low importance for the stakeholder</td>
<td>3-4</td>
</tr>
<tr>
<td>Moderate importance</td>
<td>The benefit has medium importance for the stakeholder</td>
<td>5-6</td>
</tr>
<tr>
<td>High importance</td>
<td>The benefit has high importance for the stakeholder</td>
<td>7-8</td>
</tr>
</tbody>
</table>
Table 2: Estimations for the cost of the investment (scale: 1-3)

<table>
<thead>
<tr>
<th>Cost</th>
<th>Definition</th>
<th>Score (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low cost</td>
<td>Depending on the organization and IT budget</td>
<td>3</td>
</tr>
<tr>
<td>Medium cost</td>
<td>Depending on the organization and IT budget</td>
<td>2</td>
</tr>
<tr>
<td>High cost</td>
<td>Depending on the organization and IT budget</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3: Estimations for the risks of the investment (scale: 1-8)

<table>
<thead>
<tr>
<th>Risk</th>
<th>Definition</th>
<th>Score (1-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No risk</td>
<td>Pr (lowest possibility of failure, lowest severity of failure)</td>
<td>7-8</td>
</tr>
<tr>
<td>Low risk</td>
<td>Pr (low possibility of failure, low severity of failure)</td>
<td>5-6</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>Pr (moderate possibility of failure, moderate severity of failure)</td>
<td>3-4</td>
</tr>
<tr>
<td>High risk</td>
<td>Pr (high possibility of failure, high severity of failure)</td>
<td>1-2</td>
</tr>
</tbody>
</table>

Appendix 2

Table 4: Stakeholder estimations for ‘Value’ and ‘Risk’

<table>
<thead>
<tr>
<th>Stakeholder type</th>
<th>Value (score)</th>
<th>Risk (score)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users (Prefectures)</td>
<td>12.56</td>
<td>–</td>
</tr>
<tr>
<td>Directors (Prefectures)</td>
<td>11.69</td>
<td>–</td>
</tr>
<tr>
<td>Heads of Prefectures</td>
<td>35.595</td>
<td>–</td>
</tr>
<tr>
<td>Prefect</td>
<td>40.215</td>
<td>–</td>
</tr>
<tr>
<td>Users (HMT&amp;C)</td>
<td>14.28</td>
<td>–</td>
</tr>
<tr>
<td>Directors (HMT&amp;C)</td>
<td>14.035</td>
<td>–</td>
</tr>
<tr>
<td>Head of HMT&amp;C</td>
<td>39.585</td>
<td>–</td>
</tr>
<tr>
<td>General Secretary of HMT&amp;C</td>
<td>42.21</td>
<td>–</td>
</tr>
<tr>
<td>Project Manager (Information Society S.A.)</td>
<td>44.265</td>
<td>28.5</td>
</tr>
<tr>
<td>Technical Project Manager (Information Society S.A.)</td>
<td>–</td>
<td>28.5</td>
</tr>
</tbody>
</table>

Using the median function: 
\[ S_{Value, final} = 35.595 \quad \text{and} \quad S_{Risk, final} = 28.5 \]
which means that:
\[ S_{Value, final} > S_{Risk, final} \]

References


