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<http://rcmss.com/index.php/current-issue-ijpamr-4-3-april-2018>

PUBLISHER

RCMSS

VERSION

VoR (Version of Record)

PUBLISHER STATEMENT

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REPOSITORY RECORD

Michael, Panayiota, Salomi Dimitriou, Loukas Glyptis, and Alex Zarifis. 2019. "E-government Implementation Challenges in Developing Countries: The Project Manager's Perspective". figshare. <https://hdl.handle.net/2134/37526>.

E-GOVERNMENT IMPLEMENTATION CHALLENGES IN DEVELOPING COUNTRIES: THE PROJECT MANAGER'S PERSPECTIVE

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Abstract

E-Government is a global trend with far-reaching benefits if implemented in the optimal way. All nations irrespective of whether they are considered as developed or developing economies, invest in the formation of strategies furthering their e-government agenda. While e-government has attracted extensive interest for over a decade leading to a maturing field, developing countries that are EU members have some particularities that must be taken into account. This research focuses on the critical success factors of e-government adoption by developing EU countries, using the Republic of Cyprus as a case study. This research identifies the financial position of a nation and its e-readiness level, as well as the infrastructure facilities and technological innovations, political and legal frameworks as key factors that influence the level of e-government adoption. Furthermore, organisational and institutional aspects, as well as the socio-cultural characteristics, should not be underestimated, as these factors are crucial barriers to e-government adoption. The specific country's environmental cognition and consciousness is found to be more influential in this case than what literature on other cases suggest. Transformational leadership is recommended as a way motivate, build trust and create the necessary shared vision.

Keywords: E-government, e-projects, project management, developing countries

Introduction

Information and Communication Technology (ICT) provides governments the ability to increase transparency and efficiency (García-Sánchez, Cuadrado-Ballesteros, & Frías-Aceituno, 2012), improve communication and offer better services. At the same time, it enables easier access to information for citizens improving their access and utility (Ziemba, Papaj, & Descours, 2014). ICT provides the infrastructure for better decision-making (Simon, 1976) and is a key determinant of a nation's growth (Avgerou, 2010). However, without e-government operating effectively it is harder to achieve government growth, economic growth, poverty reduction, the prosperity of citizens as well as a nation's sustainability (Hanna, 2010).

The reformation of the public sector and its transformation into a digital public sector is a necessity which is required in order to enhance efficiency, effectiveness, accountability and transparency, improving communication and access to information to stakeholders (Al-Shafi & Weerakkody, 2009). Fully utilizing e-government is necessary for nations to remain competitive in the 21st century globalized world. Influencing factors on e-government's adoption arise on both the internal and external environment of the government as demonstrated by Savoldelli's et al. (2014) model.

E-Government Debate in Cyprus

The vision is the provision of all major services electronically, creating e-projects, which possess a lot of interactive functionalities, providing services on a 24 hours basis, improving citizens service and satisfaction

by simplifying procedures, enhancing transparency, improving the quality of the services, reducing costs and raising citizens trust (Cypriot Ministry of Finance, 2017). The motivations behind this strategy are to enhance the public sector's operational and service delivery capacity, provide flexible, accessible and complete e-services to citizens while at the same time reducing operating costs. The major goals of the reformation are to create government e-tools that will enhance efficiency and effectiveness in the public sector (Cypriot Government, 2016). After the financial crisis and the bailout of Cyprus in 2013, the citizens' trust on government decisions diminished. Accountability and transparency are a priority, so the citizens' perception is enhanced. Despite the vast efforts of the government over the past ten years to concentrate its efforts to meet the above objectives, the Cypriot e-government achieves a low level of adoption and provision of e-services as indicated by the UN e-government survey raising a question why this happens. Other countries on the same level of income following the same directives perform better.

Research Aim and Research Question

This research investigates the critical factors that affect the adoption of e-government by Cyprus, particularly when considering the increased and continued investment that has been devoted to this purpose. A primary outcome of this project is to propose an abductively-informed model, which will combine findings from this research with the literature regarding success and failure factors pertinent to e-government adoption in order to inform academic debate and practice. The research question seeks to identify and analyse the factors that affect the implementation of e-government in Cyprus: What factors affect the adoption and implementation of e-government, including e-services and e-projects, in Cyprus?

By addressing the above research question, the research aspires to offer recommendations that the public sector could utilise as part of its e-government implementation initiatives.

Theoretical Background

Building trust between the government and its stakeholders is vital (Alzahrani, Al-Karaghoul, & Weerakkody, 2017). Lewicki and Wiethoff (2000) argue that trust is the way that people interact and build a positive relationship. This is particularly true in online collaboration (Cheng, Macaulay, & Zarifis, 2013), sharing information (Chen, Zarifis, & Kroenung, 2017) and making transactions online (Zarifis, Cheng, Dimitriou, & Efthymiou, 2015). Where governments fail to build trustworthy relationships the legitimacy of the reforms made will be questioned and may not be supported. ICT is a mean which facilitates trust through engaging citizens. The online consultation and feedback by e-service users, the involvement of citizens in the policy making decisions of the government, the citizens participation on the designing of the e-services and tools enabling citizens to express their opinion or their complaints are some engaging tools that enhance e-participation, e-election and promote e-democracy.

Nevertheless, e-government is a tool which requires rethinking existing processes and changing organisational behaviour so as to deliver public services more efficiently. Therefore, the factors that affect its fruitful implementation should be considered, so as nations, policy makers and practitioners benefit. The section that follows presents the critical success or failure factors that arise from literature.

E-government implementation and influencing factors

The extension of e-government is not straight forward so a nation should be aware of the factors that affect it (Kumar, Mukerji, Butt, & Persaud, 2007). Macro factors play a decisive role for e-government. For instance, the social, political and economic state in relation to the nation's e-government maturity are vital (Kachwamba & Hussein, 2009).

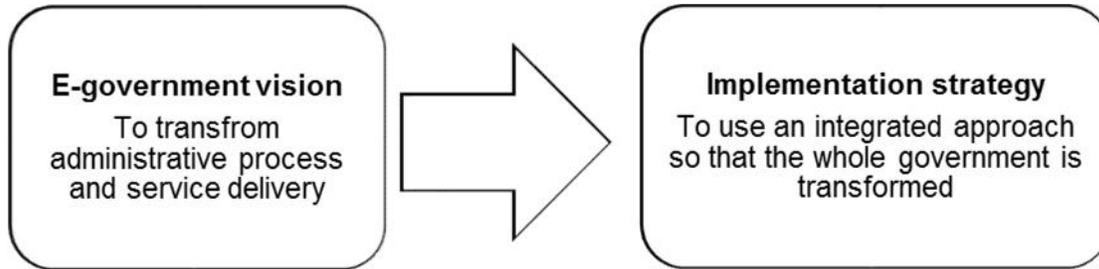


Figure 1. E-government, from vision to implementation

Others find that micro factors determine the success or failure of e-government. Oyomno (2004) identifies organizational factors, such as human resource, provision of ICT infrastructure, leadership and senior management as the most influential drivers for adoption. Additionally, Reddick (2004) suggested that the manager’s abilities and professionalism, the website maturity and the size of the organization are decisive. Therefore, it is not a straightforward process, but a more complex procedure, necessitating a blend of micro and macro factors; technological, institutional and organizational, social and cultural, economic and finally legal and political factors (Choudrie, Weerakkody, & Jones, 2005). The main challenges and barriers derived from e-government are illustrated in Table 1.

Table 1. E-government influences

Category	Barriers/Enablers
Economic	ICT cost of acquisition High maintenance cost High cost of training and education on ICT
Technical	ICT infrastructure Privacy Security
Social	Culture Digital divide
Organizational and institutional	Human factors Internal rules and long-term goals
Legal and Regulation systems	Legislation

Economic Factors

Savoldelli et al, (2014) claimed that managerial and economic factors can influence the adoption of e-government. An important role in the adoption of e-government is the investment in ICT assets, both on hardware and software systems, communication networks and broadband. Back and front office ICT systems important. Furthermore, a nation’s budget is an economic indicator which affects the full implementation of e-projects. Most nations prepare one-year budgets which prevents them to adopt long term and high cost e-project (Gil-García & Pardo, 2005). In Central and East European Union (EU) countries the investment associated with the implementation of e-government is frequently co-funded by several fund units supported by the EU enabling and facilitating the adoption (Ziemba et al., 2014).

Technical Factors

Technological difficulties arise during implementation and adoption of e-government. Factors include the lack of shared standards and compatibility on infrastructure among departments, information security and privacy of information. Any assurance from the government towards stakeholders will not be sufficient unless these technical challenges are overcome and procedures become more transparent (OECD, 2003). The level of a nation's communication infrastructure influences the adoption of e-government. A limited communication infrastructure and capacity (Layne & Lee, 2001) is considered as a barrier to adoption. E-readiness and ICT literacy are considered as important enablers e-government applications use (Kachwamba & Hussein, 2009).

Raghupathi and Wu (2011) stated that there is a positive relationship between citizens access to e-government, the quality of information the government has and the effectiveness of governance. The systems' technological compatibility are also demonstrated as critical factors since they affect the sharing of information and connectivity of systems across the government (Henningsson & Van Veenstra, 2010). Privacy refers to the guarantee of a suitable level of protection concerning information accredited to an individual (Basu, 2004). Consequently, privacy and confidentiality are critical factors for adoption (Layne & Lee, 2001). Governments should embark on the creation of e-networks with privacy and confidentiality; ensuring security of personal and financial data collected in order to enhance individuals' confidence (Ebrahim & Irani, 2005). Security involves any defence made regarding information and systems against disclosure to illegal access, illegal amendments, destruction of personal data or any protections against viruses and worms (Udo, 2001). Privacy and related security issues are facets that need to be addressed adequately (Reddick, 2004b).

Social and Cultural Factors

Zhao (2011) supported that the culture of a nation may influence individuals' expectations, orientations, preferences and experiences regarding e-government. His research pointed out that overall, national culture affects e-government development. Specifically, nations which are in favour of individualism or with long-term orientations have a positive relation with e-government development. Kovacic's study (2005), however, showed that individualist characteristics and power distance are more strongly related to e-government adoption; stating that the overall national culture has a moderate impact.

Social factors have a significant role in the adoption of e-government. The social divides within a country are shaped by the level of education of citizens and government employees, income, age, geographical location, gender and family type (Edmiston, 2003). Constrains in e-government implementation arise from two perspectives; the citizens and the government (Al-Hujran, Al-Debei, Chatfield, & Migdadi, 2015). Regarding the citizens' perspective, the generation gap, language barrier, disparities in ICT knowledge, experience in e-government and the inability to get access to information are vital. Furthermore, the individual's social influences from friends, family and colleagues, have a strong effect on behaviour towards e-government (Rana & Dwivedi, 2015).

Organizational Factors

The transformation of government into e-government is not only a technical issue and may become an institutional and organizational issue; as the human component is decisive. Lack of qualifications and training, resistance to change, long-term goals and limited management capabilities and are major barriers to implementation (Savoldelli et al., 2014). According to Edmiston (2003), managers' behaviour, support and attitude towards ICT projects are crucial factors influencing the ICT restructuring of public sector.

Lack of a measurement system for e-government procedure, performance and outcomes are barriers to the successfully implementation (Besharov, Barabashev, Baehler, & Klerman, 2013). Establishing rules and

procedures encourages the engagement of employees in the whole of the government transformation and facilitates e-government acceptance. A vague strategy, absence of procedures and regulations, absence of a policy and procedures, poor leadership and management and poor security policy are organisational factors that become barriers on e-government projects (Meijer, 2015). Undoubtedly, the human capital resources of a country influence the level of e-government adoption. Insufficient ICT skills and awareness in the public sector, the level of education, limited communication and marketing of e-government services are some of the human factors which may lead e-government initiatives to fail (Kappelman, McKeeman, & Zhang, 2006). Zhao (2011) identified that the higher the level of education in a country, the higher the acceptance and e-government usage. Moreover, individual interest and associated behaviour of civil servants lead to resistance to change which is considered a significant barrier (Gil-García & Pardo, 2005).

Legal and Political Strategies

While e-government is an institutional issue, the e-government policy should be supported by laws and regulations. Any lack of legal basis can be a threat to adoption (Esteves & Joseph, 2008). In cases where there is a lack of a legal basis, the decision-making process of e-government should be formalised to ensure transparency, facilitating the procedure (Henningsson & Van Veenstra, 2010). On the other side of the coin, some authors argued that restrictions from laws and regulations lead to a mismatch with the e-government procedures (Mahler & Regan, 2002). The absence of laws based on the protection of the citizens' rights; data protection and data security laws (Choudrie et al., 2005) lead to lack of e-Government trust and therefore failure.

Research Methodology

The objective of this research was to explore the implementation of e-government projects, identifying critical factors for effective adoption. This exploratory research aimed to obtain data from civil servants directly involved in e-government project implementation. Interviews were conducted with six civil servants, all key project managers involved in strategy formulation, approval and implementation of e-government. The selection of the participants ensured the best combination of experience on e-projects. All of the interviewees are e-project managers in their departments and three of them are e-project managers participating in the reform procedure. Their decisions affected past implementation of projects and they are responsible for future projects. All participants were informed that anonymity of volunteers and organisations will be guaranteed. The interviews lasted between 30 and 45 minutes depending on the participant's responses. The interview consisted of open ended questions and the procedure was semi-structured. The participants were asked 6 questions in total, each containing some sub-questions. The questions were based on the Savoldelli's et al. (2014) model. Pilot tests were implemented to ensure the clarity and relevance of the questions. Following Miles and Huberman (1994) the analysis of the data was conducted in two stages: First a data reduction was made, then a data display was followed. Finally, the data was verified. The inductive analysis processes involved organizing the data through coding, categorization of the data into subjects and determining connections among the themes (Miles & Huberman, 1994).

Findings

This research used Savoldelli's et al. (2014) model as a starting point. This model identifies economic, technological, legal, organizational and institutional determinants of e-government adoption and implementation. For a better understanding of their nature and impact a categorization into themes and sub-themes was pursued. This research contributes an additional factor, employees' environmental consciousness, as influencing e-government adoption.

Financial Factor

Financial barriers have to do with the economic situation and the financial position of a country, as well as the intention to invest in ICT including e-tools and e-projects. The financial situation of a nation has a crucial role in the restructuring procedure (Savoldelli et al., 2014).

Economic Crisis: All the participants claimed that the economic financial crisis and the restricted regulations imposed by IMF had a negative impact on the government's perception and intention to invest in such projects; and especially on expensive e-projects, resulting in decelerating the process of e-government adoption:

"[...] Projects [...] have been delayed over the last decade because of the lack of funds, mainly after the financial crisis and the restricted regulations imposed by IMF which prevent the government expenditure [...]"

EU Funded projects: The interviewees claimed that e-government projects subsidized by EU funds still have economic constraints but they are more limited: *"[...] EU funds should enable the whole e-government transformation procedure [...]"*.

Budgetary Restrictions: All interviewees referred to the economic factor and budgetary constraints. If the ministry or department wishes to spend more on ICT projects, then it has to reduce other administrative or operating expenses:

"[...] Important e-government projects are approved by the e-Government Board that decides which (and effectively the type of the) projects to be implemented. The decision is based on the importance and usefulness of the project and not the type of the project. Of course at the end if the budget is not available (mainly because the ministry/department exceeds the budgetary ceilings) the project cannot proceed [...]"

High Investment Cost: Participants claimed that maintenance and upgrade costs are considered as upfront costs at the time of purchase, integrating in the assessment process an amount for subsequent measurement for a five to ten years' period. Furthermore, interviewees argued that some e-projects have a large cost for updates and maintenance, which are disproportionately high when compared to their cost of acquisition or delivered benefits. To this end they claimed that: *"[...] Maintenance and upgrade costs are a significant factor to consider when developing a new system [...]"*

All interviewees claimed that a cost benefit analysis is required during the approval stage, meaning that there is care taken to approve only 'cost beneficial' projects by the e-Government Board, which overlooks the overall procedure:

"[...] But in fact some projects are considered as being more beneficial (cost benefit analysis) than others even though they cost millions, those projects can be promoted as well if they fully comply with the e-government strategy [...]"

Legal Factor

All of the interviewees referred to the legal and legislation barriers as influential, acknowledging them as crucial factors affecting the smooth implementation of e-projects. They referred to the difficulties they faced with legislation that could cause an e-project to be postponed or cancelled.

Existing legal framework vs e-government: All participants claimed that the existing legislation was an impediment to the full implementation of e-government:

"[...] when implementing e-Government Projects it is inevitable that you come across legal issues and you need to deal with it. If the law is a barrier and cannot be changed you have

to find ways to bypass the problem and implement a work around. This may delay or discontinue the whole process but you have to adapt and wait until it is overcome [...].”

Most interviewees claimed that “[...] *old legislation should be revised*” as in many cases it clashes with new legislation needed to embrace the e-government approach. The revised legislation should become an enabler when implementing e-projects.

EU regulations and directives: The majority of the interviewees claimed that Cyprus as an EU member state has to follow the directives and policies employed at an EU level. This obligation may become either a barrier or a facilitating factor, as in many cases problems or difficulties have been resolved through an EU regulation:

“[...] in the procurement area we have the eProcurement System and electronic catalogues that stem from the latest EU Directives, which at the end facilitated the adoption of e-government [...].”

Additionally, they claimed that: “[...] *the e-signature legislation is an EU directive which we had to follow [...]*” which is considered an enabling factor facilitating adoption.

Furthermore, some seemed to believe that following EU regulation may delay the implementation of the e-project. Interviewees claimed that the length and complexity of the public procurement process, as it has been amended to comply with EU directions can lead to project delays and obsolete technology:

“[...] legislative barriers arise from old legislations which did not allow us to implement in full the e-government approach in the public sector. But we are still in the transition stage; it will be time consuming since each department has to change its own policies and procedures according to our (the departments legislation on e-signatures). Also we have to adapt our legal framework to the directives imposed by the EU [...].”

Lack of e-government legislation: Finally, interviewees claimed that they follow informal guidelines as legislation which will act as an enabler when implement e-projects is not sufficient. An interviewee argued that the e-government strategy is unofficially communicated to both employees and citizens. They also mentioned that there is a draft legislation covering e-government projects which will facilitate the e-government process: “[...] *it has been sent for legal inspection to the Legal Authority of the Republic of Cyprus [...]*”. Once the e-government legislation is approved then the adoption will be facilitated.

Political Issues

Most of the respondents argued that political pressure should not be underestimated as its impact has a key effect on e-government adoption, which they described as being either negative or positive. One of the interviewees claimed that the new legislation, which was introduced in early 2017, regarding the obligatory use of e-signature was a result of political pressure. As soon as the appropriate government bodies adopt e-software tools in order to support the e-signature implementation, and once e-signature authentication is put in place, then the adoption will be boosted; as this means that they will accept electronically signed documents, having the same legal substance as if they are originally signed. The respondents claimed: “[...] *the e-government strategy should be part of the political agenda and not part of the government agenda [...]*”. Explaining that in case where e-government is part of the political agenda then it will be treated as a law or regulation which will give support to the government employees enabling the e-government adoption. If it will remain as part of the government agenda then the appropriate ministries and departments will rely on existing law and regulations, ignoring the circulars on e-government issued by the authorities, if they are contradictive to law and regulations. The lack of political commitment and coordination on establishing a clear e-government strategy makes the whole procedure of adopting e-government less effective:

“[...] the establishment of the e-government Board, in the last two years, which consists of both politicians (ministers) and government employees (head of reforming departments), gives prestige to the process and decisions making, “forcing” government employees to follow and adopt the e-government Board’s decisions [...].”

Infrastructure Factor

All participants referred to infrastructure factors, either communication infrastructure or technology infrastructure as significantly hindering e-government implementation: “[...] *even though the e-readiness in Cyprus is on high standard, there is certainly room for improvement*”.

Technological Factors: All interviewees refer to the technological factor as playing a crucial role in hindering the e-government reforming procedure. They also mentioned that there is a necessity to get access to advanced technology in order to promote the implementation of certain e-projects. Nevertheless, they argued, the procedure to acquire such specific and advanced technology can cause significant delays due to the length of the procurement cycle procedure, resulting in postponing the e-government process: “[...] *the specifications for these [technologies] are drawn in detail and usually acquired through tenders, resulting in a time-consuming e-procurement procedure*”. The interviewees argued that “[...] *major [technological] needs relate to data warehouses and internet speed [...]*”, which both play an instrumental role in the implementation of e-government projects. All interviewees also mentioned the privacy and security issues on the recording, access and communication of data as important prerequisites for the adoption and implementation of e-tools, as they allow for safeguarding the privacy and security of information, which is stipulated by laws and regulations that are in force in order to safeguard such matters:

“[...] Security of information is established through various technologies embracing the security policy. Privacy of information is established through software mechanisms that ensure access to information is given only to the owner of the information or to official agencies that have the right to collect the information or are given the right to access the information”.

Another related consideration on the impact of technology in the implementation of e-government, was the varying and often incompatible software and technological infrastructure requirements of different e-tools that the various ministries need to employ. These varying technological requirements result in the lack of interoperability of e-government across the different ministries and departments, impeding the sharing of data and information among them, and thus, ultimately discouraging the adoption of e-government tools: “[...] *software and technology newness is, therefore, needed in order to eliminate incompatibility and enhance interoperability*”.

Communication infrastructure: All the interviewees referred to the communication infrastructure as being a factor, which may either prevent the smooth implementation of e-projects or alternatively enhance their development. The interviewees claimed that the internet speed is low across the public sector and that the communication infrastructure should be further advanced to prevent delays or even the discontinuation of operations. This often discourages public servants’ from e-government.

Organizational and Institutional Factors

Andersen and Henrisken, (2005) argue that organizational structure and clear policies enable the transformation process to adopt e-government. Organizational issues also play a crucial role in the successful implementation of e-government. The lack of effective organizational strategy, the lack of effective communication on policy cycle management, the lack of a common identity card code and the lack of coordination are demonstrated to be the main barriers, which are faced by e-project managers in Cyprus when implementing e-government tools.

Lack of effective strategic direction: The majority of the interviewees expressed their worries about the e-government strategy and the fact that it is stipulated and communicated via an unofficial document. All interviewees argued that there is a lack of effective communication regarding the e-government strategy, policy procedures and structures:

“[...] the e-government strategy is expressed in a general policy statement that is not well communicated, and which the public sector is mostly unaware of [...] there is no effective strategic planning and strategic decision making [...]”.

The interviewees also declared that the absence of a strategic direction is one of the most critical and crucial factors preventing them from fully implementing their e-projects and pursuing the smooth adoption of e-government on the basis of a consistent and ubiquitous direction. It is often the case that ministries and departments create their own e-government strategies, satisfying their own needs, while disregarding the interoperability, connectivity or even integration across e-government tools. This in turn results in a waste of resources and goal incongruence:

“[...] a focal point to guide and monitor the progress towards a strategic goal does not effectively exist; and the adoption and even the prioritization of e-projects rests with lower levels of decision makers or even the internal IT suppliers i.e. D.I.T.S....”.

The interviewees claimed that the absence of strategic direction does not facilitate e-government adoption and implementation: *“[...] the priorities of government employees differ, naturally leading to unexpected delays of e-projects and other operations ...”*

They also mentioned that the *“[...] absence of a well-structured strategic plan prevents the creation of a well-communicated plan”*, which would facilitate e-government adoption. Additionally, they mentioned that, *“in cases where an e-tool was adequately communicated and promoted to both government employees and citizens, the e-tool had the highest usage, from both parties”*.

Lack of a Common Identity Code: Most of the interviewees argued that:

“[...] the process to reach a high level of e-government adoption in Cyprus, will be a difficult task, which requires substantial effort in order to be crowned with success, since we lack a common identity code to identify an individual or a business across the various systems of the government”,

They explained that the connectivity of various systems across the government can't be enhanced, hindering systems interoperability and full implementation and provision of e-services: *“the identification policies differ across the public-sector entities”*, as some departments use the social insurance number, some others the identity card number or even the tax identification number. This variability in the identification of individuals and businesses make the adoption of an effective e-government tool impractical. Senior managers must adopt a common and unique identification code, such as the identity card number. Until then, the effective adoption of e-government will be hindered.

Lack of effective policies and procedures: Each department has to apply to the D.I.T.S., which is the public body accountable for facilitating the planning and implementing of an e-tool cooperating with various departments and ministries. The prioritization of e-projects is given by the internal supplier and facilitator, (D.I.T.S.), according to D.I.T.S availability and knowledge (supply), ignoring ministries' and departments' needs. Next an approval is required, however, from the e-Government Board. In relation to the above procedure for implementing e-government tools, the facilitation of implementing e-government tools is also taken by the department of electronic and communication regarding the communication infrastructure. They also stated that *“[...] there is a predefined procedure, which needs to be followed during the planning and implementation stage of an e-tool, and which varies on the e-project's scale”*. On low scale e-projects there is no predefined procedure for planning and implementing. On the integration stage, however, they clarified that *“[...] all necessary procedures and measures are taken on the organization level (i.e. Ministry or department)”*, stating that *“[...] each ministry/department works autonomously according to the top management's decisions and the department's needs [...]”*, resulting in the development of e-projects which facilitate the ministry and department only. The lack of prioritisation on e-projects leads to the development of e-projects with low priority and this does not facilitate the whole of the government restructuring procedure:

“There is no effective e-government strategy at the governmental level. The DITS provides the role of the coordinator of the e-government strategy according to its department’s supply, ignoring demand (departments’/ministries’ needs)”.

Lack of coordination on common e-tools: The majority of the interviewees claimed that there is a lack of coordination for departments and ministries to commonly employ e-tools. They also stated, that the harmonization of the e-government strategy across the various entities of the public sector is the responsibility of D.I.T.S., whose duty is to act as a facilitator in making the appropriate arrangements to build or reuse a common e-tool. An example would be avoiding to set up separate databases. Cooperation and official approval must be pursued by management and this is something that may delay the process, mainly because each department’s and ministry’s needs or the priority for the development of such common e-tools varies. Therefore, decisions on approvals depend on management:

“[...] there are a number of cases in which Departments may have similar needs, but still, they build and use separate tools. The lack of coordination results in a waste of resources...”

Furthermore, the interviewees stated that there is a lack of coordination and co-implementation in order to pursue a shared e-tool. The process of identifying, controlling and collecting the information needed to satisfy the operational needs for a shared e-tool is complicated, since the various departments’ needs vary. The interviewees also mentioned that *“[...] the coordination process within the government is not promoted and supported [...]”*, as additional resources are needed, whilst *“[...] availability of human resources is limited [...]”*. Most of the interviewees stated that the best way to achieve a common e-tool which will satisfy e-service needs, is to establish an interface between or extension of the current e-tools in order to meet the needs of other departments:

“[...] throughout my personal experience such projects are difficult to be designed and implemented and of course to be coordinated, as departments have different needs which affect the e-tools’ specifications. The process which these departments usually follow is to design their e-tools separately, and then a connection between e-tools of various departments can be arranged and achieved when necessary”.

Socio-cultural Factors

Zhao(2011) found that the socio-cultural characteristics of a nation should not be underestimated, since those affect the individuals’ perception on a specific matter. This research identified that the socio-cultural characteristics of the Cypriot public servants affect the successful implementation of e-government. The socio-cultural characteristics that affect e-government implementation in Cyprus fit under those identified from existing literature and refer to civil servants’ resistance to change, top and senior managers’ attitude, civil servants’ attitude and lack of long term goals.

Resistance to Change: The interviewees claimed that initially government employees resist to change, such as, for example, the adoption of an e-tool, because they want to enjoy the security and comfort that they enjoy when sticking to their working routines. One of the respondents claimed that:

“[...] there is resistance to the adoption of new tools. The magnitude of that resistance, and the smoothness of the introduction of any new technology tool in the organization, greatly depends on the “micro” culture of the organization and the demographic characteristics of the employees ...”

One interviewee claimed that the resistance of employees to adopt new e-tools is limited when they are allowed to use both the embedded, traditional, routine way of undertaking one’s duties and the new ‘e-way’. This provides employees with the option to experiment with the e-tool, while keeping appropriate safeguards for their capacity to deliver their work at the appropriate standard. The interviewees stated that providing adequate training can help in overcoming resistance, facilitating the transformation process. They also claimed that the adoption of e-tools varies between employees according to their literacy on ICT, their e-

skills and their previous experience and engagement on e-tools. Specifically, one interviewee stated that resistance from younger employees is rarely exhibited, as they are IT-literate: “[...] *this has to do with computer literacy of younger generation*”. Furthering their arguments, they stated that resistance from older employees is more common and more challenging to eliminate: “[...] *the problem arises from the elders, who they do not know how to use technology and they are not efficient and effective*”.

Senior public managers’ attitude: One of the interviewees stated that civil servant employees are “*facing the problem of blaming*” and, therefore, they avoid taking responsibilities or promote and support initiatives. This is usually the case with higher-ranked employees (senior public managers) who “*are those who regularly delay the process until the official approval is gained, which is usually a long-term procedure ...*”

Civil servants’ attitude: The propensity of civil servant employees to rely on the use of technology when performing their duties affects the fruitful implementation of e-tools: “*the employees’ attitude towards IT and internet was positively related to the use of specialist computer software systems, intranet systems, chats and other tools which arise within the public-sector community*”. For those whose attitude towards IT and the Internet is negative their intention to provide e-services to citizens is limited.

Absence of long-term goals: A minority of interviewees also stated that “[...] *government employees have no long-term goals, while in most of the cases they do not meet their deadlines [...]*”, unless management or political pressure occurs. They also mentioned that they are not task-oriented, as the evaluation system in Cyprus is not comprehensive or entirely effective. One interviewee claimed that the facilitation given to him by each employee on e-projects depends on the employee’s previous experience, qualification and willingness to facilitate the procedure.

Human Resource

As in all organizations so in the public sector, one of the most important factors to run its business and offer services to citizens, is its human resources. The level of knowledge and previous experience, as well as the availability of scarce resources are factors that can determine the evolution of e-government.

Lack of available resources: All interviewees claimed that the Cypriot financial crisis and the restricted regulations imposed by IMF regarding the number of human resources employed affected the evolution of e-government. The lack of availability of human resources, especially on skilled employees in specialized areas, delays the successful implementation of e-government: “[...] *it is the management’s decision to speed up the process of e-government implementation, applying for consulting (outsourcing) the implementation of e-projects, following public procurement procedures*”.

Absence of training: All interviewees claimed that there is lack of training within the public sector. Some employees are IT-literate and some are not: “[...] *there is low usage of technology in performing their duties as most of them are untrained and are unfamiliar of what it really offers to them [...]*” On the other hand, they argued that there is an incremental usage and reliance on technology by public employees especially the younger ones. They also said that their reliance on ICT depends on the qualifications and experience of each employee:

“[...] *as in many cases the IT usage depends on the type of the employee. There are pioneers and early adopters as well as sceptical ones who resist changing [...]*”

Lack of expertise: The majority of the interviewees claimed that there are different kinds of employees; some of them may facilitate the whole procedure and some may not. The e-project managers also stated that they faced difficulties relating to the lack of experience of employees across different departments, limiting the projects’ evolution: “*Some of them [employees] are highly educated, being task oriented and hard workers; and some others are just doing their duties and they become alert when there is either a political or a top public management pressure [...]*”. They also mentioned that they, as managers, “[...] *lack such*

experience and they employ consultants to assist them". In such cases the expertise and the know-how of the consulting activities shifts outside of the government; this is automatically transformed into a barrier on e-government adoption.

Facilitation from low-ranking and younger employees: The interviewees argued that lower ranking and younger employees are mostly enabling factors in adopting e-government. They are IT-literate, more willing to learn new technologies and they are considered hard workers enabling the reformation procedure: "...key personnel are selected to act as the coordinators for the introduction stages on new e-tools..." enabling the adoption procedure. They reasoned that employees are more confident to use new e-tools when two important factors exist "[...] in top management, backing and adequate training and management support".

Environmental Cognition and Consciousness

Sustainability and environmental issues are matters that concern society increasingly during the last decades. Most interviewees claimed that the adoption of e-government is also affected by the sensitivity of an individual regarding the environment and how involved an individual is in sustainable projects. Civil servants with high perception on environmental issues are more likely to use e-services than others:

"[...] it is much easier to curb resistance and convince on the usefulness of e-tolls civil servants that are highly sensitive on environmental issues. There are cases where they also promote a campaign, in order to activate the consciousness of others, via their emails like "Think Green",

On the other hand, civil servants, and generally Cypriots are not as environmentally conscious when compared to other Europeans (EPI Country Rankings, 2017). This may become a factor that hinders the process of adoption of e-government:

"[...] unfortunately, in Cyprus we consider the environment less than other countries, we don't try to find ways to enhance our perceptions. We are not "accomplished" on that specific area; we could use i-clouds or share points to offer e-services in order to save resources, time and money, but we are stacked to the traditional way of thinking and doing things [...]"

Summary of Factors Affecting e-Government

Legal and political issues, as well as organizational and institutional issues are seen to have the most influential factors. Financial, infrastructure, socio-cultural and human resources are also considered as influential factors, but they can be positively influenced by their enabling sub-themes. Environmental consciousness also emerged from this research, as a factor that seems to affect the perception of civil servants regarding the adoption of e-government services. Table 2 exemplifies the factors which affect e-government adoption, from the government's perspective, identifying those that can be characterized as barriers or enabling factors, as transpired from this research.

Table 2. Emerging e-government barriers and enablers

Barrier	Enabler
Budgetary restrictions	
Financial crisis	EU funds
High investment on e-projects acquisition	Cost-benefit analysis
High maintenance and update costs	
Outdated and e-government provision-lacking law and regulation	EU directions
Absence of relevant law	New law on e-signature
	Political pressure
Absence of specific technology	Security and privacy of information
Technological incompatibility	
Technology newness	
Lack of interoperability	
Internet line speeds	

Absence of organisational strategy	
Lack of effective policy cycle management- unclear policies and structures	
Lack of a common identity code	
Absence of coordination	
Managers' attitude towards procedures	
Civil servants' attitude and perception	
Absence of long-term goals	
Resistance to change	
Absence of adequate training	Low-ranking and younger employees
Absence of available human resource	
Absence of expertise in human resource	
Lack of environmental consideration	Environmental perception of civil servants

Discussion and Conclusion

The question underpinning this research was: *“What factors affect the adoption and implementation of e-government, including e-services and e-projects, in Cyprus?”* Several factors that influence e-government adoption in Cyprus were identified. Most emerge from the micro-environment and some from the macro-environment of the public sector. Most of these factors are supported by the literature, indicating, therefore, their capacity to explain e-government adoption in the context of Cyprus as well. Nevertheless, one new factor emerged.

The financial crisis and economic recession impact the government's readiness to spend on e-tools. Nevertheless, the commitment to restructuring and reforming the Cypriot public sector comprises the transformation of the government to e-government, which necessitates the revival of investment in e-government tools. Therefore, while commitment to reformation is present, restrictions are taken into consideration when decisions are made concerning expensive e-projects. With regards to legislation and the legal base of the e-government in Cyprus, the research reveals that even though there is lack of e-government legal base, there is an intention for one to be established, as political pressure is increasing on this front. Nevertheless, current legislation should be revised as in many cases it appears to be an obstacle to fruitful e-government implementation. Additionally, EU directives are considered as a success factor in the Cypriot context, since regulations based on EU regulations result in raising citizens' government decision and thus enhancing their trust. This supports previous research that found that for developing small states external partners can act as a catalyst for implementing new processes (Dimitriou & Zarifis, 2015). The political effect in the Cypriot context is considered to have an effect on this reformation process. In the case of Cyprus political pressure is pushing the process forward, either by facilitating new legislation or by intervening in the implementation of e-projects.

Another important area which impacts e-government is the infrastructure in Cyprus. Although the e-readiness of the public sector seems to be maintained at a high level, the communication infrastructure is lagging. Some advanced communication infrastructure that exists affects e-government adoption positively but as technology develops fast it will always be a matter for consideration. The major themes that have the highest influence on e-government adoption are the organizational and institutional factors. The strength of these factors in the case of Cyprus appears to be affected by the absence of a government strategy at a high level in the political agenda. To this end, political intervention and commitment is considered as the most influential means for implementing e-government in the Cypriot context. Additionally, the absence of a strategic direction creates a lot of inconsistencies across the public sector as different divisions are allowed to follow strategies that meet the requirements of the specific ministries they report to. The absence of coordination and a policy cycle management regarding e-projects appear to be obstacles to embedding e-government.

Additional to the organizational and institutional factors, the human resource is a substantial factor which prevents the e-government transformation procedure. The lack of adequate training, the absence of

appropriate human resources, as well as the lack of expertise from both government employees and managers have a negative effect on the implementation of the e-projects. This is a result of the absence of strategic direction. This study also indicates that younger employees, occupying low-ranked positions are acting as facilitators to the e-government implementation process, mainly because they are well educated and have a positive attitude towards ICT.

Another critical driver is the socio-cultural behaviour of Cypriots, which underpins senior managers and low-ranking employees alike. This research indicates that managers' attitude and perception towards public and administrative procedures and their reluctance to take responsibility, are barriers to adoption. Resistance to change and adoption of e-government is mainly because there is a lack of management support, an absence of adequate training and lack of effective communication. Finally, the implementation of e-government is affected by the perception of civil servants and their cognition regarding the environment. The findings highlighted that Cypriots are not characterized by high environmental consciousness and this is a parameter identified as playing a role in hampering the acceleration of e-government adoption. The research demonstrated that civil servants with high environmental consciousness and cognition are more likely to adopt and promote e-services.

Contribution to Theory

This research contributes to literature by confirming most of the factors that have been manifested in previous studies, as identified by Savoldellis' et al (2014). The technological factor appears to be more significant for e-government adoption in Cyprus than that research on other countries suggest. For example, the lack of a unique identity code for a legal or physical entity prevents public employees to proceed to the development of common or connected e-tools across the government. Additionally, a contribution of this research to the literature and particularly to Savoldellis' et al. (2014) model is that it should encompass the civil servants' environmental consciousness and cognition with regards to the factors that affect the adoption of e-government. The civil servants that embrace environmental considerations promote and use e-services on a daily basis, saving time, lowering costs, whilst minimising the effect on the environment.

Contribution to Practice

This study also contributes to the establishment of a well-structured e-government approach in the Cypriot public sector. The absence of an e-government strategy and the absence of a legal framework conducive to the adoption and implementation of e-government are parameters of paramount importance. Therefore, policy makers and practitioners, as well as politicians should work together to establish a common "e-government strategy" that should be applicable to all areas of the public sector. Then clear and realistic directions should be provided to practitioners and government employees, engaging them in the e-government practice. In addition, an efficient communication plan, regarding the e-government strategy, including the vision and mission of the government, perhaps subsidized by EU funds, should be established. This will enhance the awareness of civil servants and citizens as well.

Additionally, senior management should engage with practitioners, empowering them to review current legislation or missing legislations and promote inconsistencies or deficiencies to policy makers and politicians to proceed with the necessary revisions of the legal framework with the aims of facilitating e-government adoption and implementation across the public sector. They should also take advantage of the ratification of the e-signature legislation and accelerate the procedures to embark on using it.

Project managers implementing the government e-projects can have a greater impact in overcoming the challenges. Challenges such as insufficient authority and training, limited long-term goals, reservations from the civil servants to adopt the new solution and limited trust in the new solutions can be overcome by adopting a transformational leadership style (Gundersen, Hellesoy, & Raeder, 2012). Project managers

adopting a transformational leadership style can motivate, build trust, create a shared vision and generate the necessary environment within their team and other stakeholders for change.

Policy makers should consider how to utilize the EU funds in a more appropriate and efficient manner. This could happen by pursuing e-projects subsidized by EU funds over and above the budget ceiling of each department and ministry for the years of the implementation stage.

Concluding, senior managers, project managers, practitioners, policy makers, politicians and others should consider all the critical factors that impede the effective adoption of e-government in developing EU countries and take appropriate actions to transform them into critical success factors. Likewise, they should be aware of the enablers of the e-government so as not to accidentally take actions that may deem them barriers to this approach.

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