

E-GOVERNMENT EVALUATION: EFFICIENCY, BASIC
EFFICIENCY, CONTACT WITH THE PUBLIC, AND
EFFECTIVENESS

by

R. Purian
N. Ahituv
P. Ein-Dor

Working Paper No 2/2011

March 2011

Research No. 00600100

This paper was partially financed by the Henry Crown Institute of Business Research in Israel.

The Institute's working papers are intended for preliminary circulation of tentative research results. Comments are welcome and should be addressed directly to the authors.

The opinions and conclusions of the authors of this study do not necessarily state or reflect those of The Faculty of Management, Tel Aviv University, or the Henry Crown Institute of Business Research in Israel.

E-GOVERNMENT EVALUATION: EFFICIENCY, BASIC EFFICIENCY, CONTACT WITH THE PUBLIC, AND EFFECTIVENESS

Ronit Purian, The Institute for Internet Studies, Tel Aviv University, Tel Aviv, Israel
purianro@post.tau.ac.il

Niv Ahituv, The Faculty of Management, Tel Aviv University, Tel Aviv, Israel
ahituv@post.tau.ac.il

Phillip Ein-Dor, Tel-Aviv–Yaffo Academic College, Tel Aviv, Israel
philipei@mta.ac.il

Abstract

This paper includes two parts: evaluating e-government and identifying its success factors. The evaluation and measurement of e-government services and contact channels are at the centre of the first part. A systematic study of local e-government has created an in-depth index of the local e-government in Israel, and its four sub-indices, that were extracted by factor analysis: efficiency, basic efficiency, contact with the public, and effectiveness. Interestingly enough, socioeconomic, financial, or demographic factors did not fully explain the index results and were consequently excluded as alternative explanatory factors. Questionnaires and interviews with managers and other officials provided support to the viability of a new model, termed technophilia, which is now extended to the organizational level. The technophilia model that was developed and empirically examined in a previous study concerning the process of technology adoption at the level of the individual is revealed, in this study, as a valid explanation for the e-government index results. By developing the index, observing municipal websites, and carrying out a detailed examination, we have opened the "black box" of organizational processes and portrayed the technophile managers that intuitively plan and implement citizen-oriented information systems and Internet websites and lead to technical and social change. Theoretical implications are discussed in the context of socio-technical approaches (actor-network theory).

Keywords: e-government, IS evaluation, technology adoption, technophilia.

1 INTRODUCTION

Facing large amounts of data and the complexity of the procedures involved, the development and evaluation of e-government turned to be one of the most intriguing challenges for researchers and policy-makers alike. In this paper we evaluate 88 local authorities' Internet websites, analyse local socioeconomic data, and suggest that citizen-oriented e-government depends on their technophile managers. Extended from the individual level, the new model of technophilia is established in this study as a main contributor for technology adoption and openness in the organizational level (Purian, 2010).

One of the main managerial issues in which researchers and policy-makers often engage relates to the measurement and evaluation of e-government systems and projects. Potential metrics for organizational performance and capabilities can be raised across different fields, including social, political, managerial, and technological themes, emphasizing the depth of e-government in research and in practice (Gronlund and Horan, 2004; Irani and Elliman, 2007; Kunstelj and Vintar, 2004; Purian, Ahituv and Ein-Dor, 2010a). This study has developed and applied an index for systematic and concise mapping of the services and information provided by local authorities in their official Internet websites employing an unobtrusive methodology of website survey. The local e-government index consists of four sub-indices that were extracted by factor analysis: efficiency, basic efficiency, contact

with the public, and effectiveness. Interestingly enough, socioeconomic, financial, or demographic factors did not fully explain the index results and were consequently excluded as alternative explanatory factors.

Notwithstanding, questionnaires and interviews with managers and other officials indeed provided support to the viability of the new technophilia theory, which is now extended to the organizational level. The technophilia model that was developed and empirically examined in a previous study concerning the process of technology adoption at the level of the individual (Purian, Ahituv and Ein-Dor, 2010b) is revealed, in this study, as a valid explanation for the e-government index results. By developing the index, observing municipal websites, and carrying out a detailed, in-depth examination, we have opened the "black box" of organizational processes and portrayed the technophile manager in the context of e-government.

2 CONCEPTUAL CONTEXT

Its social and public implications make e-government an ideal context for studying information technologies (IT) as a tool for enhancing the open flow of information and decision-making. This is to say that we do not view e-government research as a private case of IT research but as an opportunity to study IT in an environment that amplifies the many facets of IT management. In addition to the professional challenge of operating large and complex systems, strategic and ethical (Mingers and Walsham, 2010) considerations that usually accompany the processes of planning and implementing Information Systems (IS) accedes in e-government. Investigating socio-technical concepts in the framework of local e-government, where seemingly minor and technical decisions may result in wider public consequences, make the core issues of IT research even more pertinent and worthy.

The evolution of e-government has extended from static Internet web-pages that are used to relay information in one direction to fully interactive services. Today transformational government (or t-government) phase is considered the highest level of maturity for e-government programs, emphasizing personalized service provision that requires higher organizational integration. However, this phase raises privacy concerns that question its utility (Mingers and Walsham, 2010). The evolution of e-government has further progressed in recent years with the emergence of public participation in democratic processes (Paivarinta and Saebo, 2006; 2008; Saebo et al., 2008). Governmental presence in social networks, the development of open discussions, and the establishment of joint decision-making were only part of the evolution of Web 2.0 practice of sharing, collaboration and open innovation (Noveck, 2009).

Multiple definitions for e-government expose the variety of prevalent attitudes towards this concept: from an operational point of view to the focus on citizen empowerment and e-participation (Layne and Lee, 2001; Lee, Tan and Trimi, 2005). The variety raises the question: what variables would produce a reliable and valid e-government evaluation scale and index?

The evaluation of e-government depends on its objectives, whether measuring return on investment, user satisfaction, variety and quality of services, or democratic ideals (Purian, Ahituv and Ein-Dor, 2010a). Dozens of indices were developed and applied by researchers, public institutions, and consulting firms, each emphasizes a unique area and set of aspects (i.e. business environment, technological maturity of the government, social inclusion or readiness and other areas), in accordance with the goals of the report and its definition for successful e-government (Purian, Ahituv and Ein-Dor, 2010a). A review of main concepts and evaluation methods is proposed in Appendix A, sketching the evolution of e-government studies (evaluation methods that apply user satisfaction questionnaires, content analysis software, or heuristic evaluation by novice/experts deserve a separate examination and are not included in this paper).

Reviewing the many indices predominantly reveals that social and organisational aspects of e-government initiatives are considered more important for their rating. Earlier models of e-government evolution, usually with four basic stages, have evolved into the wider context of institutional frameworks, covering policy and implementation levels. Moving from the basic stages of online information towards new areas of IT-driven policy, democracy and business making, the complexity

grows (Irani, Al-Sebie and Elliman, 2006). For example, the well-accepted i2010 Action Plan by Capgemini (2009; p. 13) exhibits a combination of orientations, towards citizens as well as the organizational performance: no citizen left behind; making efficiency and effectiveness a reality; implementing high-impact key services; putting key enablers in place; and strengthening participation and democratic decision making.

This review of related literature shows that the strategic act of website evaluations is directed by an attempt to define a roadmap for the development of e-government. However, we did not wish to prescribe the right or good e-government mixture of services and attitudes. The review made us recognize the need in a web survey that will focus on the simple functions that establish an effective Internet website. Viewing the provision of municipal services online as a critical component of e-government, our analysis aimed to examine the amount of online services and contact channels that allow citizens to interact with the municipality. By focusing on information provision and basic services such as forms and payments, counting their types and sub-types in each municipal website (but not examining whether local authorities accept certain payments and taxes, to minimize interventions), we wished to create a precise index that will tell us something meaningful about the evaluated website and the organization behind it.

One of Capgemini's Action Plan objectives (2009: 172, item 16.4) required, among others, the availability of 20 online services (research question was, how many of 20 services were available through the main portals; demonstrating one stop shop approach). We do examine types of contact channels which imply interactivity, access to databases and a set of additional types of information, but we do not set a list of specific services. In addition, we examine it in a quantitative manner with few, if any judgemental or subjective evaluations.

Moreover, classification might be in itself an active process, as an action of placing into classes is performed with intent (Mosse and Whitley, 2009), while in practice each website is supposed to hold its own strategies. For this reason we used factor analysis to delineate the typology of websites.

By refining its potential scope, the resulting index is concrete and accurate, specific and selective. For example, it may include only two of the evaluation categories proposed by Scott (2005), transparency and transactions. However, the focused and detailed measurements allow better understanding of the results. As opposed to previous literature, that suggested "a direct relationship between Web site quality and population size. [...] larger cities are expected to exhibit the best quality Web sites" (Scott, 2005: 156), the current study provides selective characteristics, thanks to the sub-indices. According to this study, larger cities that have more resources are not necessarily generally better. On the contrary, their superiority in size enables them to provide basic services (basic efficiency sub-index), yet other content categories, such as contact with the public, may not require high expenses and rather depend on managerial approaches. This way, the sub-indices provide higher accuracy in analyzing and understanding the choices made by managers while planning and implementing various applications in their local e-government.

The index in this study measures online services such as forms and payments, contact channels, and types of information in Internet websites of local authorities, allowing future comparisons and replications within local authorities, between local and national levels, and between countries. We systematically counted these existing features as we view information and service provision a critical component of e-government. However, we did not impose a list of "universal" criteria and requirements, which carry "a danger of implying an 'ideal form'" (Mosse and Whitley, 2009: 155). Benchmarking or best practices can not match all. Although encouraging for action and emulation, they avoid local constraints, needs and desires. Each organization should have its own goals and accordingly create its own Internet strategy. Prioritizing local needs and investments should remain an organizational decision. From a distance, to prevent judgmental evaluation, we focused on concrete measures, and achieved an index that well reflects the level and type of e-government accomplishments in each local authority.

The paper is based on a multi method research involving three stages: 1) evaluative study – creating e-government index (dependent variable); 2) quantitative study – excluding financial and other tangible resources as an explanation for index results; 3) qualitative study – providing deeper analysis of

organizational processes and identifying the technophile manager as those actors or agents who lead to change.

3 EVALUATIVE STUDY (1): E-GOVERNMENT INDEX

What variables should be measured in order to produce a reliable and valid e-government index for local authorities?

The following list of variables and weights (Table 1) is based on decisions made by a team of experts and policy-makers serving in the e-government department of the Accountant General at the Israeli Ministry of Finance. Since 2005, the department has been annually publishing a national e-government report that includes a similar list of variables. The website survey items were examined by a focus group consisted of three researchers and three senior IT managers with practical knowledge in e-government. The revised survey was presented to other four colleagues. Table 1 presents the measured survey items, the scales and the weights.

In comparing each result to the leader in its category we used the formula: (n/n_{max}) , where "n" is number of online forms (or payments, etc.) in the local authority's Internet website; and "n_{max}" is the highest number of online forms (or payments, etc.) in any local authority. In other words, "n_{max}" is a specific "market leader" or "local authorities' leader" for each variable, for example, the local authority with highest number of online forms.

Measurements		Scales	Weight
Online services	Citizen's record.	2-point scale (yes=1 or none=0)	10%
	Downloadable forms (for print).	Number of forms (highest score after comparison formula is 75)	5%
	Online forms (filling and sending via the website).	Number of forms (highest score after comparison formula is 8)	15%
	Online payments.	Number of payments (highest score after comparison formula is 10)	20%
	Online processes.	Number of processes (highest score after comparison formula is 3)	15%
Information and databases	Online databases.	Number of online databases (highest score after comparison formula is 6)	6.5%
	Publication of public tenders.	Number of published public tenders (highest score after comparison formula is 30)	5%
	Information on officials (number of officials that are listed on the Internet website).	26-point scale (0 to 25) (highest score is computed to 1)	2.5%
	Information on small and medium business enterprise (SMEs) licensing.	2-point scale (yes=1 or none=0)	3.5%
Communication with the public	E-mail: number of e-mail addresses in relation to number of officials.	21-point scale (0 to 20) (highest score computed to 1)	2%
	Application form (to fill and send online).	2-point scale (yes=20 or none=0) (highest score computed to 1)	2%
	Newsletter (subscription for e-mail news service).	2-point scale (yes=10 or none=0) (highest score computed to 1)	1%
	Forum for open discussions (content and quality are taken into consideration).	6-point scale (0 to 5) (highest is computed to 1)	0.5%
	RSS.	2-point scale (yes=10 or none=0) (highest score computed to 1)	1%
Accessibility and usability	Compatibility with Microsoft's Internet Explorer browser.	31-point scale (0 to 30) (highest score computed to 1)	7%
	Compatibility with Mozilla's Firefox browser.	16-point scale (0 to 15) (highest score computed to 1)	3%
	Number of languages.	13-point scale (only Hebrew=12; additional 3.75 points for English; additional 6.25 for Arabic; additional 2.5 points for any other language; up to 25) (highest score computed to 1)	1%

Table 1. Items measured, scales and weights

3.1 Local authorities

Israel is a developed economy, a member of the OECD, with pioneering high-tech industries and a stock exchange that is listed as a developed market by international financial indices. This is to say that the findings are expected to be generalized to developed countries.

Out of 254 local authorities in Israel (CBS, 2006), 54 regional councils and two local-industrial councils were excluded due to structural differences. The remaining 198 local authorities include 71 municipalities and 127 local councils. On June 1, 2007 a list of 88 local authorities was compiled for those authorities that had a website. The list was based on lists of local authorities published by the Ministry of Interior and the Israeli Central Bureau of Statistics (CBS), using Google search engine, and it was verified against the LADPC's client list.

All 88 websites were sampled and measured by website survey, an unobtrusive, direct and objective methodology for measuring the features that were listed in Table 1. This website survey was performed during June-August 2007 by a researcher who was not involved in the interviews and who thus could not influence or be influenced by the findings. The resulting local e-government index is the dependent variable in this study, representing the technological artefacts or the outputs of the unit of analysis.

3.2 Findings

Having computed the results of 88 local authorities, the main values found: Maximum=0.75; Minimum=0.04; Average=0.27; Median=0.24. The grades for the leading authorities are presented herein, followed by their respective socioeconomic level and additional data for analysis. The CBS computes socioeconomic levels according to the level of income of local residents and publishes this information in the format of deciles (tenths). Statistical data was retrieved from the CBS data files and adopted as is for all 88 local authorities that have a website.

The leading authorities in the local e-government index are: Rishon Lezion with a socioeconomic level of 7; Haifa with a socioeconomic level of level 7; and Ariel with a socioeconomic level of 6. Israel business and culture center Tel Aviv, with a socioeconomic level of 8, is ranked 17th in the index while the capital of Israel, Jerusalem, displays a socioeconomic level of 4 and is ranked 25th. Lagging behind is Savyon, which although has a socioeconomic level of 10 is ranked 37th.

The Internet websites were statistically divided into four categories that express efficiency, basic efficiency, contact with the public, and effectiveness. The variables that comprise each factor were statistically grouped by Factor Analysis, applying Principal Component Analysis as the extraction method, Varimax with Kaiser Normalization as the rotation method, and seven iterations for rotation converge (Hair et al., 2005). Table 2 presents the four categories.

<p>1. Efficiency Citizen's record. Compatibility with Firefox. Number of online processes (registration to school, building permits). Number of online databases (engineering). Number of online forms. Newsletter.</p>	<p>3. Contact with the public Compatibility with Explorer. E-mail addresses. Officials' names and contact information. Number of tenders. Number of online forums.</p>
<p>2. Basic efficiency Number of forms to print. Number of online payments. Number of languages.</p>	<p>4. Effectiveness Licensing SME. Application form. RSS.</p>

Table 2. Four types of Internet websites (factor analysis)

The leading authority in each of the four categories was nominated thus according to its computed scores:

- Efficiency: Rishon Lezion is in the lead, followed by Karmiel and Ariel which are small municipalities headed by knowledgeable mayors who are aware of technological innovations. These sites offer more online processes, greater accessibility to online databases, newsletters, online forms, and other services.
- Basic efficiency: Tel Aviv is in the lead with respect to the number of downloadable forms, online payments, and languages. This category, which comprises the smallest number of authorities, includes the three biggest municipalities in Israel: Tel Aviv, Jerusalem and Haifa, probably due to the higher return of investment (ROI).
- Contact with the public: Kokhav Yair is the leader in this category, which comprises the highest number of authorities spanning a wide range of socioeconomic levels: from Savyon (10) through Pardes Hanna-Karkur to Ramla (4). Communication channels and contact information of specific officials are inexpensive and relatively easy to provide, yet greatly affect the availability of authorities to the citizens.
- Effectiveness: Givatayim is the leader in this category, where managerial abilities are manifested. Two prominent municipalities in this category, Ramat Hasharon and Ashkelon, vastly differ in their socioeconomic level yet, in both, competent managers strive for effective management of their authority. In the Internet websites of these authorities, application forms, information on SME licensing, and additional information is more prevalent than in other sampled websites.

Table B1 in Appendix B presents the results of the local e-government index and its four sub-indices as well as two background indicators, namely, socioeconomic level and the number of citizens in each local authority. In addition, evaluations emerging from interviews that were carried out as an ex-post study (described below) are also presented in this table. The local authorities are identified by their index ranking rather than by name to maintain subjects' confidentiality.

3.3 Summary of evaluative study

After creating the dependent variable, which is the local e-government index and its four sub-indices, local authorities were analyzed according to their financial and socioeconomic status. For example, it would be reasonable to assume that economies of scale may explain ICT adoption in large municipalities that have greater resources and demand. Indeed, much of the research concerning IT innovation tends to "explain innovation using economic-rationalistic models" (Fichman, 2004: 315). Fichman (2004: 592) cites Abrahamson (1991) in analyzing the efficient-choice perspective and concludes that, "given existing resource constraints, agents rationally choose the innovation that will allow them to most efficiently produce the outputs that are useful for obtaining their goals".

However, some local authorities, which are not particularly large or rich, have built informative and user-friendly website applications. What are the reasons for this variance among local authorities? The existing information and applications in the local Internet websites may tell us much about the local authority's managers who are responsible for making a difference.

The quantitative study is followed by a qualitative study aimed at identifying the driving forces behind the local IS and Internet websites.

4 QUANTITATIVE STUDY (2): TANGIBLE RESOURCES

Considering the local e-government index as an independent variable in this research, the influence of socioeconomic, financial, and demographic variables should be carefully measured and analyzed. This is done in order to identify the contribution of these variables to the results, assess their influence on the local e-government index, and investigate whether they provide a sufficient explanation for the variance emerging in the results.

4.1 Socioeconomic level

The authority's socioeconomic level reflects its revenue within its regular budget. This measure is stable and consistent (Razin, 2002), indicating the wealth of citizens as it is based on the average revenue per capita. However, it does not necessarily predict wealth for small authorities.

No correlations were found between socioeconomic level and the local e-government index, whether the general index or each of its sub-indices. Authorities from almost all socioeconomic levels were found in each of the four categories, and almost any socioeconomic level scored a wide range of grades, as presented in Figure 1. Thus it may be concluded that the local authority's revenues or socioeconomic level do not necessarily contribute to its grades in the e-government index. Despite high similarity in socioeconomic levels, some of the local authorities scored high on the e-government index while others are lagging behind. For example:

- Among the authorities that are characterized by a low socioeconomic level, Akko stands out with the score of 0.4, as opposed to Zarzir, Netivot, Dalyat ElKarmenl-Usfia and Kiryat Arba, rated at the bottom of the indices, scoring less than 0.13.
- Among the middle-ranged authorities, Ariel stands out, with the score of 0.54 while authorities such as Arad, Givat Zeev and Elyackin scored less than 0.18 despite similarity in size and in socioeconomic level.
- Among the authorities that are characterized by a relatively high socioeconomic level, Herzliya and Kfar Saba stand out, with the scores 0.46 and 0.43 (respectively) as opposed to authorities such as Raanana and Modiin-Maccabim-Reuth that were rated far below, with the grades 0.32 and 0.21 (respectively) on the e-government index despite similarity in size and socioeconomic level.

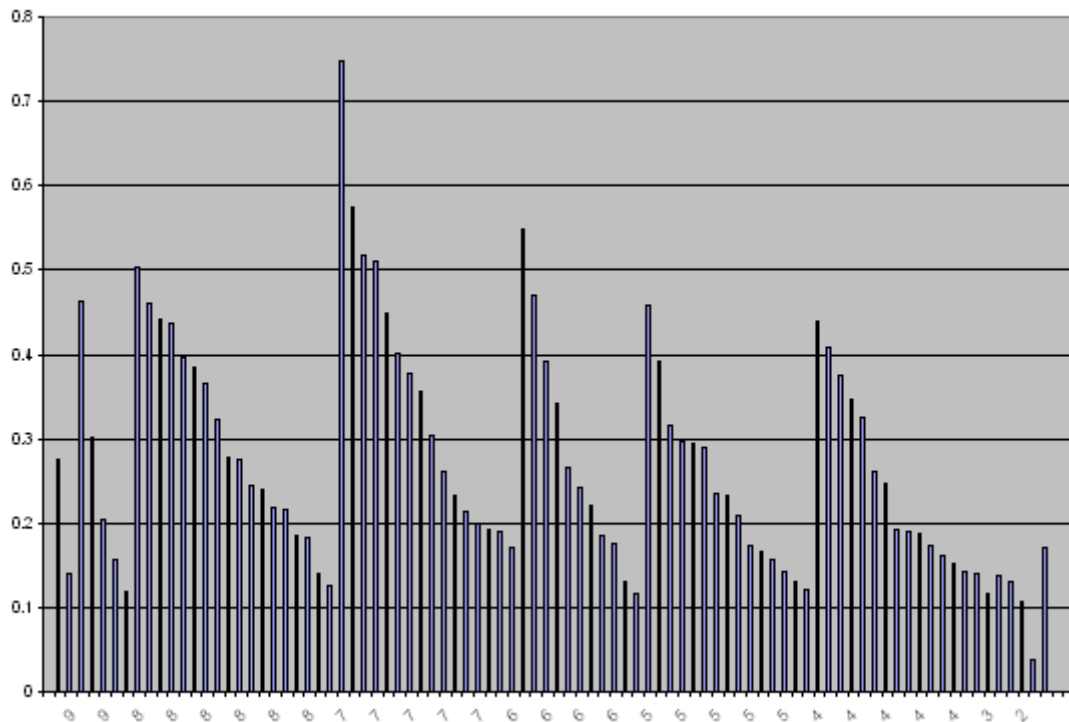


Figure 1. E-government index and socioeconomic level ($r^2=0.0689$). Local authorities are distributed according to their e-government score, per each socioeconomic (earnings) decile.

4.2 Expenses (and deficit) per capita

High expense per capita is typical for small authorities, relying on governmental grants that are targeted at balancing budgets (Razin, 2002; Ben-Bassat and Dahan, 2008). Following the balancing grants formula, small local authorities receive larger grants. Local economic studies indicate that wealthy, poor or middle-ranged authorities get into heavy deficit or surplus regardless of their income level and that a balanced budget is weakly correlated with socioeconomic level (Razin, 2002; Ben-Bassat and Dahan, 2008). These findings accentuate the importance of high-quality local management. Similarly, no correlation was found in the current study between the local e-government index and expense per capita. There is no significant difference in per capita expenses among large, medium-sized, and small authorities, probably because of the high expense level typical of small authorities.

4.3 Demographic composition

Population characteristics, such as rates of senior to younger populations, may have direct or indirect relationships with the local e-government index, probably moderated by size of population. Indeed, such a correlation was found between the local e-government index and the rate of senior population, presented in Figure 2. The effect is probably moderated by size since the rate of senior population is higher in larger cities.

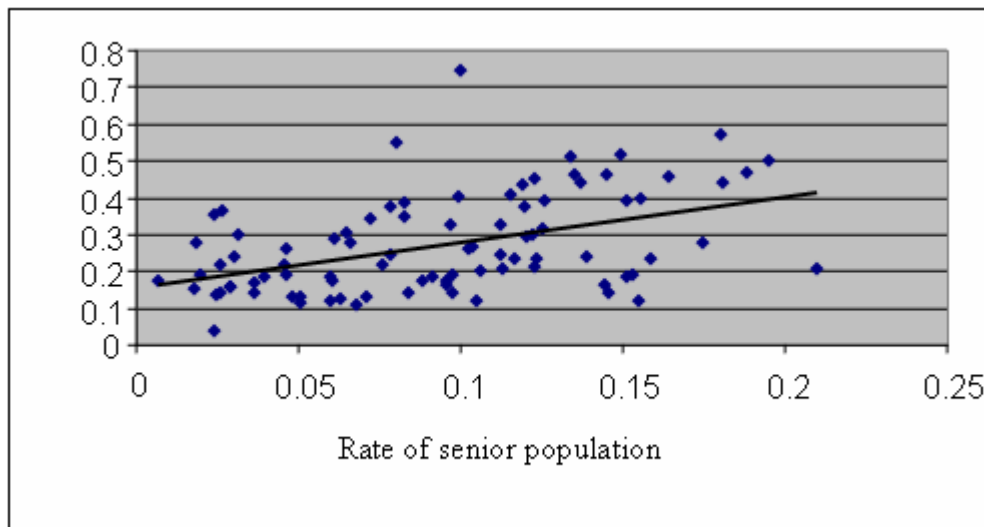


Figure 2. E-government index and the rate of senior population ($r^2=0.2042$)

Similarly, a negative correlation was found between the local e-government index and the rate of youngsters, as presented in Figure 3. Referring to the moderating size effect, a possible explanation is that younger families live in larger cities.

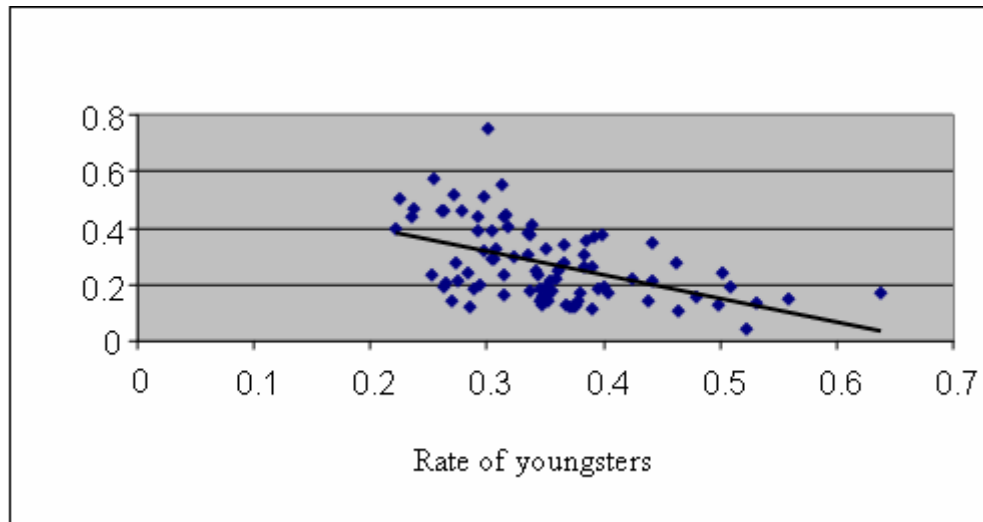


Figure 3. *E-government index and the rate of youngsters ($r^2=0.2434$). No correlations were found between the local e-government index and the averaged salary in the local authority ($r^2 = 0.0374$); or the rate of adults (age 20-65) in the local authority ($r^2 = 0.0165$).*

4.4 Size (number of inhabitants)

The fixed cost of technological infrastructure and salaries might pose a considerable burden for small authorities with limited budgets. On the other hand, in larger authorities economies of scale can more easily sustain the expense which represents a smaller segment from a larger budget. In addition, with more users, the return on investment (ROI) is expected to increase. And indeed, the local e-government index is correlated with the number of inhabitants, as presented in Figure 4. The significant size difference between local authorities in Israel strongly affects the shape of e-government, in a certain manner, as the three largest cities in Israel, Jerusalem, Tel-Aviv and Haifa, are highest in the category of basic efficiency. Interesting enough, population size does not ensure more communication channels or effective management.

It should be mentioned that no correlation was found between the authorities' size and their chances of plunging into financial crisis, suggesting again the importance of high-quality local management. Indeed, the quality of management in local authorities in Israel was recognized as one of three main causes for their financial crises, together with the downsizing of the governmental "balancing" grant and political fragmentation (Ben-Bassat and Dahan, 2008). Moreover, there is no significant difference between wealthy, poor, or middle-ranged authorities in their expense per capita; income level; or socioeconomic level (Ben-Bassat & Dahan, 2008).

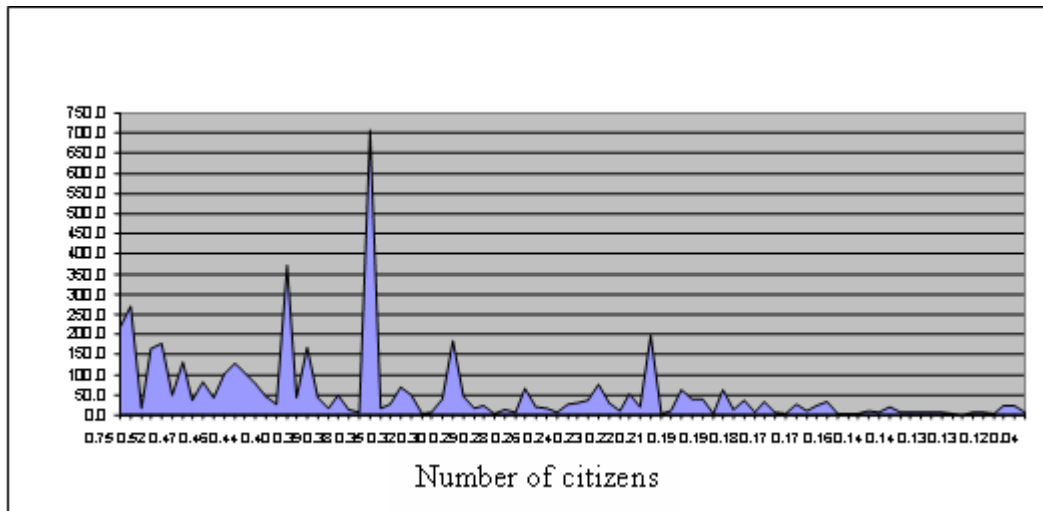


Figure 4. E-government index and number of citizens ($r^2=0.1931$)

What advantage is gained by higher budgets in the larger cities? The size difference is expected to be expressed in higher grades in the Basic Efficiency sub-index for the three largest cities. Large municipalities should benefit from their economies of scale on both the supply and the demand side. On the supply side, they should have the economic ability to allocate resources for building, operating and managing IS and Internet website for wide-scale service provision, and broadly delivering basic services. On the demand side, a high number of online users will raise efficiency and increase the expected return on investment (ROI).

This confirmed hypothesis is specific, compared to the rather general findings prevalent in the literature. As opposed to previous literature, that suggested "a direct relationship between Web site quality and population size. [...] larger cities are expected to exhibit the best quality Web sites" (Scott, 2005: 156), the current study provides selective characteristics, thanks to the sub-indices. According to this study, larger cities that have more resources are not necessarily generally better. On the contrary, their superiority in size enables them to provide basic services (basic efficiency sub-index), yet other content categories, such as contact with the public, may not require high expenses and rather depend on managerial approaches. This way, the sub-indices provide higher accuracy in analyzing and understanding the choices made by managers while planning and implementing various applications in their local e-government.

Therefore, the current study proposes two more specific and selective hypotheses:

- Larger municipalities can afford the implementation of basic and large-scale services, and, indeed, they do. The three largest cities, Tel Aviv, Jerusalem and Haifa, scored highly on the basic efficiency sub-index.
- Small local authorities score relatively high on the contact with the public sub-index.

4.5 Summary of quantitative study

The findings lead to the conclusion that the economic ability allowing one to allocate a budget for the planning and implementation of IS and an Internet website is not a sufficient condition for producing relatively mature local e-government. In practice, other driving forces affect the readiness and willingness of local authorities to plan and implement ICT. The absence of correlation between the socioeconomic level and the local e-government grades demonstrates the important role played by qualified management in local authorities.

Since quantitative measures of financial, socioeconomic, and demographic characteristics did not yield significant comprehensive findings, a qualitative method was also employed in the attempt to identify the causes and antecedents of e-government in local authorities in Israel.

5 QUALITATIVE STUDY (3): TECHNOPHILIA

What are the human traits or motivations that lead to a brave development of applications based on advanced technology?

Interviews with managers and other officials and stakeholders were designed as an ex-post study aimed to answer exploratory questions, such as what variables are responsible for creating the overall managerial ability, and how do local authorities put it into action (Benbasat et al., 1987)? What are the underlying forces in local authorities that make the difference?

In addition, the qualitative study includes an explanatory segment describing the technophilia model, that was developed and assessed in a previous study (Purian, Ahituv and Ein-Dor, 2010b), as the proposed predictor of e-government level (Bonoma, 1985). Technophile users, considered as those who gained experience with online entertainment and communication tasks, are expected to evaluate the technology mindfully. Moving from the personal context to an organizational level, technophilia that firstly emerged as enthusiasm to use technology and enjoying its capabilities – is expected to turn into critical thinking that enhances technology management.

Drawing a line from a personal approach to professional gain, the degree of technophilia, expressed as high engagement in online entertainment and communication, is expected to influence the manner by which IS and Internet websites are planned and implemented.

The main research question here is: Can we portray a technophile approach to IS and Internet website planning and implementation? To what extent can technophilia predict technology adoption at the organizational level? Is there a significant technophile organizational profile? What are its characteristics? These questions are related to e-government since the open flow of information and decision-making (Paivarinta and Saebo, 2006; 2008; Saebo et al., 2008) is much more critical in e-government than in e-commerce. These are the mandatory relationships with the public and its political nature that distinguish e-government (Warkentin et al., 2002) as a context where ICT should enable and support concepts such as accountability, transparency and openness (Kondo, 2001: 7). And so, having the power with no obligating laws or regulation, what motivates managers to contribute more information to the public, to open communication channels, and to dedicate time and efforts toward this end.

The following questions provided ingredients for the answer to the former: How were technophile managers rated on the e-government index and its sub-indices? On which sub-indices are they ranked highest? How many communication channels do they open to the public? Do they provide more information than others? Do they initiate cooperation between stakeholders and encourage workers' participation in project prioritization? How do they perceive the usefulness of their own authorities? Are they satisfied with their outputs or judgmentally under-evaluate them?

Questions about the contribution of formal methodologies to IS planning were examined in the interviews: How did you plan the IS? With whom did you consult? What information did you analyze in the various development or implementation stages? Is there a life cycle or development cycle that would add value to a municipal IS?

The interviews covered professional as well as personal topics: playing online games, tendency to buy and use new gadgets (e.g., iPod), work politics, resource availability and top management support, professional IS experience and knowledge, managerial preferences toward a cooperative approach toward other authorities and potential partners, recognition of mutual interests, development of new business models in order to overcome financial barriers, satisfaction with the authority's IS and Internet website, non-conformism, ability to develop and design interfaces in collaboration with workers and citizens. The technophile characteristics displayed by local managers are expected to explain the design of a citizen-oriented e-government.

The general index and its four sub-indices are organized below according to the respective technophile traits as were developed in previous study (Purian, Ahituv and Ein-Dor, 2010b).

Technological sophistication as manifested in the general e-government index. Technophilia, expressed as vast experience with online entertainment and communication, was found to have a

unique and crucial contribution to digital literacy (Purian, Ahituv and Ein-Dor, 2010b). Technophile managers in local authorities are expected to exhibit higher grades in the e-government index, reflecting on their technological sophistication and positive attitude toward technology. Their technological sophistication may also be reflected in their early adoption or development of applications as well as in their selection of service providers.

Communication as manifested in the public-contact sub-index. Time spent communicating with others is a complementary factor of technophilia, supplementing technological sophistication (Purian, Ahituv and Ein-Dor, 2010b). This preliminary attitude toward openness is expected to be expressed on the job. Technophile managers tend to provide more information and communication channels to the public, and would therefore receive high grades in the public-contact sub-index. The required applications are not very expensive. With minor inputs, the outputs can be transformational, contributing to transparency and to collaboration among users. Thus, the willingness to increase communication is essentially a managerial decision. In other words, transparency is a matter of IS design and implementation in Internet websites, rendering many "technical" decisions a matter of public policy. To what extent are these decisions influenced by the manager's technophile attitude? The interviews aimed to answer this question.

Communication as manifested in the effectiveness sub-index. High levels of technological sophistication could be expressed in the managerial effectiveness sub-index, specifically the managerial ability to strategically and operatively plan and implement IS, sometimes intuitively rather than in a methodological process. This ability is expected to facilitate managerial effectiveness.

Efficiency sub-indices are expected to be explained mainly by economies of scale, as was found in the qualitative study.

The "black box" of organizational decision-making processes was exposed by combining questionnaires and interviews with the survey of local websites as artefacts or outputs of the unit of analysis. By applying quantitative and qualitative methods, "the goal is to obtain a rich set of data surrounding the specific research issue, as well as capturing the contextual complexity. [...] Using multiple methods of data collection offers the opportunity for triangulation and lends greater support to the researcher's conclusions" (Benbasat et al., 1987: 374). The context of e-government, and especially local e-government, offers an opportunity to deliberate on these questions and to examine how technophilia is related to variables such as technological sophistication and communicability expressed during the processes of IS planning and implementation.

5.1 Methodology

Interviews concerning decision-making and management within the local authority were conducted among managers and other stakeholders in the local authorities. For the purpose of this study, those managers responsible for IS and Internet website are referred to as Chief Information Officers (CIOs). Out of 25 interviews, two interviews took place after the results were published, and two additional interviews were conducted with persons who were not CIOs: an interview with a town mayor (the single politician in this study, from a small local council), and an interview with an official who holds a senior position in one of the national headquarters of local government in Israel.

Most of the interviews were conducted in the process of the annual conference of CEOs and CIOs of local authorities that took place in Nazareth in February 2008. The minority were conducted at the respondent's office. Interviews lasted for 1 to 2 hours. Two women were interviewed, both serve as CIOs in wealthy municipalities. The respondents and the interviewer were unaware of the results on the local e-government index, and the interviewer did not collect or analyze the data for the local e-government index or its sub-indices. A few months later, after the research results were presented to faculty and in press, a few local authorities requested a meeting to learn how they could improve their e-government activities. This was an opportunity to carry out an additional set of interviews, in different circumstances, where the grades scored by the local authority were known.

A questionnaire for background details was completed by 14 CIOs from local authorities of three sizes: large (3), medium (8), and small (3). Half of these authorities received high scores in the local e-government index (top 20% of authorities), providing a fair distribution.

5.2 Questionnaire findings

The largest cities employ CIOs while smaller local authorities employ a part-time webmaster, spokesperson, or a manager who undertook the mission of building a local Internet website from scratch, as a personal assignment.

71% of the local authorities outsourced the implementation and maintenance of their Internet website. 78.5% believe that the CIO should not be employed by the outsourced provider. These 78.5% have in-house IS departments. 71% employ a network manager, 65% employ a website coordinator, 57% employ a CIO, and 43% employ a project manager and an information-security manager.

CIOs rated their local authority Internet website as an effective tool for the following purposes (on a 1-10 scale, from "not at all" to "very much"):

- Publication of dynamic information: 8.3.
- Improving the local call-center quality of service: 8.
- Enhancing tax collection from the citizens: 7.8.
- Enhancing engineering services to citizens: 7.8

Lower scores were given to the Internet website as an effective tool for the following purposes:

- Improving financial services to the citizens: 7.4.
- Improving educational services to the citizens: 6.8.
- Increasing efficiency and savings: 6.5.

Lowest scores were given to the Internet website as an effective tool for the following purposes:

- Improving welfare services to the citizens: 6.2.
- Improving the education for good citizenship amongst the citizens: 6.1.
- Improving public participation in decision-making: 5.7.

Figure 5 presents the purposes for which managers perceive the local authority's Internet websites to be an effective tool.

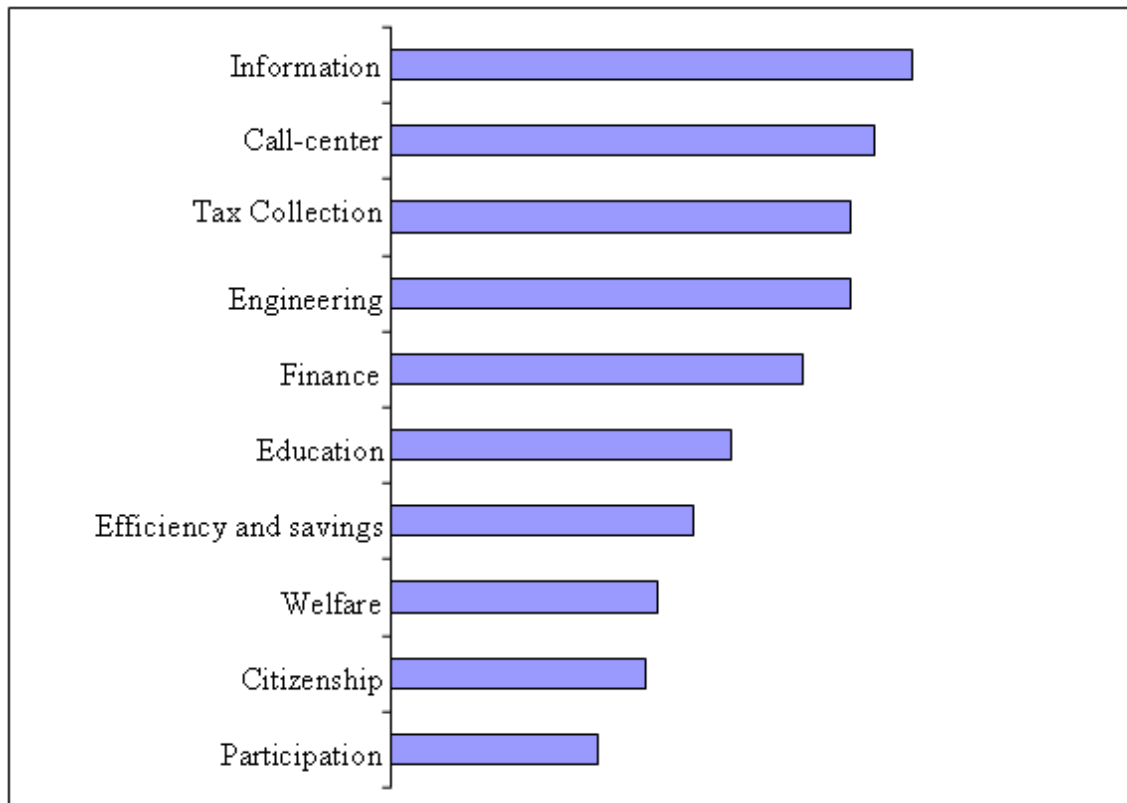


Figure 5. CIOs rating their Internet website effectiveness in different areas

The data present a clear picture. The difference between the highest rated area, meaning "how effective is my Internet website for the purpose of publishing information" (8.3), to the lowest, "improving public participation in decision-making" (5.7), reflects the difference in technological and managerial infrastructures that are required in order to initiate and improve public participation in decision-making. Cooperating with the public is much more complicated and challenging than uploading information in a controlled process.

Moreover, perceived effectiveness decreases as the services become more citizen-oriented. The results express the CIOs' satisfaction with their websites and not the priorities which they have set. The high rating for enhancing tax collection or improving engineering and financial services, as opposed to educational and welfare services, does not reflect the CIOs' plans, but their self-evaluation. Responses to this question may be considered as a measure for Perceived Usefulness (PU). As predicted by the technophilia model, sophisticated CIOs were less satisfied with the website of their local authority.

5.3 Interview findings

Table B1 in Appendix B presents the main findings that emerged from the interviews along with minimal information about the local authority, in order to preserve anonymity among the respondents while still offering the full picture for each local authority. Managers interviewed after the publication of the results are denoted. The order of presentation accords with the final grade achieved in the e-government index. The grades are used as identifying numbers for presenting respondents with their remarks and arguments.

The local e-government index and its four sub-indexes provide specific and selective dependent variables. Having the leading authority in each of the four sub-indices selected, as presented in Table 2 above, the connection to the manager's characteristics should be revealed in the interviews, for each category. Indeed, the interviews support the structure of the four sub-indices:

- Efficiency: Managers in the leading authority – both in the general index and in the efficiency sub-index – expressed clear targets with an accessible service delivered to the citizen as top priority.
- Basic efficiency: Managers in the largest municipalities, that were top leaders in the basic efficiency sub-index, emphasized project management practices rather than public or societal issues. This attitude is well-reflected in their high scores for delivering basic services and applications rather than innovating or displaying openness and initiating additional contact channels with the public.
- Contact with the public: A small authority (local council), leading on the contact sub-index, is headed by a technophile mayor who believes in the advantages of transparency and public debate for the common interest. For example, he has exposed valuable information on building plans, using mapping systems (GIS) and pictures, in order to open this issue to public discussion. Additional systems are implemented at this local council for various areas of interest. The mayor is engaged in online entertainment and describes himself as a fan of new technologies. This personal tendency is also manifested in the adoption of new green technologies, such as energy-efficient street lighting, in the same authority.
- Effectiveness: IT managers at the authorities leading on the effectiveness sub-index are skilled managers who tend to have greater community-awareness. They strive to effectively manage their departments and authorities, even in the face of political pressure and constraints. They tend to be more civically aware and engaged in online entertainment of all types. They demonstrate the ability to exercise independent sound judgment and operate in a politically sensitive environment.

The number of optional communication channels, the amount of data, and its importance or potential value – express the managers' personal attitudes toward the adoption of transparent norms and the initiation of social contact. To what extent would the manager in the authority emphasize fair access to valuable information? In the absence of appropriate legislation regulating the rules of transparency, this is a matter of personal and local preference.

The interviews provided evidence to the key role that CIOs play while designing IS that expose valuable information on real-estate and municipal (or rural) urban planning. The citizens' subjective welfare would benefit from planned IS and Internet websites that would "face the community", as put by one of the interviewed CIOs (whose authority rated among the first in effectiveness sub-index): "this is something that the website can tell us about the authority" (Respondent 6).

To emphasize the link between personal preference and resulting e-government policies, we bring a couple of additional quotes from respondents participating in this study, which further delineate different approaches to the citizen.

The single respondent who mentioned reducing the digital divide as one of the municipality's goals is also the CIO with the highest score in the e-government index:

"Our most important consumer is the citizen. Our three goals are: increasing the efficiency of management systems in the municipality, providing effective services to the citizens, and reducing the digital divide. We have adopted a holistic strategy for managing the city, and understand that IS can provide solutions to the decision makers" (Respondent 1).

Similarly, a manager from one of the three largest cities (highest score in basic efficiency sub-index) said:

"The website was static, mainly describing the departments. The municipality employed a part-time individual working ten hours a week, only for updates. We are now building a new website from a completely different perspective: we perceive it to be not the municipality's website, but the city's website. The purpose of the new website is to increase the municipality's accessibility to the citizens" (Respondent 25).

As opposed to these CIOs, other CIOs from large municipalities that enjoy high socioeconomic levels – and yet achieved low scores in the e-government index – have exposed the reason for their results by describing their jobs. In contrast to the holistic approach expressed above, the other approach is technical, expressed by a concrete perception of success as financial or operational gain. One example

is manifested in the words of a CIO from a city with a similar number of citizens and same socioeconomic level. The CIO, who adamantly declined to fill the questionnaire or give an interview, presented a narrow and technical view of his responsibilities, describing an upgrading project in operational terms:

"Our users hardly felt the change. We did it in the middle of the night. We have increased our savings and achieved a good ROI. These are our two measures and we are successful in both"
(Respondent 9).

The interviews focused on the specific personal background that contributed to the professional experience and abilities to plan and implement IS and Internet websites resulting in high scores on the e-government index and each of its four sub-indices.

6 THE UNIVERSALITY OF INFORMATION SYSTEMS (IS)

The interviews show that the CIOs did not follow any formal guidelines of IS life cycle. Most, if not all, answers denied such an option categorically and there were almost no differences among the negative responses. Aware of organizational constraints, one of the CIOs explicitly said: "we were not in a position that was mature enough to adopt a methodological process. We were not ready for this. We were too focused on ourselves and could not take into consideration the users' needs, which is the only way that the process should have been done" (Respondent 7).

Tools for IS development have been available for years, and yet, not a single ICT manager among those interviewed followed known life cycle guidelines. In their unique way, technophile managers assure that requirements such as defining user's needs and demands are fulfilled – although they do not follow the methodological stages. Intuitively, they happen to follow the key foundations of IS theory.

More specifically, and based on the IS literature on development methodologies, the interviews raised old questions: Is there a life cycle or a development cycle that is crucial for the IS and Internet website to follow? Is there a certain normative procedure that should be applied to the IS development process?

Ahituv, Neumann and Riley (1994: 268-273) presented rigid procedures that should be imposed on the IS development cycle (ISDLC). For example, out of 18 basic principles of IS life cycle two principles might be of special relevance in the context of e-government: The IS "is being developed for a user" (p. 268) which implies the user's active involvement in the developmental process, and "active participation of the management of the organization in the life cycle must be [conducted] mainly in the definition phase" (p. 270). The authors emphasized: "We do not advocate a return to a haphazard, individual, intuitive approach to ISDLC. On the contrary, a commonly accepted framework is absolutely essential" (Ahituv, Neumann and Riley, 1994: 299). Among our respondents, the "individual, intuitive approach to ISDLC" was indeed prevalent – but not haphazard. The differences in the CIOs responses did not stem from different methods but from the CIOs themselves, their technological skill and attitude. These differences were clarified in the interviews, specifically by questions concerning the CIOs' attitudes towards openness and communication with the users. The manner by which they perceive their role shapes the manner by which they plan and develop their websites. CIOs who view users (citizens and workers) as main stakeholders tend to provide more information and communication channels, consistent with their social values (Walsham, 2009).

The CIOs addressed the required demands for every step and developmental phase intuitively, in their unique individual approach, based on their technophile qualities of communicativeness and openness that lead to the specific professional decisions they undertook in the process of IS planning and implementation. These are the very same qualities that enabled their deep acquaintance with the organizational conditions and with the local population and mentality, while also enabling their familiarity with the technological and managerial solutions that can be made available. Their technophile qualities have exemplified a return to the foundations of IS theory, understanding that an Information System is a system that provides information and communication. There is a specific normative way for developing IS, under any circumstances, and technophile managers are intuitively applying it.

The technophile managers intuitively planned IS that provide information according to the desired IS life cycle. While they did not follow formal methodological phases in which user specifications are delineated, defining user's needs and demands, they did in fact support these needs, as manifested in their local authority's scores on the e-government index. These technophile managers subjectively valued the information and mindfully made decisions based on personal experience and understanding.

7 SUMMARY

Citizen-oriented e-government depends on people who care. Theories from different disciplines have emphasized the centrality of the individual's motivations and actions in social phenomena (Elster, 1983). The current study provides further evidence for the viability of Technophilia (Purian, Ahituv and Ein-Dor, 2010b), at the organizational level, by empirically studying e-government Internet websites as an expression of subjective managerial perceptions. More specifically, the technophile manager is portrayed as the creator of citizen-oriented e-government. Furthermore, there is almost no previous study that interweaves online entertainment with e-government. In this study we follow Orlikowski and Robey (1991), who suggested to adopt a structural perspective in the research of information technology and organizations applying both quantitative and qualitative methods. This study captures the richness of data by multiple methods: website survey of local Internet websites as artefacts or outputs of the unit of analysis followed by questionnaires and interviews.

By creating the local e-government index and interviewing managers with respect to their process of planning and implementing IS, this study evaluates the contribution of the individual manager to IS. The proposed e-government index is revealed in this study as an accurate measurement for managerial evaluation, targeting concrete outputs such as online forms and contact channels. This focus renders the e-government index more user-centred than merely stressing professional goals such as the design of the ultimate enterprise architecture. While the system is evaluated as the user's playground the technophile manager intuitively accomplishes the normative principles of IS and Internet websites planning and implementation, therefore confirming the predictive value of technophilia in a managerial context.

This paper is aimed to provide a systematic study of local e-government, and to identify the ones who are actually shaping the public sphere. In doing so, this paper should break new ground on an important topic of democratic change.

Acknowledgements

Research has been supported by the Institute of Technology and Society (BRM), Faculty of management, Tel Aviv University; and the Institute for Internet Studies (IIS), Tel Aviv University. The research is part of a Ph.D. dissertation under the supervision of Niv Ahituv and Phillip Ein-Dor, Faculty of Management, Tel Aviv University. I am especially grateful to Ornit Mor, Anat Fang and the tremendous team for their research assistance.

References

- ABRAHAMSON, E. (1991). "Managerial fads and fashions: The diffusion and rejection of Innovations", *Academy of Management Review*, (16)3, pp. 586-612.
- AHITUV, N. NEUMANN, S. and RILEY, N.H. (1994). *Principles of Information Systems for Management*. Revised fourth edition, New York: Wiley.
- BARAK-EREZ, D. (2007). "Administrative Law in the Age of the Electronic State". *Hamishpat*, 24, pp. 57-65. www.tau.ac.il/law/barakerez/articals/BE2.pdf
- BENBASAT, I., GOLDSTEIN, D.K. and MEAD, M. (1987). "The Case Research Strategy in Studies of Information Systems", *MIS Quarterly*, Sep, 11, pp. 369-386.
- BONOMA, T.V. (1985). "Case research in marketing: Opportunities problems, and a process", *JMR, Journal of Marketing Research*, 22, pp. 199-208.

- BONOMA, T.V. (1985). "Case research in marketing: Opportunities problems, and a process", *JMR, Journal of Marketing Research*, 22, pp. 199-208.
- CAPGEMINI (2009). 8th eGovernment Benchmark Measurement. Prepared for the European Commission Directorate General for Information Society and Media.
www.capgemini.com/insights-and-resources/by-publication/2009-egovernment-benchmark
- CBS (2006). "Local Authorities in Israel 2006". Publication #1315, financial data updated to 2006, published on April 2nd 2008 by the Research Department, the Senior Division of Municipal Management, Ministry of the Interior. Data file for analysis:
www.cbs.gov.il/publications/local_authorities2006/excel/p_libud.xls
- CHIOU, W.C., LIN, C.C. and PERNG, C. (2010). A strategic framework for website evaluation based on a review of the literature from 1995–2006. *Information & Management*. Volume 47, Issues 5-6, pp. 282-290.
- ELSTER, J. (1983). "Explaining technical change". Cambridge: Cambridge University Press; Oslo: Universitetsforlaget.
- FICHMAN, R.G. (2004). "Going beyond the dominant paradigm for information technology innovation research: emerging concepts and methods", *Journal of the Association for Information Systems* 5(8), pp. 314-355.
- GRONLUND, A. and HORAN, T.A. (2004). Introducing E-Gov: History, Definitions, and Issues. *Communications of the Association for Information Systems*. Volume 15. p.: 713-729.
- HAIR, J.F., BLACK, B., BABIN, B., ANDERSON, R.E. and TATHAM, R.L. (2006). "Multivariate Data Analysis", 6 edition, Prentice-Hall, Upper Saddle River, NJ.
- IRANI, Z. and ELLIMAN, T. (2007). Electronic transformation of government in the UK: a research agenda. By project VIEGO: towards a virtual institute for research into e-government.
www.iseing.org/iseing/Resources/VIEGO%20Report.pdf
- KONDO, S. (2001). Fostering Dialogue to Good Government. Public sector transparency and accountability - Making it happen, OECD, P. 7-11.
- KUNSTELJ, M. and VINTAR, M. (2004). Evaluating the progress of e-government development: A critical analysis. *Information Polity*. 9. 131-148.
- LAYNE, K. and LEE, J. (2001). "Developing fully functional E-government: A four stage model". *Government Information Quarterly* 18. 122–136
- LEE, S.M., TAN, X. and TRIMI, S. (2005). "Current practices of leading e-government countries". *Association for Computing Machinery. Communications of the ACM*. New York: Oct. Vol. 48, Iss. 10; p. 99.
- MINGERS, J. and WALSHAM, G. (2010). Toward Ethical Information Systems. *MIS Quarterly* Vol. 34 No. 4.
- MOSSE, B. and WHITLEY, E. A. (2009), Critically classifying: UK e-government website benchmarking and the recasting of the citizen as customer. *Information Systems Journal*, 19: 149-173.
- NOVECK, B.S. (2009). *Wiki Government: How Technology Can Make Government Better, Democracy Stronger, and Citizens More Powerful*. Brookings Institution Press.
- ORLIKOWSKI, W. J. and ROBEY, D. (1991). "Information Technology and the Structuring of Organizations," *Information Systems Research*, vol. 2, pp. 143-169.
- PAIVARINTA, T. and SAEBO, O. (2006). "Models of E-democracy". *Communications of the ACM*, Vol. 17, pp.818-840.
- PAIVARINTA, T. and SAEBO, O. (2008). "The Genre System Lens on E-Democracy". *Scandinavian Journal of Information Systems*, Vol. 20, pp.51-82.
- PURIAN, R. (2010). "Technophilia: From Entertainment to Digital Literacy and E-government – A New Multilevel Concept for Technology Adoption" (Unpublished doctoral dissertation). Tel Aviv University, Israel.
- PURIAN, R., AHITUV, N. and EIN-DOR, P. (2010a). "A new model for transparency and e-participation in e-government: Who transforms what policy into whose practice". In: "Public Sector Reform Using Information Technologies: Transforming Policy into Practice". Editors: Papadopoulos, T. and Kanellis, P. Publisher: IGI Global. In press.

- PURIAN, R., AHITUV, N., and EIN-DOR, P. (2010b). Technophilia: a new model for technology adoption. Manuscript submitted for publication.
- RAZIN, A. (2002). "Fiscal Disparities Among Local Authorities in Israel in the Year 2000: Continuity and Change in a Period of Political Instability". Publication #1/45. Floersheimer Studies. The Institute of Urban and Regional Studies. The Hebrew University of Jerusalem.
- SAEBO, O., ROSE, J. and FLAK, L.S. (2008). "The Shape of eParticipation: Characterizing an Emerging Research Area". Government Information Quarterly, Vol. 25, pp.400-428.
- SCOTT, K. J. (2005). "Assessing the Quality of Municipal Government Web Sites". State and Local Government Review, Vol. 37, pp.151-165.
- WALSHAM, G. and SAHAY, S. (1999). "GIS for District-Level Administration in India: Problems and Opportunities", MIS Quarterly, Special Issue on Intensive Research in Information Systems (23:1), pp. 39-65.
- WALSHAM, G. (2009). Interpreting Information Systems in Organizations. Global Text.
- WARKENTIN, M., GEFEN, D., PAVLOU, P. and ROSE, G. (2002). "Encouraging Citizen Adoption of e-Government by Building Trust". Electronic Markets. 12(3) pp. 157-162.

APPENDIX A TABLE A1: THE EVOLUTION OF E-GOVERNMENT EVALUATION METHODS

APPENDIX B TABLE B1: E-GOVERNMENT INDEX, SUB-INDICES, AND TECHNOPHILIA LEVEL