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EVALUATING EUROPEAN MINISTRIES' WEBSITES

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Abstract

Despite the proliferation of e-government in recent years few studies evaluate the efficacy of e-government websites. The aim of this article is to investigate the state of ministries' websites in Europe. Ten types of ministries in ten European countries were selected, thus giving a total of 100 websites. In order to evaluate these 100 European ministries' websites from the citizens' perspective, an evaluation framework (eGovQual) consisting of 100 criteria was developed. The thirteen main evaluation dimensions of the eGovQual are the following: 1) Content, 2) Presentation – Media – Format, 3) User Interface, 4) Structure & Organization, 5) Navigation, 6) Orientation, 7) Interactivity & Feedback, 8) Services – Functions – Facilities – Operations – Applications, 9) Reliability & Availability, 10) Maintainability, 11) Performance, 12) Openness – Compatibility – Interoperability, 13) Security. Then seven University students evaluated these websites using eGovQual. The evaluation results revealed that most European ministries' websites stand at a respectful quality level. The websites of the Ministries of Foreign Affairs, National Defense, and Environment excelled. However, there are inefficiencies with respect to the dynamic interaction and communication with the citizen, the e-services, the personalization, and the special needs person consideration. Furthermore, the sites' administrators should continuously adopt new technological advances (e.g. mobile government, Web 2.0) in order to effectively serve the citizens.

Keywords: e-government, e-services, Europe, evaluation criteria, ministries' quality, websites, usability, website evaluation.

1. Introduction

As the world steps forward and technology develops at high rates, the World Wide Web is expanding to every corner of the earth. Millions of users around the world, every day use the Internet in order to make their life more comfortable. People take advantage of what the Web can offer to achieve this goal. So do several countries around the world that have conceived that the Internet is becoming a mainstream choice for people to contact with Government. As a result, they offer a great number of public services to them via the Web. But as technology advances people

expectations are increasing. Can governmental websites fulfill their needs and expectations? The success depends on a number of criteria that will be presented in the article below.

The Commission of the European Communities (2003) defined e-government as "the use of information and communication technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies". Thus, e-government (Electronic Government) includes all governmental actions that use electronic means. On this basis, different types of interactions can be distinguished: G2C (Government to Citizen), G2B (Government to Business), G2G (Government to Government) and recently, G2NGO (Government to Non-Governmental Organizations) and G2NPO (Government to Non-Profit Organizations) (Montagna, 2005). Kraemer and King (2003) gave the following definition: "Electronic Government refers to the use of information technologies to improve the efficiency, effectiveness, transparency and responsibility of public governments." Another definition is the following: "E-Government means putting citizen services online" (Caldow, 2003).

This paper investigates the state of ministries' websites in Europe. To our knowledge, there are not such previous studies. In order to evaluate these ministries' websites, an evaluation framework of relevant criteria is needed. Although previous research had proposed criteria for evaluating websites, mainly in the e-commerce area, there is not a comprehensive evaluation framework for evaluating e-government websites. After introducing eGovQual, such an evaluation framework from the citizen's point of view, seven undergraduate students in an Economics department of a University evaluated one hundred European ministries' websites using eGovQual.

In the next section, previous research on e-government site evaluation is presented. In section 3, the research procedure and methodology is described. In section 4, the evaluation framework is presented. In section 5, the results are discussed. Finally in section 6, conclusions are drawn and future research is suggested.

2. Previous Research

Previous research on e-government site evaluation takes various approaches. For the evaluation of e-government in New Zealand, Smith (2001) suggested two groups of criteria: a) *Information content* criteria, which evaluate the nature of the information and services provided by the website (orientation, content, currency, metadata,

services, accuracy, privacy and external recognition), and b) *Easy of use* criteria (links, feedback, accessibility, design, navigability). For evaluating St. Petersburg e-government sites, Merkuryeva et al. (2003) suggested three categories of criteria: *functionality, accessibility and usability*. Wood et al. (2003) suggested a multidimensional approach where web evaluation methods fall into four major classes: *Usability testing, User feedback, Usage data* and *Web and Internet performance data*. The evaluation results can offer to website developers a very detailed and specific feedback on site design and functionality. However, the major problem of this approach is its high cost. West (2003; 2005) focused on six policy issues facing the public sector: D*isability access, Readability, non-English language accessibility, Interactivity, Equity of access across the agencies,* and *User fees and premium sites*. Barnes and Vidgen (2003; 2004) proposed an evaluation method based on the *WebQual instrument*. The WebQual instrument is a detailed questionnaire containing twenty topics that users are asked to rate using a seven-point scale. For the evaluation of American governmental web sites, Freed (2003), the president and CEO of ForeSee Results - an expertise web satisfaction management company – suggested the use of a survey where the sites are rated by their visitors. The rating is converted through the ACSI (American Costumer Satisfaction Index) methodology into a score on a 0-100 point scale. The ACSI methodology, produced quarterly by the University of Michigan, is a national economic indicator of customer evaluations of the quality of goods and services available to household consumers in the United States. These results are used to link consumer satisfaction to measurable business results. Steyaert (2004) proposed an evaluation model, using the e-commerce model of Watson et al. (2000). This model includes five e-commerce performance indicators: *awareness, popularity, contact, conversion* and *retention*. Taken together, these five marketing indicators can help IT managers to measure the web efficiency of their sites. Top Of The Web (2003) proposed the use of questionnaires to measure the quality and the usage of public services. The following three topics were measured: i) *overall evaluation*, ii) three criteria of *usability* (effectiveness, efficiency, user satisfaction), and iii) seven types of *benefits* (save time, gain flexibility, getting more and better information, receive better help, getting a faster case/reply, getting better control over the process, save money). Signore (2005) suggested five quality dimensions: *correctness, presentation, content, navigation and interaction.* Banerjee and Chau (2004) focused on the creation of an evaluation framework to analyze the e-government convergence capability in developing countries.

Wauters et al. (2007) examined more than 5,000 public agencies' websites in 27 European Union countries plus 4 other European countries. They evaluated 20 public *services* on these websites. These services include the following 12 services for citizens: Income taxes, Job search services, Social security benefits, Personal documents (passports / driver's license), Car registration, Application for building permission, Declaration to police, Public libraries, Certificates, Enrolment in higher education, Announcement of moving, and Health-related services. Also, they include the following 8 services for businesses: Social contributions for employees, Corporate tax, VAT, Registration of a new company, Submission of data to statistical offices, Customs declaration, Environment-related permits, and Public procurement. Specifically regarding e-taxation websites, Economides and Terzis (2008) evaluated the e-taxation websites of five European countries with respect to five quality categories: *content, presentation, usability, technical and e-services & interactivity.* Each quality category consists from several sub-categories.

A totally different approach is the evaluation of websites using web diagnostic tools (Choudrie et al., 2004). These tools can produce unbiased results examining critical issues such as are the accessibility, the broken links and the colors schemes that have an impact upon people with various forms of color blindness. Some of these tools are: WebXact (http://webxact.watchfire.com), NetMechanic (http://www.netmechanic.com), Validator (http://validator.w3.org) and Vischeck (http://www.vischeck.com). Also, Wulff (2007) presented a usability testing technique called "Eye Tracking". Eye tracking is a tool used to analyze human - computer interaction by registering the user's eye movements and fixation time. In a different approach, Gardner (2007) used evaluators to remotely perform 25 tasks on the United Nations Economic Commission for Europe (UNECE) Statistical Division website. The goal was to find out usability inefficiencies.

However, most of these previous approaches suffer from several limitations: (a) the high implementation cost of some methods; (b) the need for specialized laboratories and equipment by some methods; (c) the criteria used by some methods are abstract and general and can mislead the evaluators (also, some times the same criteria are considered twice); (d) some categories of citizens (e.g. special needs persons) are not taken into consideration by some methods.

Trying to overcome these limitations, we developed eGovQual, an evaluation framework from the citizens' point of view tailored to e-government websites.

3. Research procedure

The task procedure can be divided into four phases. During the first phase, we selected the ministries' websites. First, we considered the websites of ministries that are considered as the most important in most countries. These are:

1) Ministry of Economy,
2) Ministry of Interior,
3) Ministry of Foreign Affairs,
4) Ministry of Labor,
5) Ministry of Health,
6) Ministry of National Defense,
7) Ministry of Culture,
8) Ministry of Environment,
9) Ministry of Justice,
10) Ministry of Education

Then, we considered ten European countries across various European regions. These countries are: Belgium, Croatia, England, Finland, France, Germany, Greece, Italy, Poland, and Spain. We tried to represent different geographical and cultural areas of Europe.

During the second phase (2006-2007), we closely examined each one of these one hundred websites. So, we explored almost every page of every site in order to find out the advantages and drawbacks of each site. During the third phase, we developed the evaluation framework (eGovQual) based on our experience with these ministries' websites, on our experience of using and evaluating other website types and on previous research. Finally, during the last phase, seven undergraduate University students evaluated these one hundred websites using eGovQual. Besides their mother tongue, all students were fluent in English. Some of them were also familiar with other languages. Furthermore, they used translation machines (e.g. Google Language Tools) to translate web pages into their mother tongue.

They gave marks for each criterion for each site depending on the degree that the site fulfilled this criterion. For each criterion, the range of marks was from 0 to 5. So, the marks were: 0:=non-existence, 1:=very poor, 2:= poor, 3:=moderate, 4:= good, 5:= very good. The evaluation took place during 2006-2007.

4. Evaluation Framework - eGovQual

One of the most important parts of the whole task is the definition of the criteria that will be used to evaluate the ministries' websites from the citizens' point of view. We considered thirteen categories of criteria (Table 1):

1) Content,
2) Presentation – Media – Format,
3) User Interface,
4) Structure & Organization,
5) Navigation,
6) Orientation,
7) Interactivity & Feedback,
8) Services – Functions – Facilities – Operations – Applications,
9) Reliability & Availability,
10) Maintainability,
11) Performance,
12) Openness – Compatibility – Interoperability,
13) Security.

These 13 categories are further divided into subcategories consisting of about 100 different criteria. Some of these criteria were also proposed by previous researches in the field (Table 2). We used so many different criteria in order to consider as many as possible aspects and details of each site from various points of view.

The evaluators considered all criteria in evaluating the ministries websites. Based on their personal experience and preferences, they assigned a mark on each category for every ministry's site. These websites are used by ordinary people. So, the evaluators were ordinary people and not e-government experts, designers and developers. However, the evaluators had to do a lot of work. Since we wanted to perform a holistic evaluation of the ministries' websites, we used many criteria. So, we got a detailed picture of the sites' structure and offered services. No other previous approach used so many criteria. Many of the previous studies used some basic criteria but did not take into consideration some other important ones. Although we used many criteria, anyone with a little experience on the Web can rank a site with respect to each one of these criteria. There are several aspects to be discussed over this matter.

To start with disadvantages, it is clear that anyone having to do an evaluation using marks or points evaluates subjectively judging by his own taste, his own beliefs and experiences. This is true regarding criteria that are based on matters of taste, of

convenience, of aesthetics, etc. that differ from person to person. For example, there are criteria like colors, fonts, variety of media, right position of media etc. These depend on someone's taste when it comes to make a judgment, so different marks are expected. However, there are some criteria that take no more than two different answers (existence or not). For example, criteria like Special Needs Persons Consideration, Site Map, Search and FAQ (Frequently Asked Questions) are either fulfilled or not. Specifically, regarding Special Needs Persons Consideration it was examined whether there was any consideration at all, even the simplest one (e.g. zooming, colors, voice). Another thing is that the good quality in a criterion could lead to low quality in another criterion. For instance, the quality of the media (pictures, slides etc.) can affect someone's marks in the Presentation criteria but at the same time in the Performance criteria. This can occur when a picture with high resolution takes longer time to load.

On the other side, there are plenty advantages that this method has to offer. First of all, the simplicity (i.e. no special knowledge and skills needed) of performing the evaluation can enable the use of a big sample of "evaluators", which means that the evaluations' subjectivity could be "neutralized". Secondly, there are many evaluation criteria in order to capture a very detailed picture of what the ministries' websites can offer to users. Finally, this evaluation framework can point out the strengths and inefficiencies of a website helping by this way the web designers to enhance the strengths and correct the inefficiencies.

5. Results and Discussion

At a first glance, the results are encouraging. Most of the sites satisfy the basic users' needs. They contain an adequate pack of information that covers most of the users' requirements. The sites' Presentation and Navigation, key factors that affect people opinion towards a governmental portal, are quite good. In general, an ordinary citizen looking for some basic E-Services will probably be satisfied by most sites. But when it comes for an experienced user (or an evaluator using some specific criteria) to explore the sites, there are some issues that need discussion.

First of all, it was obvious that in the majority (around 70%) of the sites there was no consideration for individuals who have visual disabilities or hearing impairment or face other physical challenges. There were no options like magnifying the text by changing the font size or the colors of the page or providing audio support. So, persons with special abilities were not having equal treatment as others. Notable

exceptions were the English and Italian sites, German Ministries of Health and Justice, French Ministry of Education, and Finnish Ministries of Economy and Foreign Affairs.

However, this inefficiency also appears in even more advanced countries in e-government, like USA (West, 2003; West, 2005). Similarly, Wauters et al. (2007) found that compliance to international Accessibility standards was poor, with only 5% of 5000 European public service websites making this visible (e.g. statement; logo). This indicates very modest progress compared to the 3% of the 436 online public service websites achieved the minimum standard under the W3C Web Content Accessibility Guidelines in 2005.

Another important issue that the authorities and web designers should focus on is the orientation of the users into the site. This can be enhanced by supplying many more tools (e.g. Search and advanced search from every page, Index and Directory, Navigation trail, Stable position of the menus in the entire site) in order to facilitate the citizens to access what they are looking for.

Also, the lack of adequate feedback options made the sites impersonal. Functions such as user login (e.g. Polish Ministry of Foreign Affairs), application forms, forums or new-special content and deadlines could be necessary for some cases. The creation of forums into the sites could be a great advancement that could help citizens discuss common problems and solve them. French and Finnish Ministries of Education were two out of few sites to host a forum.

More specifically, the evaluation results of the European ministries' sites with respect to the countries are presented in Figures 1-13, and with respect to the ministries' types in Figures 14-27.

5.1 Evaluation with respect to the countries

The purpose of this study was not to compare the countries but to find out the state of ministries' websites and the existence of any large deviations among the countries. Most countries' sites provided *Content* that was comprehensive and relevant to the sites' purpose, as well as multiple language support for immigrants and visitors from foreign countries (Figure 1). France leads with regards to Content because almost all of its sites were offering rich content, which was day-by-day updated and categorized in appropriate categories. This option makes the searching of the required information very easy. Greek sites (with the exception of the Ministries of Foreign Affairs and Justice) achieved the lowest scores because of the small amount of information supplied, the lack of multi-language support and the not recently updated content.

Generally, there was not a large variation among the countries regarding the Content. There was a satisfactory amount of information in every site. This was expected since these sites were designed aiming to provide news and information to citizens to make their lives easier.

German sites showed a nice *Presentation-Media-Format* using the appropriate fonts and combination of colors, many pictures and media. That is why they achieved the highest average score of 4.6 (Figure 2). Presentation is a key factor to the success of a site as it makes it more approachable to the users and provides a friendly, pleasant environment with pictures and multimedia instead of just plain text. German sites designers achieved this as they used among others appealing colors and pictures next to each topic. Belgian sites achieved the lowest score of 3. The evaluators did not like the Belgian sites topics' presentation. In addition, many Belgian sites were using small fonts (e.g. Ministries of Economy, Interior, and Foreign Affairs), intense colors and color combination, and were ignoring persons with special abilities.

Regarding the *User Interface* (Figure 3) and *Structure & Organization* (Figure 4), Germany, England, and Spain supported well-organized sites that could be easily accessed. In a well-organized site, the organization of its material is logical and intuitive. So, the user could easily explore the site and find what s/he is looking for. S/he should not need to access every page of the site in order to find what s/he is looking for. Furthermore, the sites presented their topics and directories in stable positions on their pages. User Interface and Structure are crucial for the satisfaction of the users and are also related to the Presentation and the Navigation. As before, Belgian sites (specially, Ministries of Foreign Affairs, Justice and Interior) achieved the lowest score. One should always have in mind that these sites are accessed by citizens of different educational levels, computer skills, web navigation experience and abilities. So, both a novice and an experienced user should be able to easily use them.

Similar results were derived regarding *Navigation* (Figure 5) and *Orientation* (Figure 6). German, English, and Finnish sites were offering easy and simple navigation and consistent orientation throughout the whole site.

Finnish sites were the most satisfying regarding *Interactivity & Feedback* (Figure 7). For example, the Finnish Ministry of Foreign Affairs provided a variety of forms to the users such as forms for human rights complaints, and for visa applications in the Schengen area. Most Finnish sites provided a "Feedback" button that activates a short message sent to the corresponding department of the Ministry. They also offer to the user many contact options, like e-mail addresses, telephone numbers and postal

addresses. These options could be available in all European governmental sites. We should keep in mind that these sites were designed in order the government to come closer to the citizens and satisfy their needs. In order to achieve this, they must be in close touch with the citizens to receive their complaints, their questions and their suggestions that will improve the sites and the offered services. Greek sites achieved the lowest score in terms of interactivity as they did not offer many options in order to contact the authorities, to submit online applications or download forms.

Services represent the most advanced features of a government site. It could be useful that a citizen complete all of his transactions with the government through government sites. So, ministries sites should offer as many as possible services to the users. German and Finnish sites were once again leading the way as they offered several useful and innovative services (Figure 8). For example, a visitor of the German Ministry of Economy could order various brochures from the site using a shopping basket. Most of the German sites offered the option of ordering brochures in paper format, plus most of them had download folders filled with multimedia (Ministries of Interior, Foreign Affairs, National Defense, and Environment). Moreover, they did take into consideration people with visual disabilities. For example, visitors could set the font size and the contrast or listen to the text (Ministries of National Defense, Justice, and Education).

This paper's objective was not to compare the ten countries. However, these countries were ranked by a recent benchmarking of the online public services regarding online sophistication maturity as follows: UK, France, Germany, Spain, Finland, Belgium, Italy, Greece, and Poland (Wauters, 2007). Also, they were ranked regarding full online availability as follows: UK, Germany, France, Italy, Spain, Finland, Belgium, Greece, and Poland (Wauters, 2007). In our study, Germany and Finland achieved the highest score regarding the ministries' e-services, while Greece the lowest (Figure 8).

Concerning *Reliability & Availability* (Figure 9), *Maintainability* (Figure 10), and *Performance* (Figure 11) there were not many significant variations among the sites. Almost all sites were continuously available; 24x7 availability, meaning that the government services are available 24 hours per day, 7 days per week (Criado, 2003). However, Croatian sites fell short mainly due to many "under construction" messages that were observed in their pages (e.g. Ministries of Economy, and Education). Similarly, results were achieved regarding *Openness-Compatibility-Interoperability* (Figure 12). It is notable that the vast majority of the sites functioned smoothly without technical problems.

Finally, it was examined *Security*, a very sensitive issue for gaining the citizens' trust. English sites appeared to have worked on security and privacy issues the most as they were interested in taking care and informing the users about topics as: privacy policy, crown copyright, freedom of information, terms and conditions of use, security policy etc at the bottom of their home page (Figure 13). On the contrary, most of the Greek sites did not inform the user about such issues.

To sum up, Germany (total average score= 4 000), England (total average score= 3 984) and Spain (total average score= 3 823) were the countries with the best ministries' sites. On the other side, Greece (total average score= 3 300), Belgium (total average score= 3 461), and Italy (total average score= 3 523) should put effort on upgrading their ministries' sites. Several explanations have been given above for the underachievement of these countries. A last remark has to be made regarding the low scores of Belgian sites that surprised the evaluators. A higher score was expected since Belgium is a technologically advanced country. So, being a technologically advanced country does not guarantee that this country will develop satisfying and appealing governmental websites. In order to develop effective sites, it is necessary to continuously take into consideration citizens' requirements and needs and adopt new technologies and applications.

A final comment has to do regarding at which categories of criteria the ministries' sites achieved the highest and the lowest scores. The sites achieved high scores regarding *Openness-Compatibility-Interoperability* (Figure 12), *Maintainability* (Figure 10), and *Content* (Figure 1). The sites supported users with different types of connections, operating systems and did not require any special software and Plug-ins. Also, they offered technical support and comprehensive content to the user. On the other hand, the sites did not satisfy the evaluators with respect to *Interactivity* (Figure 7), and *Services-Functions-Facilities-Operations-Applications* (Figure 8). That means that the evaluators demand for more interactive and convenient sites that provide even more services to citizens.

5.2 Evaluation with respect to the ministries

Next, the evaluation results are presented with respect to the ministry type (Figures 14-27). For example, the Content score of the Ministry of Education is the average Content score of all ten Ministries of Education. This could enable us to examine at what extend each ministry type satisfies the citizen expectations. The purpose of this study was not to compare the ministries but to find out the state of ministries' websites and the existence of any large deviations among the ministries' types.

Regarding *Content*, the Ministries of Foreign Affairs, National Defense, and Environment provided the most comprehensive content (Figure 14). A possible explanation could be that these ministries deal with issues that attract the interest of many people; not only citizen but foreigners too. So, they have to offer rich and quality Content. These three ministry types were the most advanced in most categories of criteria. Ministries of Foreign Affairs could be considered as "best practice" due to their extensive and daily updated content plus the support of many language options which is an accommodation definitely required by the visitors of the Foreign Affair Ministry. A negative surprise was triggered with regards to the scores of the Ministries of Culture sites. These sites were unexpectedly achieved the lowest scores with respect to the Content. Someone could expect that these Ministries present the art and culture of their nation in the best possible way, not only to attract tourists but also to promote and propagandize their nation's culture to the whole world. The evaluators suggested that these sites could inform the visitors about the cultural heritage of their nation by providing plenty of information about their history, civilization, tradition, culture, art, museums, etc. as well as the ability to reserve tickets and order brochures and items.

Most Ministries of Environment were impressive and leaders regarding *Presentation-Media-Format* issues (Figure 15). Of course, these ministries have an advantage due to their theme. Vivid colors (i.e. Polish site), nice pictures and multimedia improved the presentation of these sites. Ministries of National Defense and Foreign Affairs also exhibited nice Presentation. On the contrary, once again the Ministries of Culture did not achieve a high score failing to take advantage of their theme. These sites could show to the visitors various types of multimedia (e.g. pictures, music, video, television) regarding art events and performances, monuments, landmarks, artifacts, traditional habits and customs etc. that could improve the sites' picture.

Regarding *User Interface* (Figure 16) and *Structure & Organization* (Figure 17), similar results were expected because similar issues were examined. Once again the Ministries of Foreign Affairs stood as the best practice. Polish Ministry of Foreign Affair offered a member's login service for their visitors and text-only version in case of users with low-speed connection. The users seem to appreciate such services as they can navigate a user-friendly environment designed according to their personalized needs. Again, the worst sites were those of the Ministries of Culture. Keeping on, Ministries of Foreign Affairs were the leaders regarding *Navigation* (Figure 18) and *Orientation* (Figure 19). The navigation trail, the Home button in

every page, and the site map were helping users to explore the sites. Ministries of Justice failed to manage and organize their website space in a manner that could help users to access easily every kind of information they are looking for.

The sites achieved the lowest scores with respect to *Interactivity and Feedback*. All Ministries types did not satisfied the evaluators. Especially, the Ministries of National Defense and Culture were the most disappointing. According to the evaluators, the lack of options such as Online Applications or Newsletter and Downloading section was the most striking miss.

One of the most important categories is that of the offered *Services*. Ministries of Foreign Affairs lead the way. For example, the Belgian Ministry of Foreign Affairs provided services concerning nationality issues, registry, legalization and much more. The Italian site was offering many similar services too, in addition to a very innovative virtual tour option.

Finally, regarding *Security*, the Ministries of Foreign Affairs leaded again, while the Ministries of Interior and National Defense followed closely. These types of ministries are probably the most popular governmental sites and they host many sensitive services. So, a security system that could guarantee the safety of the transactions, the navigation and the privacy of the users is required. Moreover, it is a main issue (especially for the Ministries of the National Defense) to make citizens feel safe towards any kind of electronic threats, as they reflect a robust governmental policy towards malicious invaders.

While the Ministries of Foreign Affairs and those of National Defense were the best sites, the Ministries of Culture and Labor did not achieve high scores in most categories of criteria. This is a surprising result if we consider the importance of Culture and Labor in the citizen life. These sites had unsatisfactory structure, were not user friendly and offered the minimum feedback services. At least, the Ministries of Labor provided adequate online services but they should add even more, like a service that could establish contact among unemployed people and the enterprises that are looking to hire staff. Ministries of Culture could increase their popularity by hosting forums where people could have open discussions regarding historical events and cultural issues. They could also present the art and culture of their country using advanced multimedia tools in order to attract tourists and advertise their culture.

The final results of the evaluation illustrate the fact that European governments made a huge effort to offer services to citizens and enterprises via the Internet.

6. Conclusions and Future Research

This paper presented the evaluation findings of the main ministries' websites of ten European countries. Its purpose was to investigate the state of the ministries' websites from the citizens' point of view under a common framework and not to rank the websites or the countries.

The basic features (e.g. return to Home from every page, search, contact us, news) were offered by almost all sites. Also, most sites offered important services such as language selection, download section to get press releases, brochures, videos or photos, or even some basic multimedia and document software. However, special needs person consideration (e.g. font size and color configuration) and interaction between the site and the citizen (e.g. member login, subscription to receive a newsletter, RSS service, forums) were missing in most of the sites. Specifically, we counted:

- Only 2 sites performed any type of polls
- Only 5 sites hosted a discussion forum
- Only 20 sites hosted the service of Newsletter
- Only 31 sites offered the RSS service
- Only 32 sites took into some consideration people with visual or hearing impairments
- Only 57 sites provided the option of language selection (English was the dominant language)
- Only 67 sites offered a download section with documents, photos or videos.

Also, 8 sites were not updated on a detail basis.

Next, we describe at what stage of development the ministries' sites stand. Let consider the following three stages:

1) Access Information stage: Site-to-citizen (e.g. read information, requirements, regulations, advices, benefits etc., download forms)
2) Communication stage (e.g. email, request information, complains, suggestions, discussion, chat, forum, conferencing, alerts, sms)
3) Secure Communication stage (e.g. filling application, receiving certificate, e-payment, voting).

All of the examined ministries' sites successfully passed the first stage of development where the flow of information is one-way directed from the site to the citizen. The majority of the sites stood in the second stage where there is interaction between the site and the citizen. Almost 20% of the Ministries reached the third stage

of secure communication. These ministries were mainly the Ministries of Interior and Foreign Affairs. These sites provided applications to get a Visa, renew or get a new passport (Ministries of Foreign Affairs), voting (e.g. Croatian Ministries of Interior and National Defense) or even deposit a tax declaration and an added value tax declaration (e.g. Ministries of Economy). It is clear that when private personal data are exchanged between the sites and the citizen, the safety and the privacy of the transactions should be assured.

Citizens increasingly get online rather than by phone, in person or other traditional means and they save time from bureaucracy procedures. The governmental sites have to continuously develop and adopt modern technologies and systems (e.g. location-based services, map navigation, GPS- Global Positioning System, mobile TV, Wi-Fi, Bluetooth, RFID- Radio-frequency identification). For example, they should adopt m-Government (i.e. the use of mobile and wireless communication technology within the government administration and in its delivery of services and information to citizens and firms; Ostberg, 2003), CRM (Customer Relationship Management) and ERP (Electronic Resource Planning). They should also offer their content and services in the most appealing way (e.g. virtual tours in the Italian Ministry of Foreign Affairs, streaming video and TV news). For example, French, German and Spanish sites offered printer-friendly versions. Furthermore, they have to become more sensitive towards health issues following the example of the Italian Ministry of Health that hosted a video campaign with respect to the HIV (Human immunodeficiency virus). They should also become more sensitive towards ecological issues.

The Ministries' sites should employ technological advances in order to better serve the citizens. For example, the Ministries of Labor could send job postings to the mobile devices of citizens looking for a job. The Ministries of Health could offer continuous monitoring chronic patients using mobile devices. The Ministries of Transportation could send traffic updates on citizens' mobile devices. The Ministries of Environment could present the current environmental conditions (e.g. atmospheric pollution) in various regions. The Ministries of Economy could offer the current prices of several markets (e.g. stock, housing, food). The Ministries of Interior could send warnings (e.g. hurricane, flood, fire) using sms on citizens' mobile devices.

The above outcomes lead to the conclusion that the design of a central strategy with predetermined targets and specific time plans is required to enhance and improve e-government. However, this strategy implementation presupposes and requires the following (Tahinakis et al., 2006):

- Political will

- Redesigning of processing procedures
- Change of the public services' way of organization
- Modification of the current legal status
- Alteration of the attitude from "public sector centric" to "customer-centric services" and
- Cooperation between the different public sector institutions for the creation of an electronic virtual government (Makrimanolakis, 2002).

The presented evaluation method was based on a wide spectrum of criteria. Some of them were similar to those of previous studies (Table 2). Each site was evaluated in full detail and almost every aspect of the site was highlighted. As opposed to previous studies, this paper considered a large number of criteria trying to incorporate many citizens' demands. Considering all these criteria, sites' designers should continuously evaluate and redesign their sites in order to fulfill the rising expectations of the citizens and make the sites' operation efficient and effective.

On the other hand, the limitation of this evaluation method is the short number of evaluators that were used to generate the final result. This limitation can obviously be weathered through the use of a bigger sampler of evaluators that will provide a better statistical result. Also, the evaluators were undergraduate students in an Economics department. A larger sample of evaluators at various ages, citizenships, cultures, educational levels, disciplines, economic levels and occupations could provide a more accurate average score. Also, the use of a wider grades' scale (e.g. from 0 to 10) could make the evaluation more accurate and the differences between the sites could be clearer. Finally, we should mention that this research and evaluation of the ministries' sites took place during winter 2006 and spring 2007, so changes in the sites' characteristics are expected in the future.

Future research could repeat this evaluation considering larger numbers regarding (a) evaluators, (b) ministries' sites and (c) countries. For example, a large number of people from different countries could evaluate all ministries' sites. Furthermore, new categories of criteria could be introduced for evaluating new services (e.g. mobile services, location-based services) that will sooner or later appear in e-government. For example, new criteria could examine the sites with respect to semantics, to personalization, to easiness of comprehending the Content (e.g. by educated or illiterate people) or to examine the impact of mobile technology on citizen interaction with government. Most ministries' sites ignored people with special needs. Further efforts should be made to facilitate the equal e-government access for all people without discrimination.

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Table 1. Criteria used for the evaluation of the ministries' websites

1. CONTENT
Comprehensive, complete, valid, accurate, correct content
Useful, relevant, simple and clear content
Unique content
Current and updated content
Uniform and consistent use of terms
Multiple languages for Immigrants
Special Needs Persons' consideration
Non-discrimination and Objectivity
Variety of links to other useful Websites

2. PRESENTATION – MEDIA – FORMAT
Variety of Media (Text, Diagrams, Pictures, Maps, Sound, Video, Webcam, etc.)
Quality & Fidelity of Multimedia
Right Spelling, Grammar, Syntax, etc.
Appropriate & Effective Titles
Aesthetics
Suitable and Consistent use of Style, Format, Colors and Fonts
Right Quantity of Multimedia
Right Mix of Media
Right Position of Media
Special Needs Persons' consideration (e.g. audio, zooming)

3. USER INTERFACE
User Profile Registration, Modification, etc.
Simple, Useful and Effective Menus, Toolbars, Buttons and Shortcuts
Appropriate & Useful Frames
Ergonomic User Interface
Right Position of Menus, Toolbars, Frames etc
Consistent and Stable position of Menus, Toolbars, Frames, etc. in whole website
Appropriate Background
Input and Output for Special Needs Persons

4. STRUCTURE & ORGANIZATION
Simple structure & organization
Intuitive and Rational structure and organization
Appropriate Number of Levels and Choices per Level

5. NAVIGATION
Easy and Simple navigation
Intuitive and Rational navigation
Accurate and Consistent navigation
Alternative paths to a page
Shortcuts
Return to Home from every page
Help from every page
Notification when transfer to another website
No Navigation Errors
No Broken and Missing Links
No Under Construction Pages
Clear and Consistent Highlighting of links
Navigation Prediction (e.g. short description of links)
Navigation Trail and History
Special needs persons' consideration

6. ORIENTATION
Variety of orientation methods
Appropriate Quantity of orientation and accuracy of orientation in every page
Consistent orientation through the whole website
Simple Search from every page
Advanced Search from every page
Site Map
Table of Contents
Subject Index and Directory
Alphabetical-Chronological-Geographical Index
Departments Directory
Persons-Telephone-Email-Addresses-URLs Directory

7. INTERACTIVITY AND FEEDBACK
Online application
Email, Telephone, SMS, Fax, Postal Address
Newsletter, RSS feeds, Podcasts
Alerts for New or Special content or deadlines
Chat, VoIP, Videoconference
Discussion Forums, e-Communities
Blogs, Wikis
Polls, surveys, voting
Downloading
Easy use of interactivity
Request – Applications Form
Complaints and Suggestions Form

8. SERVICES – FUNCTIONS – FACILITIES – OPERATIONS – APPLICATIONS
Variety of services (e.g. application for passport, car registration, taxes declaration, birth certificate, unemployment aid)
Easy to Find and Use the services
Description of services procedures
FAQ (Frequently Asked Questions)
What's New?
Easy Request a service
Easy Printing Downloading and Storing
Easy Payment

9. RELIABILITY & AVAILABILITY
Continuous operation
Recoverability & Resume-ability in case of error/fault
Asking for Confirmation
Acknowledging Transaction

10. MAINTAINABILITY
User Technical Support

11. PERFORMANCE
Input Speed (e.g. Application submission)
Output Speed (e.g. Multimedia downloading)
Processing Speed (e.g. Calculation, Searching, Order)

12. OPENNESS–COMPATIBILITY–INTEROPERABILITY
Support various User Connections (e.g. low communication speed users, wireless users)
Support various User Operating Systems
No need for User to have special software and Plug-ins

13. SECURITY
Security Certifications and Guarantees
Confidentiality and Privacy of user
Control of Personal Data and Profile by user
Non Obligatory Registration
No unauthorized user monitoring (e.g. cookies)

Table 2. Criteria used by previous approaches evaluating websites

1.1. Criteria	*Previous research*
1.Content	Withrow et al., 2000; Smith, 2001; Denfeld et al., 2002; West, 2005; Stowers, 2002; Merkuryeva et al., 2003; Huang, 2003; Top Of The Web, 2003; Wood et al., 2003; Choudrie et al., 2004; Steyaert, 2004; Australian Gov. Information Management Office, 2005; Lihua and Zheng; 2005; Montagna, 2005; Economides and Terzis,2008;
2.Presentation-Media-Format	McClure et al., 2000; Withrow et al., 2000; Smith, 2001; West, 2003; Huang, 2003; Merkuryeva et al., 2003; Top Of The Web, 2003; Wood et al., 2003; Economides and Terzis,2008;
3.User Interface	Withrow et al, 2000; Huang, 2003; Ma, 2003; Top Of The Web, 2003; Wood et al., 2003; West, 2003; Choudrie et al., 2004; Steyaert, 2004; Australian Gov.Information Management Office, 2005; Montagna, 2005; Economides and Terzis,2008;
4.Structure-Organization	Withrow et al., 2000; Stowers, 2002; Economides and Terzis,2008;
5.Navigation	Smith, 2001; Huang, 2003; Merkuryeva et al., 2003; Wood et al., 2003; Top Of The Web, 2003; Economides and Terzis,2008;
6.Orientation	Smith, 2001; Huang, 2003; Economides and Terzis,2008;
7.Interactivity-Feedback	McClure et al., 2000; Larsen and Rainie, 2002; West, 2005; Stowers, 2002; Merkuryeva et al., 2003; Wood et al., 2003; West, 2003; Steyaert, 2004; Zhou, 2004; New Zealand E-Government Strategy, 2005; Economides and Terzis,2008;
8.Services-Functions-Facilities-Operations-Applications	McClure et al., 2000; Smith, 2001; West, 2005; Stowers, 2002; Choudrie et al., 2004; Steyaert, 2004; Zhou, 2004; Lihua and Zheng, 2005; New Zealand E-Government Strategy, 2005; Economides and Terzis,2008;
9.Reliability-Availability	McClure et al., 2000; Smith, 2001; Barnes and Vidgen, 2003; Wood et al., 2003; Economides and Terzis,2008;
10.Maintainability	McClure et al., 2000; Economides and Terzis,2008;
11.Performance	Wood et al., 2003; Economides and Terzis,2008;
12Openness-Compatibility-Interoperability	Smith, 2001; Stowers, 2002; Merkuryeva et al., 2003; Top Of The Web, 2003; Wood et al., 2003; Economides and Terzis,2008;
13.Security	McClure et al., 2000; Smith, 2001; Stowers, 2002; West, 2005; Barnes and Vidgen, 2003; Economides and Terzis,2008;

Figure 1. Content average score per country

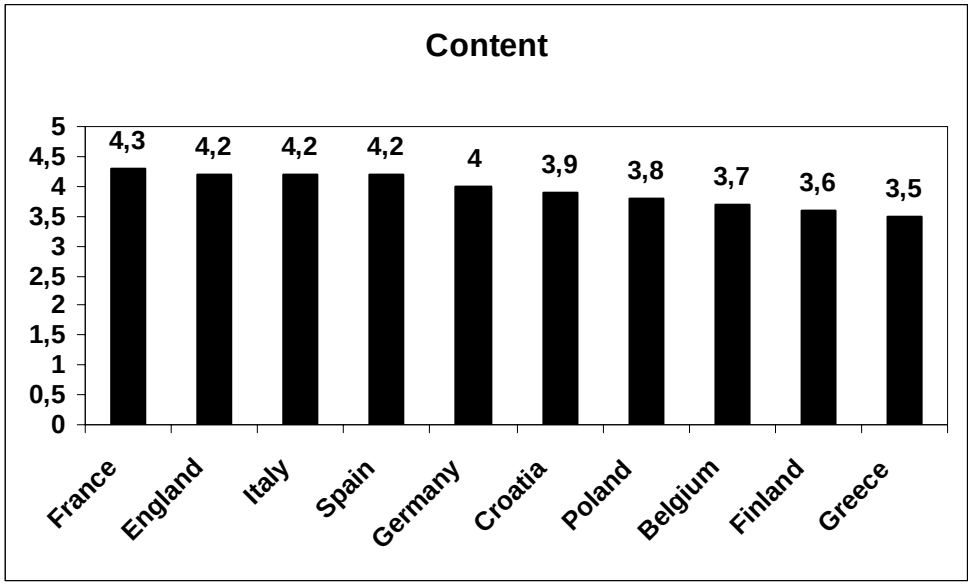

Figure 2. Presentation-Media-Format average score per country

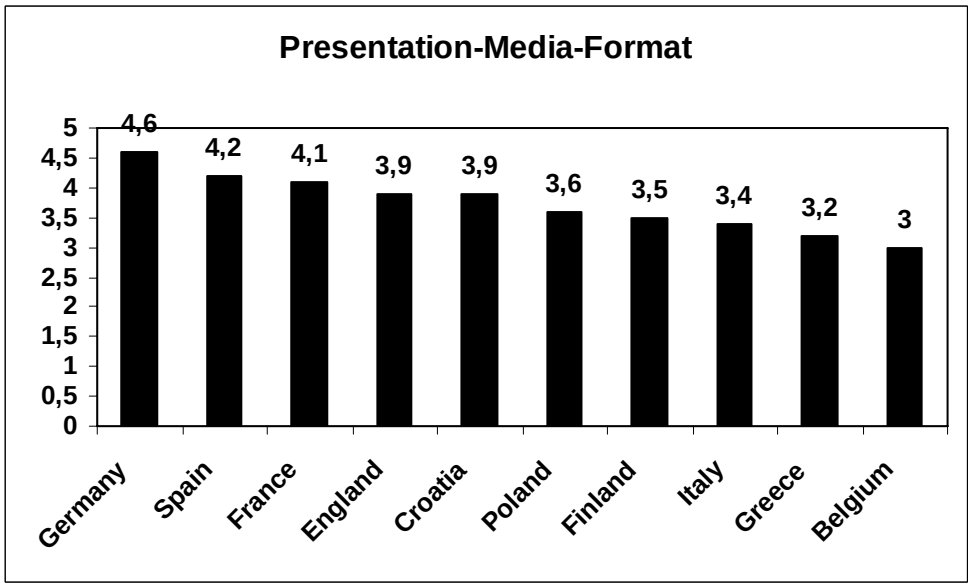

Figure 3. User Interface average score per country

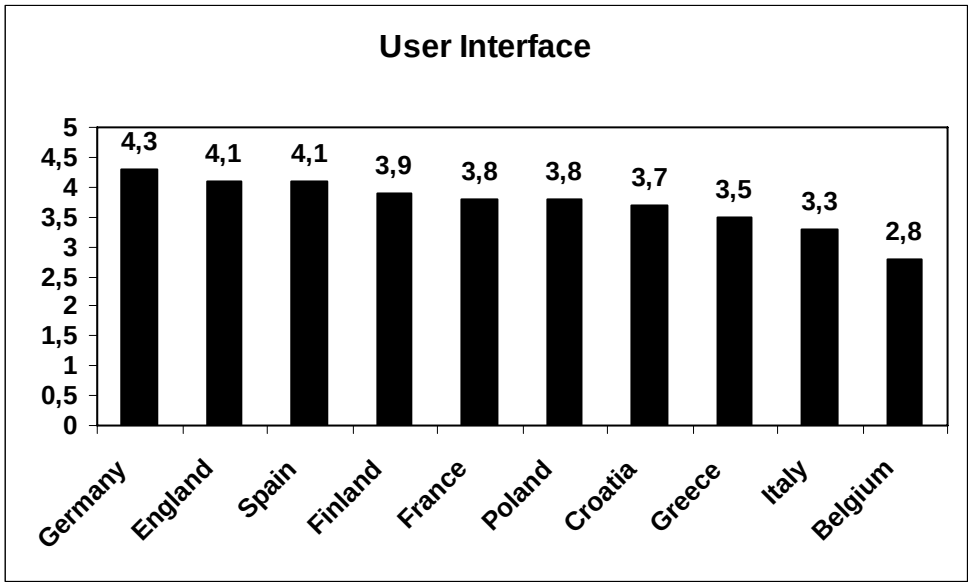

Figure 4. Structure & Organization average score per country

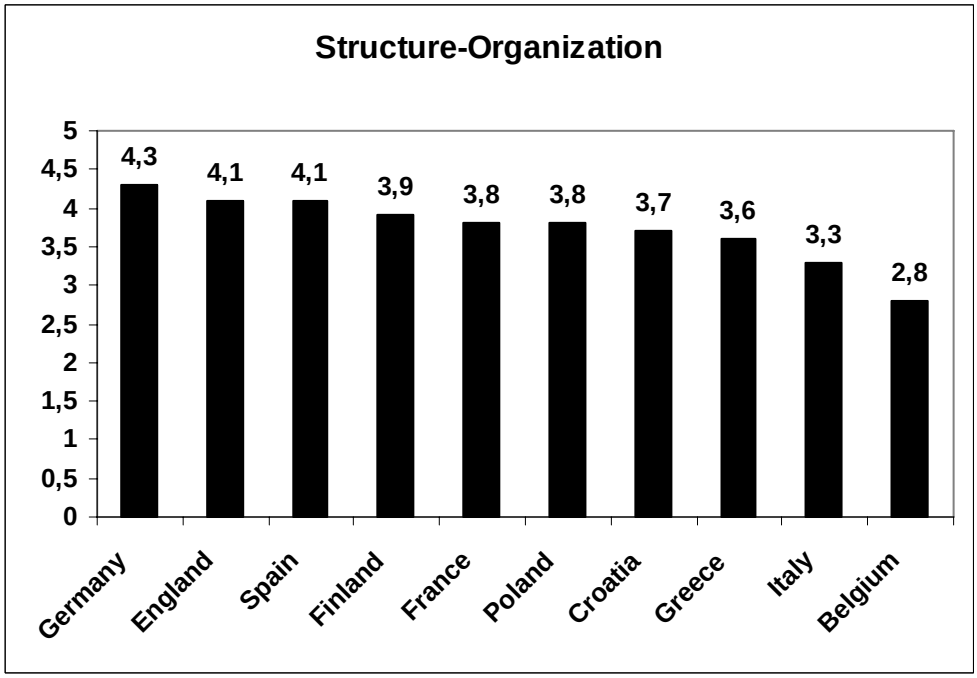

Figure 5. Navigation average score per country

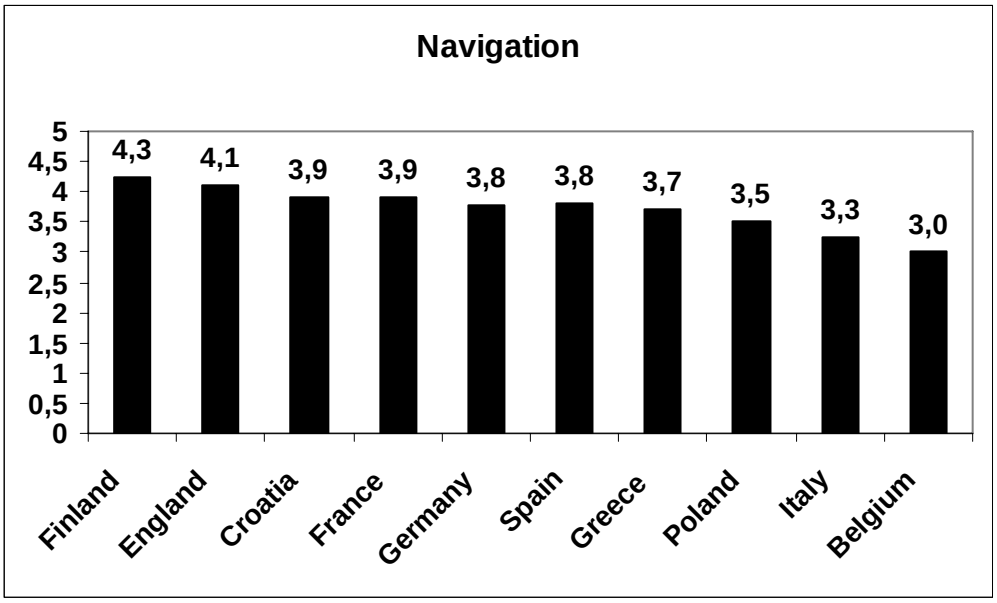

Figure 6. Orientation average score per country

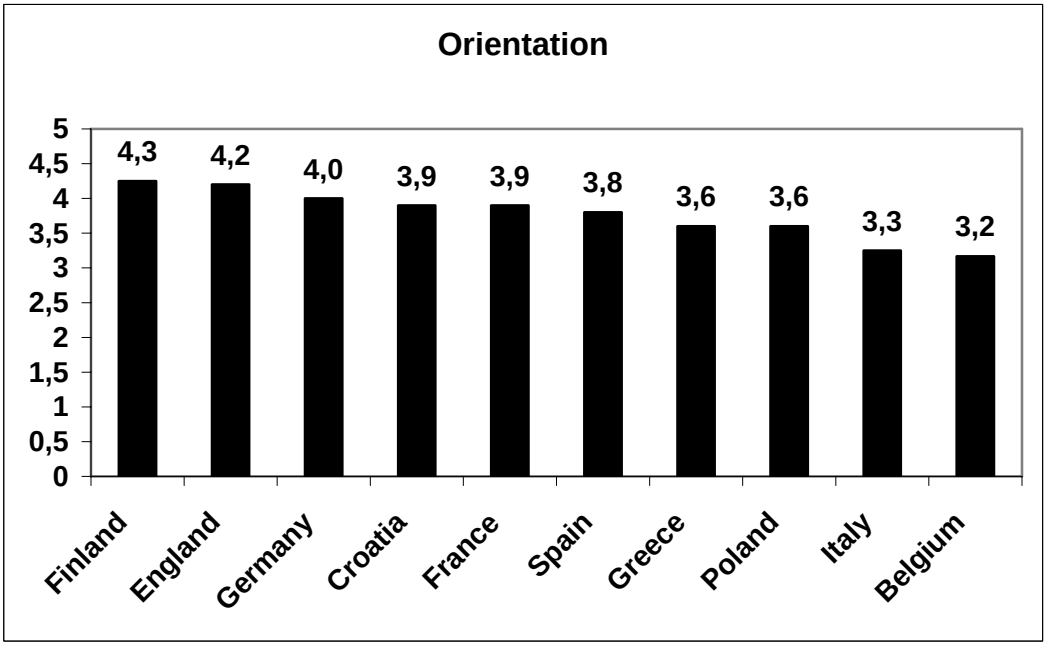

Figure 7. Interactivity & Feedback average score per country

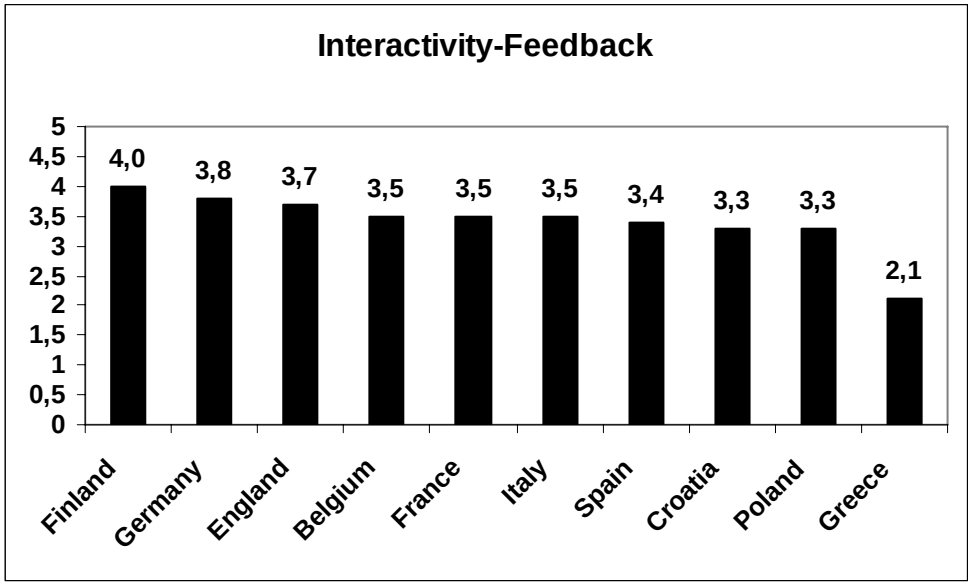

Figure 8. Services & Functions average score per country

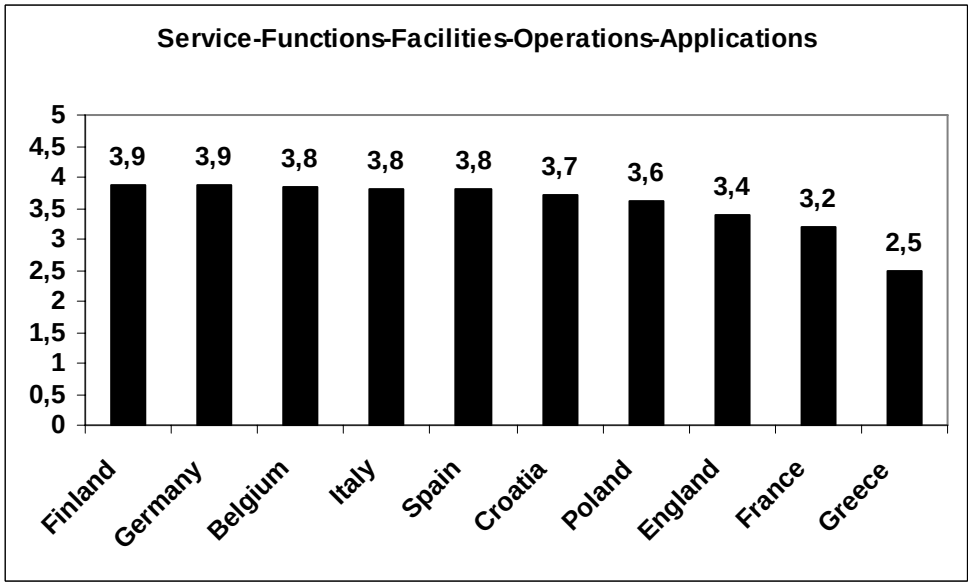

Figure 9. Reliability & Availability average score per country

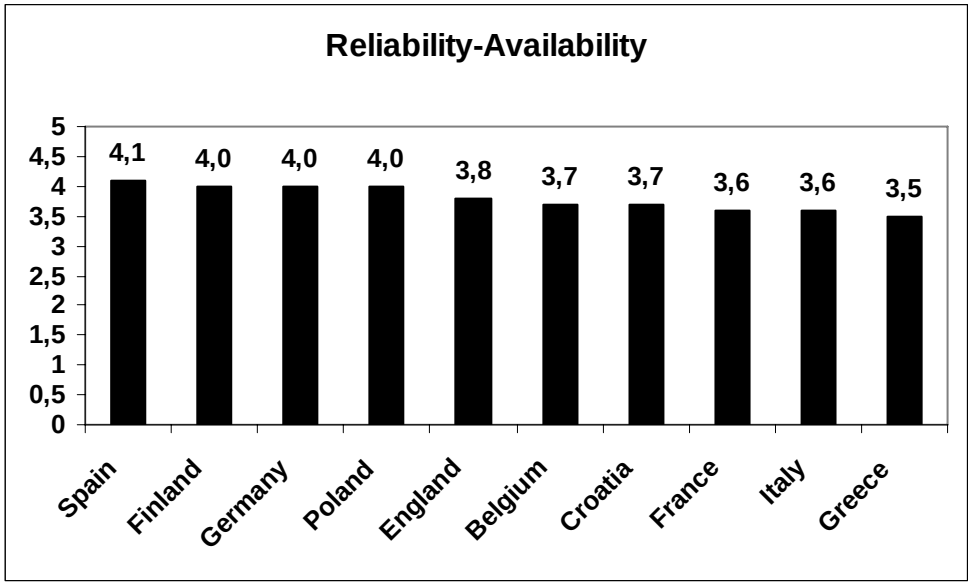

Figure 10. Maintainability average score per country

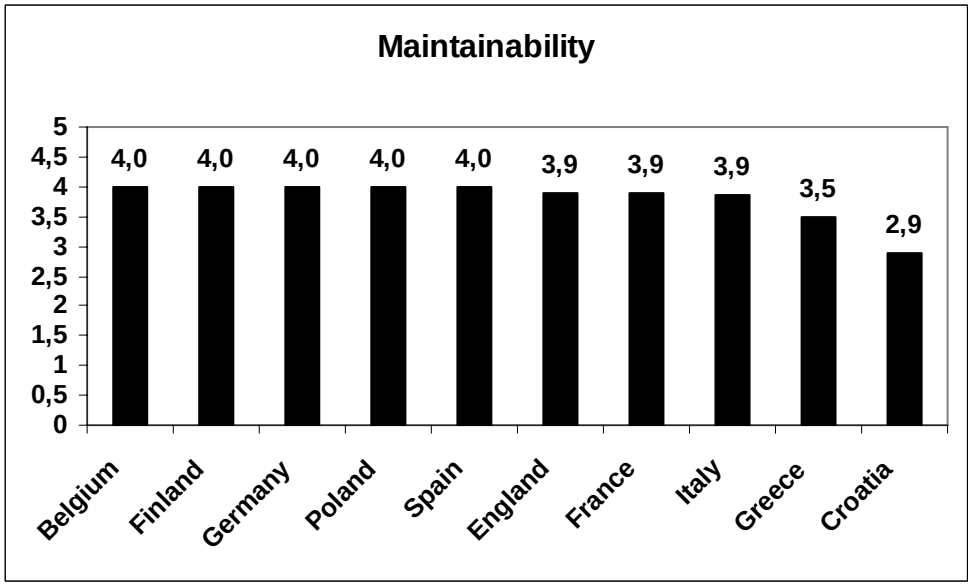

Figure 11. Performance average score per country

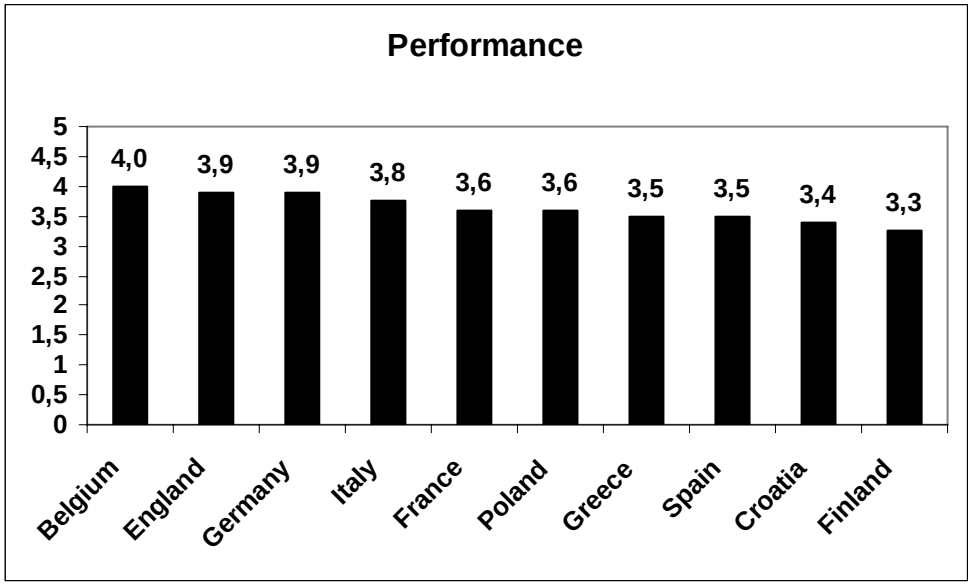

Figure 12. Openness- Compatibiliy- Interopability average score per country

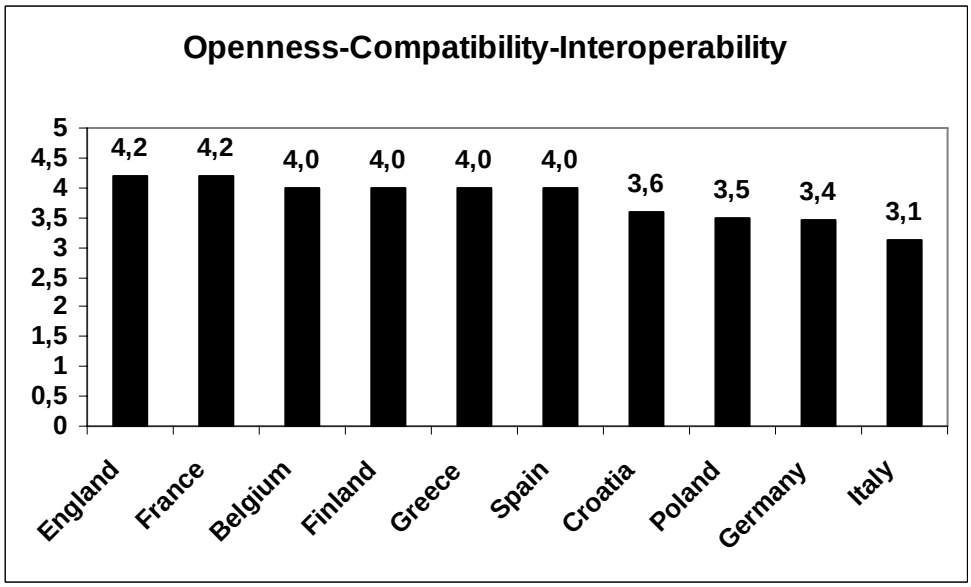

Figure 13. Security average score per country

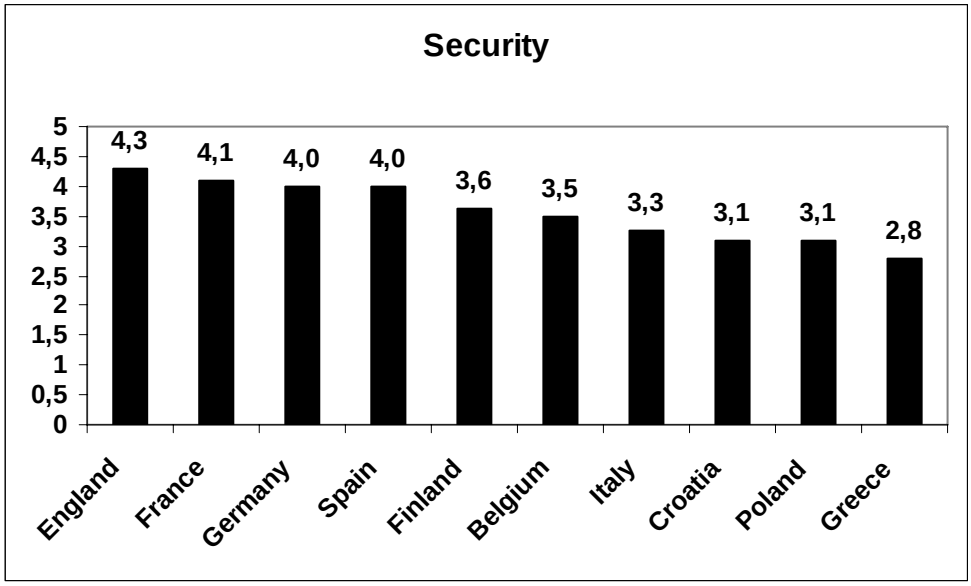

Figure 14. Content average score per ministry type

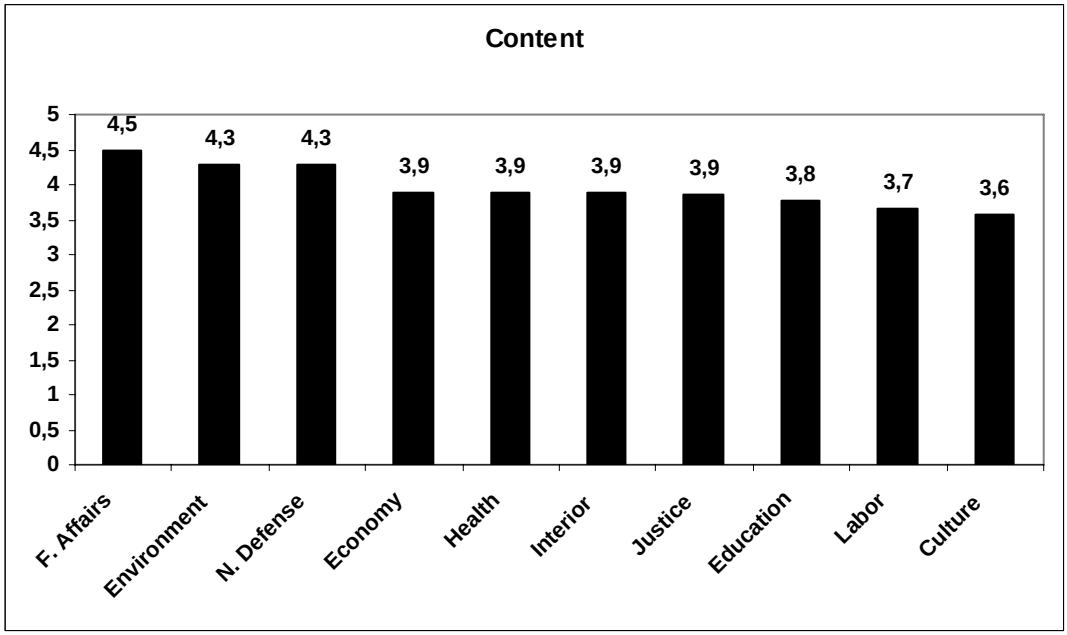

Figure 15. Presentation-Media-Format average score per ministry type

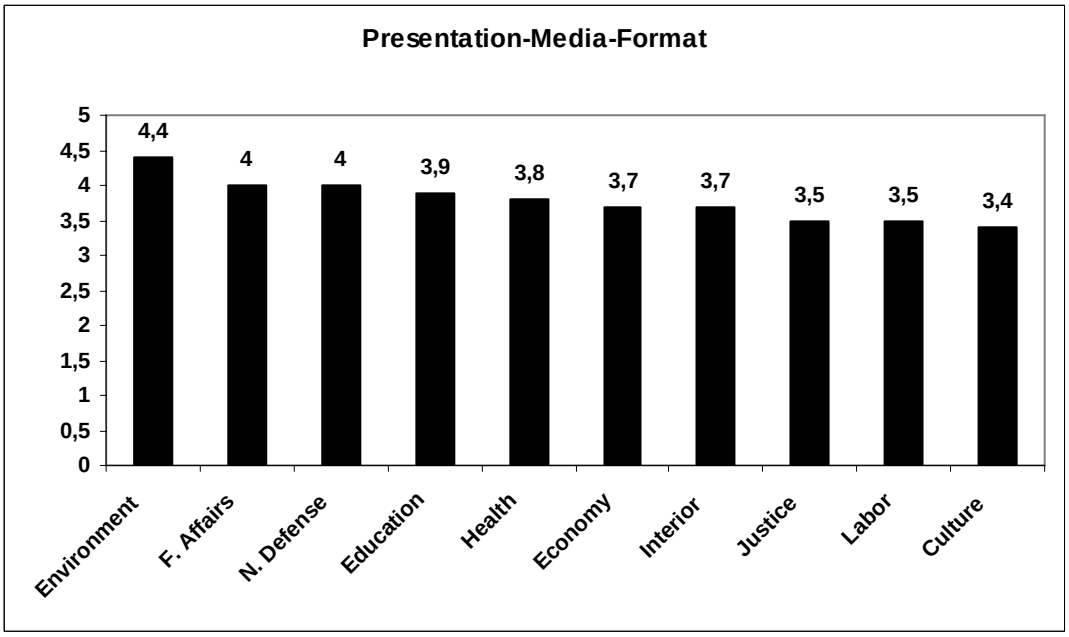

Figure 16. User Interface average score per ministry type

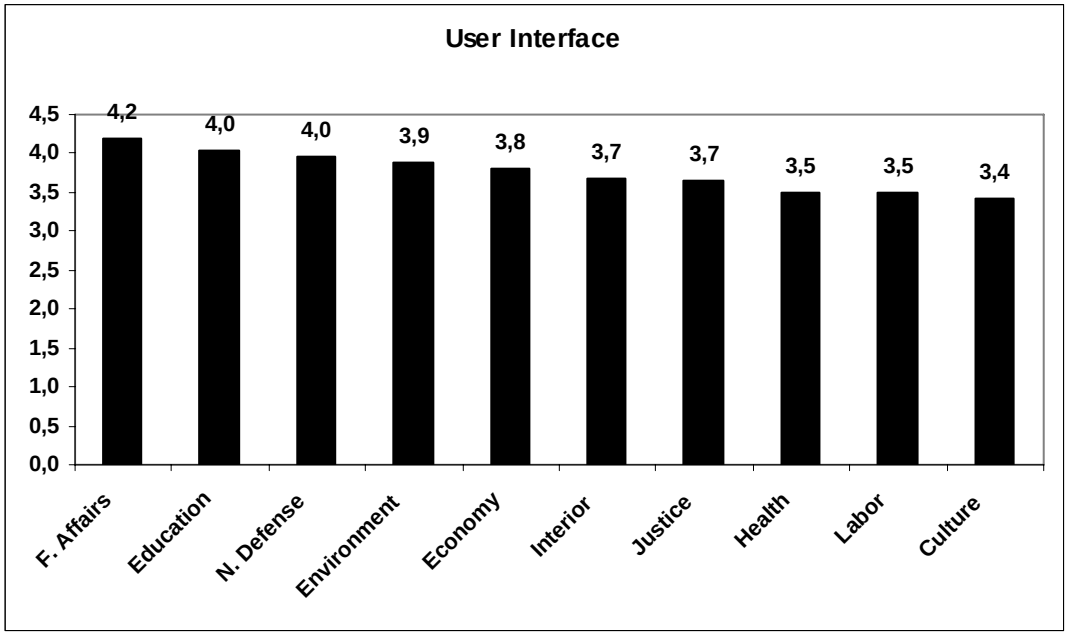

Figure 17. Structure & Organization average score per ministry type

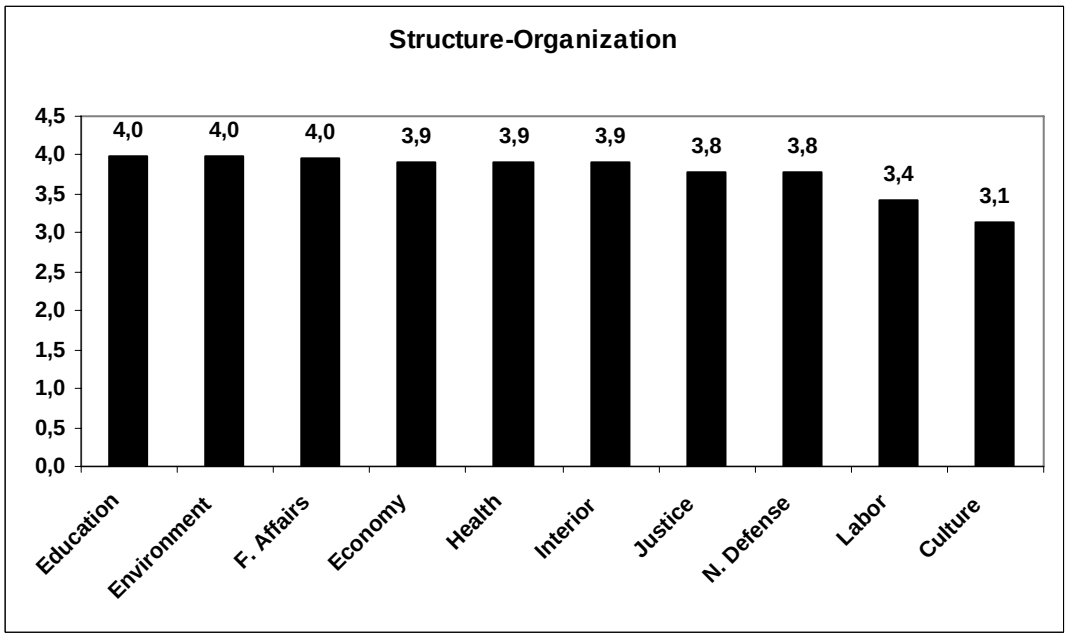

Figure 18. Navigation average score per ministry type

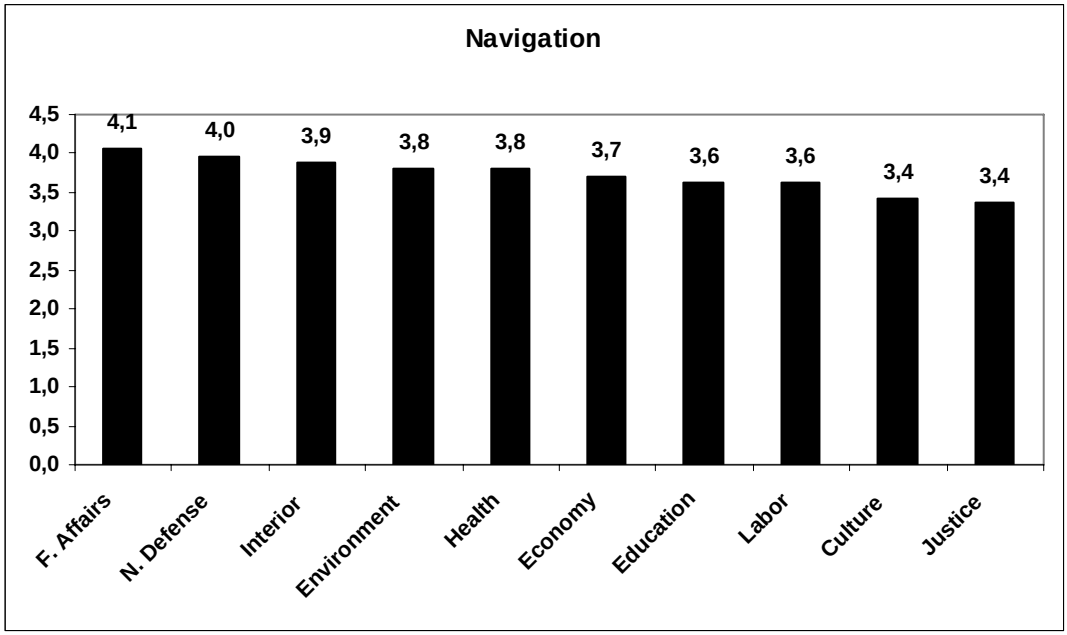

Figure 19. Orientation average score per ministry type

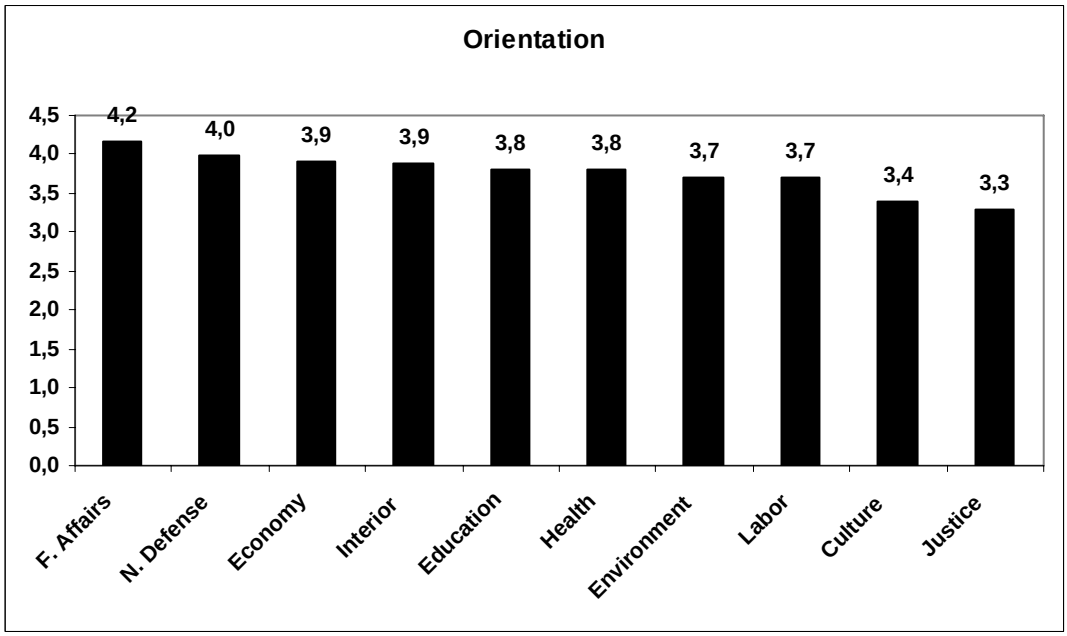

Figure 20. Interactivity & Feedback average score per ministry type

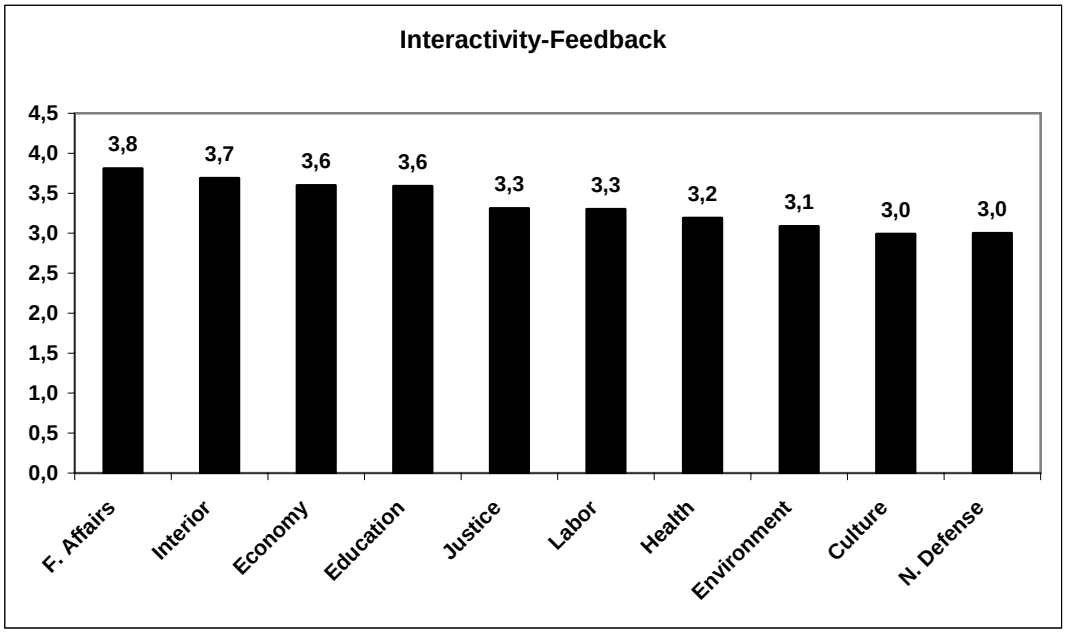

Figure 21. Services- Function-Facilities average score per ministry type

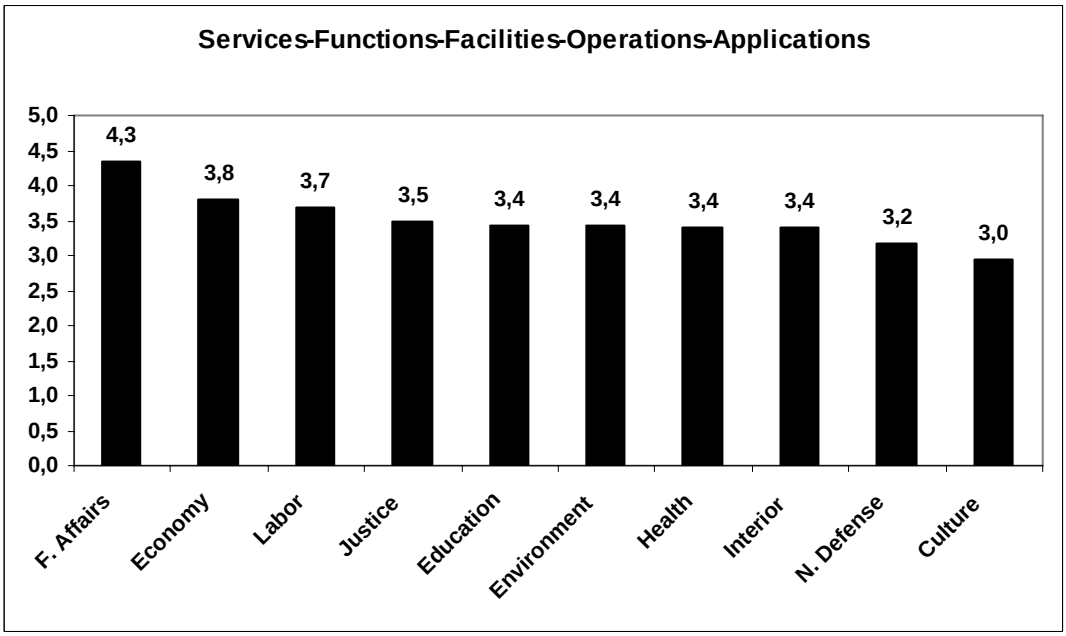

Figure 22 Reliability & Availability average score per ministry type

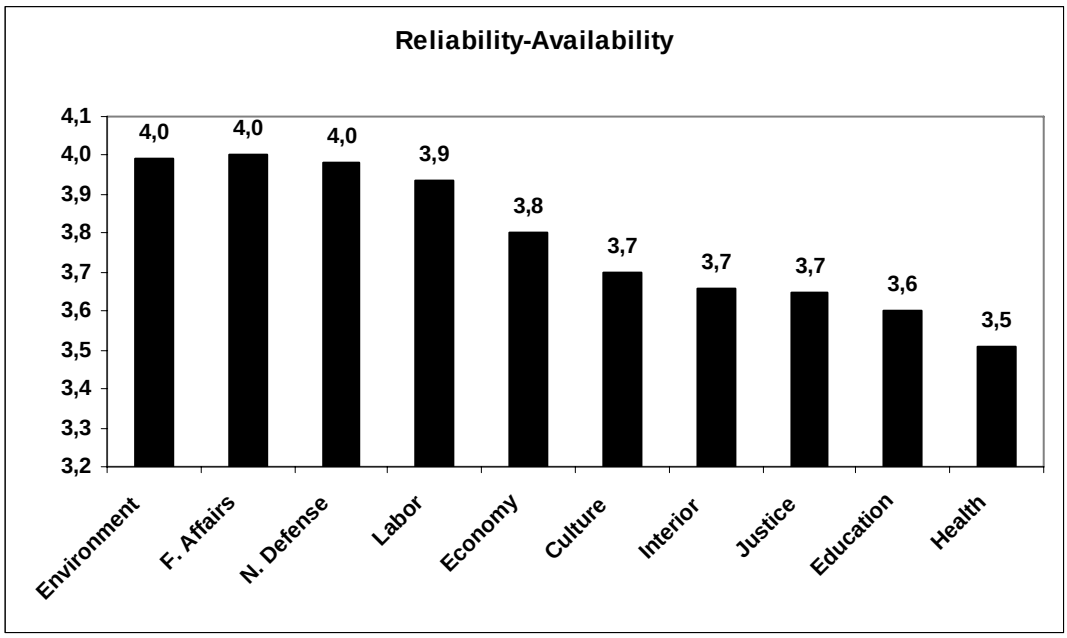

Figure 23. Maintainability average score per ministry type

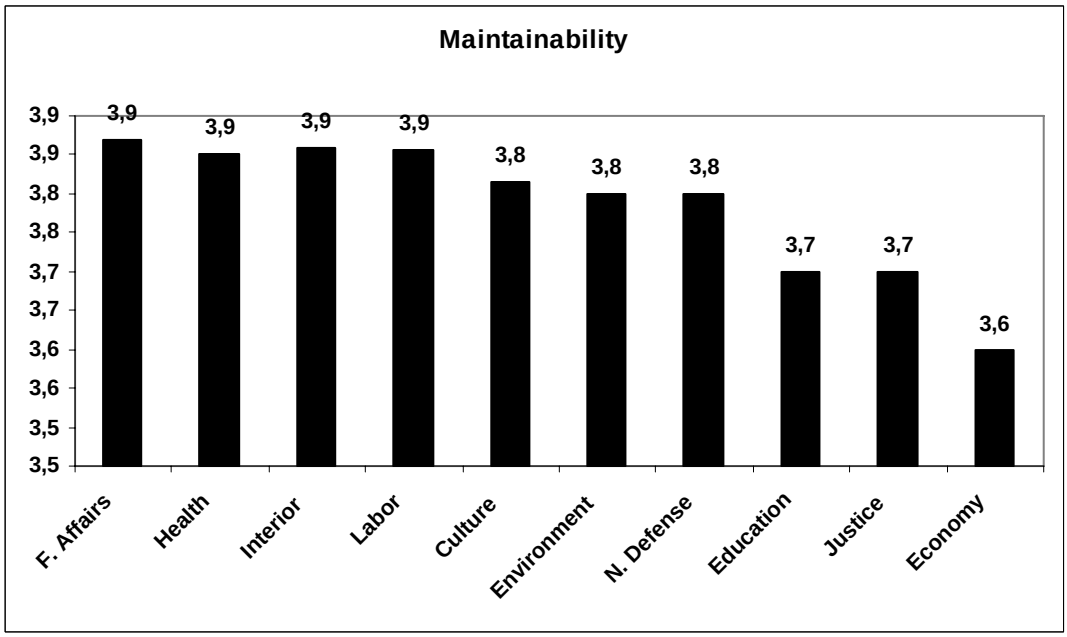

Figure 24. Performance average score per ministry type

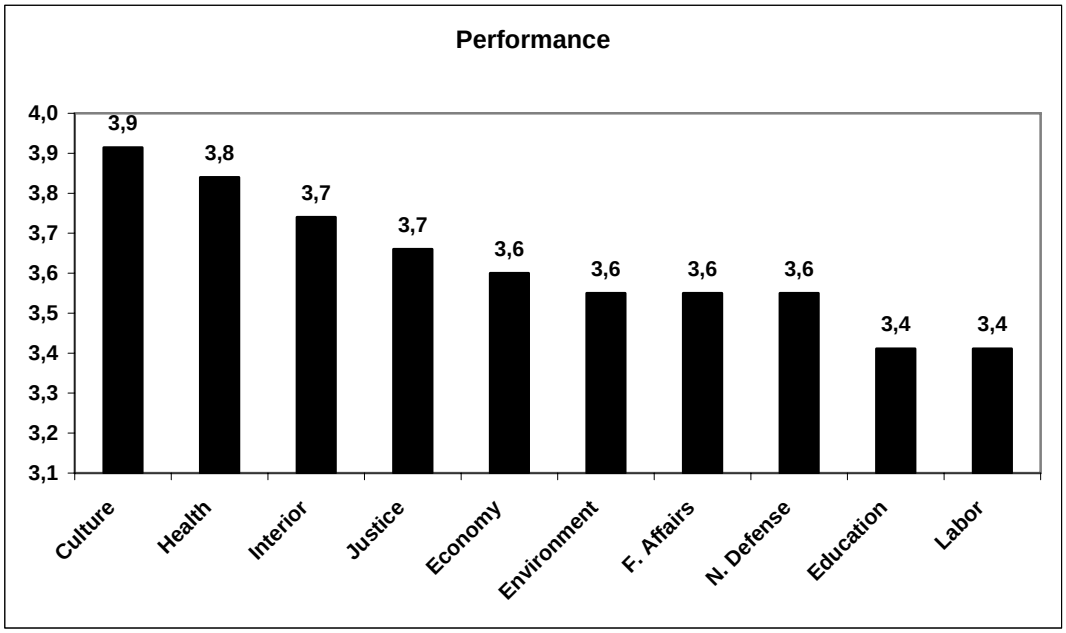

Figure 25. Openness-Compatibility-Interoperability average score per ministry type

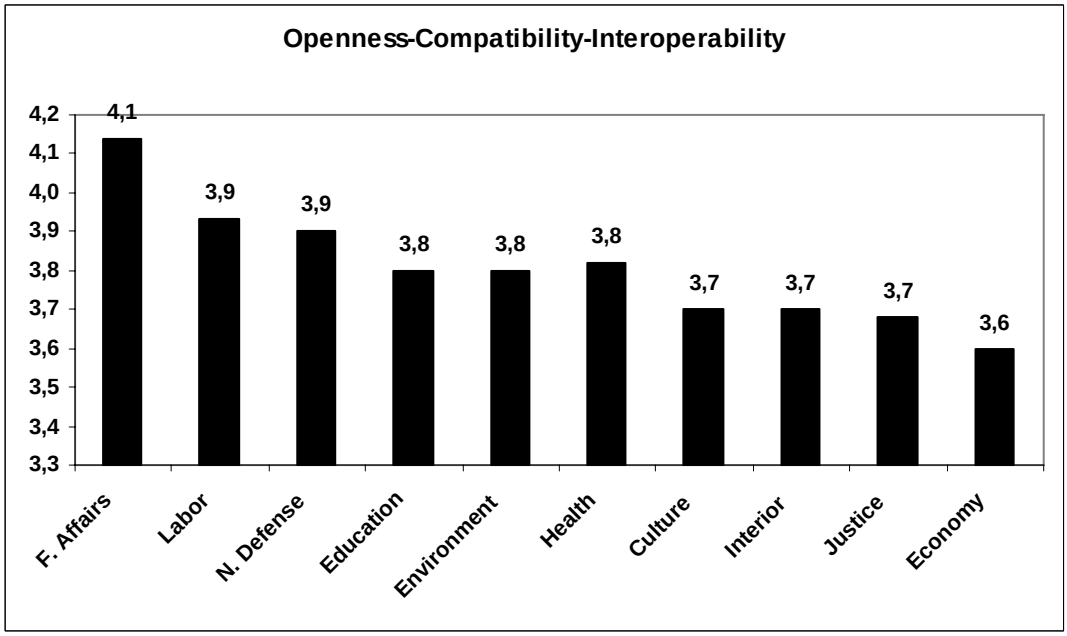

Figure 26. Security average score per ministry type