

# Greek vs. International E-commerce Systems: an Evaluation Based on User-centered Characteristics

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**Abstract.** This paper presents a survey about Greek and International electronic commerce systems. The survey focuses in specific characteristics aiming to evaluate the quality of e-commerce systems as far as the end user is concerned. This paper provides the set of characteristics used for the evaluation, discusses the evaluation method and the derived results and the presents the basic similarities and differences between Greek and International e-commerce systems. The paper presents detailed results from the evaluation of both Greek and International e-commerce systems related to characteristics such as the existence and usability of basic e-commerce functions –such as shopping cart, shopping list, search engine, etc. It also focuses on web-based characteristics –such as background colors, site map, multilingualism, etc.– and mostly focuses on e-commerce specific issues –such as the product’s presentation, payment methods, product shipment, etc. Evaluation results showed that the Greek e-commerce systems are developed having as model similar International e-commerce systems with fairly good results. It should be mentioned that the improvement of the quality for e-commerce systems would not have to be relied on coping the international systems. On the contrary the growth of Greek e-commerce systems should emphasize in the collaboration with the end user, in the application of new ideas. That will give impulse in the development and growth of Internet technologies and electronic commerce in Greece.

## 1 Introduction

E-commerce continuously constitutes a developing sector, as it is confirmed by the turn of large enterprises to the creation of e-commerce systems and the rapid expansion of the economic and commercial transactions via Internet. Hundreds of e-commerce systems have been developed in Greece and many thousands internationally in the last three years. Rapid growth is reported in e-commerce systems in the category of Business to Consumer (B2C) as much as in the category of Business-to-Business (B2B).

In these systems the user’s interaction with the system is based on web page applications. The user interacts with the interface of e-commerce system, which could be

defined like a human computer interaction interface. Consequently interface's quality is particularly related with the quality of e-commerce systems and the way with which quality becomes perceivable to the user [5]. The quality of these systems constitutes a determinant factor for the success of the system. The end user asks for flexible e-commerce systems, without complex structure where he/she might seek information fast and easily and complete commercial and economic processes [1]. If therefore the quality of e-commerce systems don't correspond to end user's expectations, then easily the end user is found with click far away from the e-commerce system.

Quality's evaluation of e-commerce systems as long as it concerns the end user's requirements in previous corresponding approaches mainly gives emphasis in the systems usability and in the level of user's satisfaction. Methods that are used for the evaluation of quality of e-commerce systems are included in the frame of summative evaluation, with the use of questionnaires or with research in the content of selected evaluators [3, 6, 8].

This paper, on the other hand, emphasizes in the characteristics of e-commerce systems, studying at the same time the particularity of the Greek and the international e-commerce systems. The presented work gives emphasis in B2C e-commerce and examines the differences between the Greek and the international systems by selectively characteristics.

In section 2, the paper presents the evaluation method, while in section 3 the analysis of the selected characteristics. Section 4 offers a comparative presentation of characteristics in Greek and international e-commerce systems. Finally, section 5 presents the conclusions of the research. At the conclusions, the paper's contribution is pointed out in the development of Greek e-commerce systems aiming at the additional growth of electronic commerce in the Greek area according to the international developments.

## 2 Method

The frame of the research was based on the measurement of selected characteristic of e-commerce systems. The selection of the characteristics is based on previous work [7]. The determination of characteristics occurred having as criteria the estimation's possibility and attribution of quantitative results, the degree of importance of characteristics in the e-commerce system and the possibility of export a general estimation for the quality of the systems that are evaluated. The selected characteristics were given with the form of questionnaire, which contained questions of closed type as well as precise description of the characteristics, which will be measured. The presentation of the way that characteristics are described is analyzed below.

They were selected to participate in the process of measurement 50 total e-commerce systems, which are separated in 2 groups (25 Greek and 25 international). The determination of systems that participated in the research was based on the order of preference, in sample of 60 individuals, who are Internet users and were called to answer to the question which international and Greek e-commerce systems they have visited at least one time for purchase or for products information and services. The 25 most popular were selected. These systems were consequently given to a group of

evaluators. The list of e-commerce systems that participated in the measurement is presented in the appendix.

As evaluators were selected, individuals with basic knowledge in the theoretical and practical content of e-commerce systems and with experience in regard to the structure and the technologies of the Internet. The number of the evaluators that participated in the research was 5. This number is considered as sufficient for the particular method of evaluation [9]. The evaluators were asked to answer for the existence or not of the characteristics and to select from determined scales of measurement. The aim of the method was, with the help of many evaluators, to avoid the case of wrong measurement. Afterwards the evaluator's results have been compared. Final control of the results has been conducted from the writers of the research. Relatively, the characteristics, that were studied are the site map, the shopping cart, the search engine, the loading time of the main page, the colors of the interface, product's presentation, alternative payment methods, the possibility of return to the main page, multilingualism, purchasing offers and discounts, the way of delivering a product, the existence of information for the business profile of the e-commerce system.

### **3 Characteristics and Evaluation**

An analytical description for each of the above characteristics follows hereafter. For each characteristic the way that the survey can be accomplished is presented.

#### **3.1 Site Map**

The existence of site map in the main page of the electronic shop was studied. The existence or not of site map is defined either with the appearance of a different link in the main page or with the appearance of distinct bar of catalogues of the products and services, that offers the e-commerce system. A site map is a suitable and accurate overview diagram, in a dynamic tree form, that helps end users find information faster. The evaluators had to select "Yes" or "No" and in the "Yes" case to measure the depth of the dynamic tree at browsing using the site map until they browse to product or service.

#### **3.2 Shopping Cart**

In regard to the shopping cart, that is one of the most important functions supporting the purchasing process in e-commerce systems, the existence or not of the shopping cart has been examined.

#### **3.3 Search Engine**

The evaluators examined if the e-commerce system offers search engine. If the evaluator's choice was "Yes", the evaluators were asked to characterize the search

engine, as simple or advanced. As simple is described, in the frame of the research, the search engine, where the information is found using the "keyword". As advanced is described the search engine, that provides to the end user the possibility of combining logical operators, to seek per category and to make category combination and product's characteristics. It is pointed out that the evaluator had the possibility of characterizing as simple and advanced the search engine, if both possibilities existed in the system.

### **3.4 Uploading Time**

The time of the main page uploading at the e-commerce system was measured. It should be mentioned that the uploading time, is reported in the time interval, which is required by the moment, that we type the electronic address of the e-commerce system until the complete uploading of the main page. At the final control of measurements a dial up line of connection with the Internet, 56 K modem was used. According to Nielsen [4] the acceptable time of web pages uploading is smaller than one minute in order that the system is characterized by high responding time. In the first 30 sec basic elements of the main page should have been appeared, as for example the text information. In the frame of research a scale was selected, that separates the loading time in the following categories: a)  $t \leq 30$  sec, b)  $30 \text{ sec} < t \leq 60$  sec, c)  $60 \text{ sec} < t$ .

### **3.5 Colors**

Each evaluator has to select between the basic colors red, green, blue and the additional colors yellow, light blue, purple as well as white. It was studied which colors were selected by the e-commerce systems at the interface design. The meaning of color is determined by the choice of colors that recommend interface of the web main page, without taking into consideration the color of fonts and pictures.

### **3.6 Product's Presentation**

The research was emphasized to the way, with which the required information is provided to the end user according of the properties of the product or the services that the e-commerce system provides. The description has the form of text, photograph, video and sound. In the choice of photograph, it was examined if the end user has the possibility of zoom or not. Also the existence of the possibility of 3D representation of the product was examined and the presentation of it, from different optical angles. It is mentioned, that in every case the evaluator measured the existence or not of each characteristic.

### **3.7 Payment Methods**

The existence or not, of alternative payment methods into e-commerce systems was studied. In the case where a payment method existed, the existence of alternative

ways of payment was studied, selecting between the payment on cash on delivery, the use of credit card and other means of financial transaction, like e-check. At the same time it was asked from the evaluators to point out if the user, who starts the process of payment should obligatorily register themselves as members in the club of e-commerce or not.

### **3.8 Browsing to the Main Page**

In the research was studied the possibility of the end-user's browse in the main page of the e-commerce system from any other web page. In this way the end user is facilitated to browse at the web pages of the e-commerce system particularly when he/she does not have experience in the Internet.

### **3.9 Multilingualism**

The multilingualism in e-commerce systems was studied in a binary way. Concretely in the Greek systems of electronic trade was studied, if they provide information in a language apart from Greek. Similarly in the international systems if except English exists the possibility of presentation in other language. The multilingualism is a significant characteristic. E-commerce systems should not only comprehend to the end user's need but also to communicate with them in their language [5]. This means that anyone user of the Internet can visit them and buy independent from his/her language and country.

### **3.10 Purchasing Offers and Discounts**

The existence or not, of offers and discounts, which constitutes basic advantage to e-commerce systems, was studied. Each evaluator is called to check if offers and discounts are provided.

### **3.11 Product's Shipment**

The way with which the products are delivered to the customer was studied. Each evaluator could select for the shipment of the product between the choices, postal, Internet and receipt from the shop.

### **3.12 Business Profile**

The existence or not to have an independent choice of form "About us" or "About the company" or choice with relevant content was studied. The choice provides information relatively to the business profile of the e-commerce system, fact that strengthens the relation of confidence between end user and e-commerce system.

## 4 Results

The results of the research are presented in this section both for Greek and international e-commerce systems. The nature of research in its total did not allow disagreements apart from the cases of measurement of the loading time of the main page and depth of the site map. The final estimation determined from the writers of research in collaboration with the evaluators.

The *colors* that usually prefer in Greek e-commerce systems are white, red, blue and light blue. In the international systems of electronic trade are presented colors such as white, blue, light blue, yellow, red and green.

The Greek and international systems use in high percentage colors as white and blue. The similar chromatic choice is owed to the fact that blue and white constituting colors friendly to the human eye and are proposed in the chromatic choices of web page applications [2]. However the international systems of electronic trade, present distribution in the choice of colors.

	# Colors	Max	Most used colors		
Greek	1.36	3	40% white	24% red	20% blue
International	2.15	4	40% white	21% blue	17% yellow

**Table 1.** Main background colors

Their *time of main page uploading* in the majority of Greek e-commerce systems is limited from 0 until 30 sec that is characterized as acceptable time for the end user to wait. Respectively the time of main page uploading in the international systems assigned from 30 until 60 sec. It should be mentioned that didn't exist e-commerce systems with time of uploading more than 1 minute in both groups. We observe that in Greek e-commerce systems the uploading demands shorter period of time. Fundamental cause of difference is the simple structure, which the Greek systems present as well as the number of categories and products, that provide.

Timelines	0 sec – 30 sec	30 sec – 60 sec
Greek	82%	18%
International	33%	67%

**Table 2.** Uploading times

The site map in the total of e-commerce systems presented with the form of catalogues in a dynamic tree or as independent page of the system. In this way the user can immediately see from the main page the number of product's categories and browse easily to the web pages of his/her interest. The Greek e-commerce systems present site map with depth above 3 in total percentage of 74%. On the contrary 81% of the international e-commerce systems present site map with depth smaller the 3 while parallel the international systems provide facility of browsing.

Depth	1	2	3	4	> 4
Greek	19%	7%	33%	26%	15%
International	58%	23%	8%	1%	11%

**Table 3.** Site map depth

The *products' presentation* is provided in various ways. The total of Greek systems provide text information that usually constitutes description of products in 15 until 70 words. The presentation of products with picture follows and usually the possibility of zoom exists. The use of sound messages is used in the Greek e-commerce systems only from systems that are referred in the music. On average in the Greek e-commerce systems 2 alternative ways of presentation are provided. In the international e-commerce systems offer product's presentation in alternative ways. The provision of information in text format, the use of pictures are two basic alternatives. Moreover, the 3D presentation of the product from different optical angles is provided. The sound is used for the creation of a friendly and a pleasant environment for the end user. Remarkable is that international systems provide on average 3 different ways of product's presentation.

	Image	Image – zoom	Sound	3D animation	Video
Greek	50%	19%	6%	13%	13%
International	34%	37%	11%	14%	3%

**Table 4.** Presentation of the product

The search engine constitutes a flexible function in e-commerce systems. Most Greek systems offer simple search (67%) with the use of a key word. In low percentage of systems it is offered advanced search (33%). The 67% of international e-commerce systems provided simple search, 33% provided advanced and total 25% provided also simple and advanced search. It is mentioned, that in Greek systems the existence of the characteristic of the search engine several times had formal presence and the results of searching didn't appear with precision.

Basic characteristic of e-commerce systems is the existence of *discounts and purchasing offers*. This characteristic provides an important impulse to the competitiveness of the e-commerce systems compared to common shops. Is not high the percentage of Greek systems that provides purchasing offers and discounts. Concretely 47% of Greek e-commerce systems provide special offers and discounts in contrary to 53%, which do not offer any. Also, several of the Greek systems provide information on their products from the Internet and ask the user to purchase them from the common shop. On the contrary the percentage of international e-commerce systems that provides purchasing offers and discounts is significant. 73% of international systems provide purchasing offers and discounts with the characteristic phrase "save money", next to the products.

The *multilingualism* of an e-commerce system determines it's local or international character. A high percentage, over 90%, of the Greek systems doesn't provide the

possibility of multilingualism. The language that only use is the Greek language. The basic conclusion is that Greek e-commerce systems aim at the Greek market. Usually other languages provide the e-commerce systems that have been designed in a similar way with the international systems, like e-banks. About 30% of international e-commerce systems provide languages' selection. Usually French, German and some of the Asiatic languages are proposed. The most common way of multilingualism is a link to the e-commerce system of the country that interests the end user. However, about 70% of the international e-commerce systems don't provide the choice of multilingualism, except for English.

*Payment methods*, that the Greek e-commerce systems apply, it is observed that 29% of payment is made on delivery, 33% by credit card and 38% proposed a purchase from the real and not the virtual store. The precocious organization of e-commerce in Greece and the mistrust that prevails in regard to the safety of transactions explain the preference in payment on delivery and purchase in the real shop. The payment method that dominates in the transactions of international systems is credit card in percentages of 85%. Payment on delivery is provided as an alternative selection in percentage of 5% while the purchase from the real store is proposed in percentage 10%.

Information about the business *profile of e-commerce system* is provided in percentage 76% from the Greek e-commerce systems. The information becomes with independent choice "About us" or "Business profile", where the end user can find any information (address, telephones of direct communication, structure and organization, enterprising planning, list of company's agents). Respectively, 74% of international e-commerce systems provide information about system's business profile.

The browsing to the *main page* of the system, which facilitates particularly the browsing of end users, exists in high percentage in the Greek and the international e-commerce systems. The percentage of Greek systems that allocates return to the main page is 75%. In the international systems 95% provides "Home" selection from each web page of the e-commerce system.

The percentage of Greek e-commerce systems that provide independent function of *help* reaches 43%. The operation of help is presented in the form of explanatory steps, so that the end user accomplishes some actions. Even lower, 30% is the percentage of international systems that provide independent choice of help. Help function to the end user is provided mainly in the form of interaction while in the processes of purchase and payment it is presented in the form of successive steps of browsing.

Courier in percentage of 70% provides *products' shipment* for the Greek e-commerce systems usually. Remarkable is the fact that none of the Greek e-commerce systems that were studied deliver the product to the end user via Internet. The ways of the product shipment varies in the international systems.

About 48% of international e-commerce systems deliver the product by post determining the date of delivery. 19% provides the product in digital form using the Internet. By this way, direct delivery is ensured and time is economized. The digital delivery of the product constitutes the ideal form of B2C electronic commerce and depends naturally on the type of the product. About 33% of international e-commerce systems provide services including buying information.

The *shopping cart* is provided in the total of Greek e-commerce systems. Also, the total of international e-commerce systems, that sell products from the Internet provide



shopping carts, trying to give the end-user the feeling of a traditional purchase. The end user has the possibility to modify it's content, or to erase it before the process of payment. The shopping cart provides total information on the type, the quantity, the discount or the additional taxes that are included in the final price of purchase.

Remarkable is that in the process of payment the user is made to become a member in the club of customers of the e-commerce system, so the transaction can be accomplished, even if the end user doesn't wish to. This policy is applied to 50% of Greek systems that allocate process of payment. Respectively 90% of international e-commerce systems use the entrance to the club of the customers of the system as a preliminary step for the process of payment. If the user doesn't complete the intermediary step, cannot develop the process of purchase.

## 5 Conclusions

The Greek and international e-commerce systems present common structure and methods of applying the above characteristics. The acceptable time of the main page uploading and the common most used colors constitute two basic characteristics. Also characteristics as the search engine, the shopping cart, the site map and the return to the main page are presented in Greek as well in the international e-commerce systems.

Differences are located mainly in the way of development and application of the above characteristics. Basic differences are presented in payment methods, in products' variety and in products' presentation.

The payment method that dominates in the international e-commerce systems is credit card. This fact strengthens the international character of e-commerce systems and makes them competitive also to the Greek e-commerce systems. At the same time the international systems provide variety of different products, often offering discounts and offers and presenting consequence in regard to the ways of the delivery. If therefore the user decides to make a purchase via Internet nothing prevents him from being addressed in international e-commerce system. It should be mentioned that high percentages of Greek e-commerce systems provide information only in Greek language. This fact facilitates the Greek end users, but decreases however the competitiveness of e-commerce systems in regards to the total of users and is opposite to the international character of electronic commerce.

However, a significant number of Greek e-commerce systems do not provide the possibility to the end user of purchase via Internet. The Greek e-commerce systems have an informative character. The user can seek information on the products of the system and be proposed to visit the physical store, where he can purchase. E-commerce systems in Greece identified with Companies web sites in many cases. Providing purchasing information is included in the character of e-commerce like e-service but in the same time the role and the importance of e-commerce systems for the Greek user has been degraded.

Deductively, the Greek e-commerce systems are developed having as model respectively international e-commerce systems with fairly good results. It should be mentioned that the improvement of the quality for e-commerce systems would not

have to be relied by coping the international systems. On the contrary the growth of Greek e-commerce systems should emphasize in the collaboration with the end user, in the application of new ideas. That will give impulse in the development and growth of Internet technologies and electronic commerce in Greek cyberspace.

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