E-Government for National Forest Parks in Greece

Christiana Koliouska[1], Zacharoula Andreopoulou[2], Fedra Kiomourtzi[3], Basil Manos[4]

[1]Laboratory of Forest Informatics, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki, Greece, P. O. Box 247, 54124, e-mail: ckolious@for.auth.gr
[2]Laboratory of Forest Informatics, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki, Greece, P. O. Box 247, 54124, e-mail: randreop@for.auth.gr
[3]Laboratory of Informatics in Agriculture, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece, e-mail: fkiomour@agro.auth.gr
[4]Department of Agricultural Economics, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece, e-mail: manosb@agro.auth.gr

Abstract. Electronic government services strengthen the internal market and complement European Union legislative acts and their effectiveness in a number of domains where ICT can improve delivery of services. Today, there has been observed an increasing interest in applying electronic government to different business sectors such as the environmental sector. Effective and successful management of National Forest Parks relies on a complete understanding of the goods and services which they provide to the society. This paper aims to study electronic government websites concerning the 10 Greek National Forest Parks and analyze the websites as to their qualitative and quantitative features. Then, the electronic services model adoption of the websites is assessed. The electronic government websites are classified in electronic services adoption stages starting from a simple presence of the government agency in the Internet to the total electronic services integration through multiple Information and Communication Technologies tools and applications provision according to content features accomplished by the websites. The findings can be helpful for managers, policy makers, web designers, environmentalists and government agencies.

Keywords: Electronic government, Information and Communication Technologies, Electronic services adoption, National Parks, Website assessment.

1 Introduction

Lately, sustainability has been globally a key goal at local and regional level. The environmental governance and the management issues related to decisions which verify performance have also gained a continuously growing focus. Information and Communication Technologies (ICT) have become the means to make government more accountable, transparent and effective. ICT are key elements supporting the growth of electronic governance (e-governance) initiatives and projects (Andreopoulou et al, 2011).

Proceedings of the 7th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA 2015), Kavala, Greece, 17-20 September, 2015.

Electronic government (e-government) has been defined as "the use of ICT, and particularly the internet, as a tool to achieve better government" (OECD, 2003). In Europe, governments are under intense and sustained pressures to remain competitive on a global level, in responding to a variety of now well-known and profound challenges (demographic change; environmental impacts; natural resource shortfalls; social cohesion, worrisome waste streams, and the like) (European Union, 2013). E-government services strengthen the internal market and complement European Union legislative acts and their effectiveness in a number of domains where ICT can improve delivery of services such as in procurement, health, environment, mobility and social security, and support the implementation of citizens' initiatives with ICT tools (European Union, 2010). Implementation of e-government can produce a form of relationship such as: Government to Citizen (G2C), Government to Business (G2B) and Government to Government (G2G) (Widodo et al., 2013; Hazlett and Hill, 2003).

Further, there has been observed an increasing interest in applying e-government to different business sectors, such as the environmental sector. The contribution of protected areas such as National Forest Parks has been proven to be highly significant for the preservation of biodiversity and of genetic material, for maintaining the productive capacity of the related ecosystems, for the protection of man-made, cultural elements and for rural development as a whole (Arabatzis and Grigoroudis, 2010; Colchester, 2004).

The aim of this paper is to study e-government websites of the 10 Greek National Forest Parks. The websites that enhance government management services in the areas of National Forest Parks in Greece, by using ICT tools and applications, are analyzed. The websites are analyzed as to their qualitative and quantitative e-services features. The retrieved e-government websites are also classified in the four e-services adoption stages, starting from a simple presence of the government agencies in the Internet to the total exploitation of ICT tools and applications according to their content features.

2 Materials and Methods

E-government websites of the 10 Greek National Forest Parks are retrieved from the Internet using various keywords and combinations such as 'Greek National Forest Parks', 'Management Agencies of National Forest Parks', 'Ainos National Forest Park', 'Vikos-Aoos National Forest Park', 'Oiti National Forest Park', 'Olympus National Forest Park', etc. The websites are retrieved using the large-scale hypertextual search engine "Google" which provides much more satisfying results than other existing search engines (Berry and Browne, 2005; Langville and Meyer, 2006).

Initially, qualitative analysis is performed to the collected e-government websites in order to examine the type of common features (e-services) found in these websites. There were various features introduced in the retrieved websites. These features are then used to describe variables x_1, x_2, …x_n. The features that are used are described in Table 1.

Table 1. Variables attributed to e-government services to be achieved by the website

Variable	Feature	Variable	Feature
X_1	two or more languages	X_{16}	links to other companies etc
X_2	information about products-services-activities	X_{17}	various topics of interest
X_3	contact information	X_{18}	downloadable files
X_4	local information	X_{19}	calendar application
X_5	digital map	X_{20}	event calendar application
X_6	audiovisual material	X_{21}	celebration calendar application
X_7	live web camera	X_{22}	social media sharing
X_8	search engine	X_{23}	social media profile
X_9	sitemap	X_{24}	forum
X_{10}	updated enterprise information	X_{25}	related sources of information
X_{11}	online survey	X_{26}	third person advertisement
X_{12}	online communication form	X_{27}	newsletter
X_{13}	weather forecast	X_{28}	RSS
X_{14}	website visitor tracker	X_{29}	code access
X_{15}	Frequently Asked Questions (FAQ)	X_{30}	personalization of the page, trace, safety

Then a quantitative analysis is carried out, in order to examine the presence or absence of common e-services features. A 2-dimentional table is developed that examines the existence of features and the values of 1, for the existence, and 0, for the non existence of the features, are attributed to variables X_1 to X_{30}, respectively. The total amount of e-services features achieved by each website is also studied. For each e-government website, the total number of achieved features is attributed to a new variable, named t. Variable t presents the sum of e-services features, and therefore it takes a value between 1 and 30.

2.1 Classification of E-government Websites in the Four Stages of E-services Adoption

E-government websites are further classified in four categories, each one representing a stage of usage of ICT tools and applications and e-services adoption. Various researchers have described a four stages adoption model (Gossain and Kenworthy, 2000; Rao et al., 2003) that represents four different distinctive categories or adoption stages for an agency with varying strategic objectives and aspirations. These stages are: presence, interaction, transaction and transformation. The grouping depends on the features achieved by a website.

"Presence" is the stage that ensures that the website is accessible in many ways by the users who want to visit the website and interact with the interface in order to gain some information. It is ensured just a simple presence in the Internet for advertisement purposes. "Interaction" addresses the engagement of website visitors and enables them to complete whatever process or experience is provided by the

website. Moreover, in the second stage of interaction, there are some limited actions enabled for the users, such as navigation through the website and the provision of various links.

"Transaction" is related with the e-shoppers experience in the purchasing process and payment orders. Furthermore, in the third stage of transaction there are enabled applications that enhance the transactions where the final user can play a major role, such as electronic exchange of texts and self-services provided for the user. "Transformation" includes the quality of communication and transaction along with responsiveness and reliability to the potential customers. Therefore, in the fourth stage of transformation the value chain is optimized while users have the possibility for online orders and payments while they are simultaneously in position to check the stage of their order.

According to that method, websites that achieve t<=4 , only one to four (1-4) features, are classified in the stage of *presence*, while websites fulfilling five to 21 (a total 5<t<21) features belong in the stage of *interaction*; websites that accomplish 22 to 26 (22<t<26) features belong in the stage of *transaction*, while websites accomplishing the majority or all of the features, a rate 27 to 30 (27<t<30), represent the stage of *transformation* (Andreopoulou et al., 2007; Andreopoulou et al., 2008).

3 Results

The research through the search engines on the Greek Internet resulted in the retrieval of 64 e-government websites that promote the 10 National Forest Parks in Greece.

Concerning the area of Olympus National Forest Park, all e-government websites (7) belong to the second stage of e-services adoption model, the 'interaction' stage. As for the area of Parnitha Forest National Forest Park, seven e-government websites belong to the 'interaction' stage and one e-government website belongs to the third stage of e-services adoption, the 'transaction' stage. There have been retrieved five e-government websites about Parnassos National Forest Park which are classified in the stage of 'interaction'. As for Sounio National Forest Park, all e-government websites (7) belong to the second stage of e-services adoption model, the 'interaction' stage. Concerning the area of Iti (Oiti) National Forest Park, all e-government websites (5) belong to the second stage of e-services adoption model, the 'interaction' stage. Concerning Samaria National Forest Park, one e-government website belongs to the first stage of e-services adoption, seven e-government websites belong to the second stage of e-services adoption model and two e-government websites belong to the third stage of 'transaction'. As for Valia Calda - Pindos National Forest Park, all e-government websites (10) belong to the second stage of e-services adoption model, the 'interaction' stage. There have been retrieved four e-government websites about Prespes National Forest Park which are classified in the stage of 'interaction'. Concerning Vikos - Aoos National Forest Park, the seven e-government websites belong to the second stage of e-services adoption model, the 'interaction' stage.

Table 2. E-services adoption stages of e-government websites per National Forest Park

National Forest Park	Stage 1 "Presence"	Stage 2 "Interaction"	Stage 3 "Transaction"	Stage 4 "Transformation"	E-government websites per National Forest Park
1. Olympus	0	7	0	0	7
2. Parnitha	0	7	1	0	8
3. Parnassos	0	5	0	0	5
4. Enos (Ainos)	0	3	0	0	3
5. Sounio	0	7	0	0	7
6. Iti (Oiti)	0	5	0	0	5
7. Samaria	1	5	2	0	8
8. Valia Calda, Pindos	0	10	0	0	10
9. Prespes	0	4	0	0	4
10. Vikos - Aoos	0	7	0	0	7
Total	1	60	3	0	64

4 Conclusion

The research in the Greek Internet retrieved 64 e-government websites in the areas of the 10 officially recognized National Forest Parks in Greece. The existence of e-government websites constitutes a first and very important step for the enhancement of government management services in these protected areas with the huge natural, ecological and cultural importance. There are identified 30 different e-services features introduced in each e-government website.

Most e-government websites deal with Valia Calda – Pindos National Forest Park, while the least websites serve the area of Enos (Ainos) National Forest Park. Moreover, most e-government websites belong to the second stage of e-services adoption, the 'interaction' stage. These websites apart from the informational material about the provided products - activities – services and the contact information, provide some information about the National Forest Parks with pictures, videos or maps, some useful links to related issues and some limited actions enabled for the user, such as navigation through the website and the provision of various links.

The findings of the study are concurrent to those of similar studies in other western countries about the evolution of e-government among National Forest Parks. The results show that the websites which enhance e-government services need to improve the interaction with the local population. The existence of e-government websites constitutes a first and important step for the promotion of local and sustainable development action. Nevertheless, their association with the local

population is primarily based on the possible citizens' access to the internet society and in the adequate use of internet from the citizens or not. So, it is essential for the state to provide internet access to the vast majority of the population.

Findings can be helpful for managers and policy makers while planning activities and implementing innovative technological changes, such as the functional and effective websites as also for web designers while designing website of similar interest in order to fulfil certain features and characteristics aiming to optimize the websites that promote protected areas and to generally improve effectiveness of e-services.

References

1. Andreopoulou, Z.S., Arabatzis, G., Manos, B. and Sofios, S., 2007. Promotion of Rural Regional Development through the WWW. International Journal of Applied Systems Studies, Vol. 1, No. 3, pp. 290-304.
2. Andreopoulou, Z., Manos, B., Polman, N. and Viaggi, D., 2011. Agricultural and Environmental Informatics, Governance, and Management: Emerging Research Applications. In the book Agricultural and Environmental Informatics, Governance, and Management: Emerging Research Applications. Editors Andreopoulou, Z., Manos B., Viaggi, D. and Polman, N. IGI Global. USA
3. Andreopoulou, Z.S., Tsekouropoulos, G., Koutroumanidis, T., Vlachopoulou, M. and Manos, B., 2008. Typology for E-business Activities in the Agricultural Sector. International Journal of Business Information Systems, Vol. 3, No. 3, pp.231-251.
4. Arabatzis, G. and Grigoroudis, E., 2010. Visitors' Satisfaction, Perceptions and Gap Analysis: The Case of Dadia–Lefkimi–Souflion National Park. Forest Policy and Economics, Vol. 12, No. 3, pp. 163-172.
5. Berry, M.W. and Browne, M., 2005. Understanding Search Engines: Mathematical Modeling and Text Retrieval. Society for Industrial Mathematics (SIAM), Philadelphia.
6. Colchester, M., 2004. Conservation Policy and Indigenous Peoples. Environmental Science and Policy, Vol. 7, No. 3, pp. 145-153.
7. European Union, 2010. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0743:FIN:EN:PDF (28/9/2013)
8. European Union, 2013. Public Services Online, 'Digital by Default or by Detour?'. Assessing User Centric eGovernment Performance in Europe – eGovernment Benchmark 2012. Final insight report. Available at : https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/eGov%20Benchmark%202012%20insight%20report%20published%20version%200.1%20_0.pdf (28/9/2013).

9. Gossain, S. and Kenworthy, R., 2000. Winning the third wave of E-Business - Beyond net markets, NerveWire. Available at: http://www.nervewire.com (20/2/2013)
10. Hazlett, S., A. and Hill, F., 2003. E-Government: The Realities of Using IT to Transform the Public Sector. Managing Service Quality, Vol. 13, No. 6, pp. 445-452.
11. Langville, A.N. and Meyer, C.D., 2006. Google's Pagerank and Beyond: The Science of Search Engine Rankings. Princeton University Press, Princeton.
12. OECD, 2003. The E-Government Imperative. Organisation for Economic Co-Operation and Development, Paris, France.
13. Rao, S., Metts, G. and Mora Monge, C., 2003. Electronic Commerce Development in Small and Medium Sized Enterprises: A Stage Model and its Implications. Business Process Management Journal, Vol. 9, No. 1, pp. 11 – 32.
14. Widodo, A.P., Istiyano, J.E., Wardoyo, R. and Santoso, P., 2013. E-Government Interoperability Framework Based on a Real Time Architecture. International Journal of Computer Science Issues, Vol. 10, No. 2, Is. 1, pp. 469-477