Determining importance degrees of website design parameters based on interactions and types of websites

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ABSTRACT

Nowadays, the internet is the most widely used and an effective tool for firms/organizations to reach their customers by their websites. Hence, effective design of websites helps firms/organizations to reach their aim. There are lots of design parameters that play an effective role on website design. These parameters are considered by researchers in some academic papers. However, none of the published articles takes into account both interactions among the design parameters and importance degrees of design parameters in terms of website types. Therefore, in the scope of this paper, in order to address these research gaps, an integrated multiple criteria decision making method including Delphi and DEMATEL (DEcision-MAking Trial and Evaluation Laboratory) techniques has been proposed for determining importance degrees of website design parameters. Furthermore, the website design parameters were determined based on detailed review of literature available. In addition, a new classification has been presented for websites. Finally, this paper indicates that the importance degrees of website design parameters are based on both website types and interaction among the design parameters. To illustrate the steps of the proposed algorithm, an application has been presented.

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1. Introduction

Internet, which has a wide application area, is accepted as an information data-base by websites. With the enlargement of the Internet and World Wide Web (WWW) applications, users are increasingly interfacing and interacting with web-based applications [2]. In particular, the rapid growth of the internet presents a new perspective to all aspects of business [19]. By using the internet, for instance, an organization can easily reach customers to provide them not only general information about its products or services but also the opportunity for performing interactive business transactions [2]. Therefore, an effective website design has an important role for organizations which want to maximize their profits by promoting their services or products in a competitive and limited market. To design an effective website, there are various design parameters that must be taken into consideration simultaneously. It is possible to define design parameters as qualitative and quantitative aspects of physical and functional characteristics of a website which play an important role on effectiveness of website design. However it is not easy to determine the design parameters of a good website-design because of its complex nature depending on expectations of humans [29]. Hence, website designers have to take an increasing number of design parameters such as usability, accessibility, cost, delay, quality, security, maintenance, etc. into account during design process to satisfy users' needs [9]. Therefore, the

design parameters of a good website have been taken into consideration by researchers since last decade in order to increase the performance of the websites.

In the last decade, numerous papers have concentrated on the design parameters of websites. Some of them deal with the quality of the website ([6,19,31] etc.), usability of the website ([29,39,40] etc.), esthetics ([1,37,57] etc.), and website content [5,10]. These papers, published in the literature, depict that there are various design parameters to evaluate the effectiveness of websites. Furthermore, they prove that each design parameter has an impact role on website design. However, the common feature of these studies is that they consider simultaneously one or two design parameters, mentioned above during the evaluation of websites. Hence, taking all design parameters simultaneously while evaluating design aspects of a website may present an effective tool to reach perfect design. Moreover, some studies use a fixed set of design parameters to evaluate all of the websites with different purposes or usage [6]. Furthermore, none of the proposed approaches for evaluation of websites considers the interactions among design parameters. Therefore, to cope with these shortcomings in the literature, this article addresses the concern for effective website design by means of multiple criteria decision making methods. In the scope of this paper, an integrated multiple criteria decision making model including the interactions among design parameters has been used. The main aim of this study is to present the importance of design parameters of websites based on types of websites and interactions among the design parameters. For this purpose, an integrated method has been proposed

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based on the method proposed by Shen et al. [41]. At the first step, Delphi method is used to determine website design parameters with respect to website type. Then, decision-making trial and evaluation laboratory (DEMATEL) method is applied not only to obtain the importance of design parameters but also put to forward interactions among the determined design parameters [41,43].

The rest of this paper is organized as follows; Section 2 presents a wide literature review. In Section 3, the structure of the proposed method is given. An application of the proposed method is conducted in Section 4. Section 5 discusses the results obtained from the application. In Section 6, the degrees of interactions among design parameters are analyzed. Finally, concluding remarks are presented in Section 7.

2. Literature review

2.1. Classification of websites

On the internet, there have been various website applications which have been put out for various purposes and for wide user profile. Therefore, different classifications have been proposed for website categories in the literature. For instance Hoffman et al. [20] proposed a classification consisting of six categories for commercial websites. These are; i) online storefront websites which offer direct sales through an electronic channel via an electronic catalog or other, ii) internet presence sites which provide a virtual presence for a firm and its offerings, iii) content which is fee-based (where a provider supplies and/or pays for content while the consumer pays to access), sponsored sites (which sell advertising space), and a searchable database (where merchants or advertisers pay a provider for information placement), iv) mall sites which constitute a collection of online storefronts, v) incentive sites which represent a unique form of advertising that attract a potential customer to a site, and vi) search agent sites which identify other websites through keyword search of a database [20]. Zviran et al. [59] classified websites into five categories with respect to volume of their traffics. These are: i) publish/subscribe websites which provide users information such as search engines, media sites, and newspapers, ii) online shopping websites which let users browse and buy, iii) customer self-service websites which let users help themselves such as banking at home, tracking packages, and making travel arrangements, iv) trading websites which let visitors buy and sell, and v) business to business (B2B) websites which let businesses buy from and sell to each other [59]. Lee and Koubek [29] classified website into four categories due to usage purposes. These categories are: i) entertainment websites which provide diversion and relaxation to users who want to escape from the stressful reality, ii) information websites which make it possible for users to obtain useful information more quickly and more easily, iii) communication websites which facilitate communicating

with others, and iv) commercial websites which provide an online market place for goods and services [29]. Hasan and Abuelrub [19] classified the websites into four categories. These are i) Business to Business (B2B), ii) Business to Consumer (B2C), iii) Consumer to Business (C2B), and iv) Consumer to Consumer (C2C).

In the literature, there are various classifications for website types with respect to different purposes. However, the current classifications do not include all types of websites. For instance, Hasan and Abuelrub [19] focused only commercial websites. Although, the most detail website classification has been presented by Lee and Koubek [29], it does not include mixed type of websites. For instance, some websites present a chance to gain money for their users beside they provide diversion and relaxation. Another example can be given for organization websites: their aim is to sell their product online while providing information for their product and company as well. Therefore, in the scope of this paper, we classified the websites based on both users' expectations and websites' purposes. Apart from governments' and some civil organizations' websites, the main objective of the most websites is to gain money. A website makes money in two ways; the first one is the direct way to make money by selling products or services. The other is the indirect way to make money over commercial advertisements. The second option is nearly used among all types of websites. Therefore, by taking users' expectations and direct purpose of websites into account, a new classification of websites has been proposed in the scope of this paper.

In Fig. 1, websites are classified into three main groups and seven sub-groups. These are i) commercial websites including B2B, B2C, and C2C, ii) service websites including self-service websites, information websites, entertainment websites, and communication websites, and iii) mixed type websites. The main objective of the commercial websites is to make money by selling products or services. In other words, a user utilizes this type of website to purchase a product or to pay money for any service. The commercial website consists of B2B, B2C, and C2C. The main objective of B2B is to present a transaction between companies such as websites for the company and its vendors or its suppliers. The main objective of B2C is to present marketing between company and consumer such as shopping websites, transportation websites, travel agency websites, etc. The main objective of C2C is to present transaction between consumers such as bid websites. The purpose of the service websites is to present their users with various services without any cost such as information websites, entertainment websites, etc. The service websites consist of self-service websites, information websites, entertainment websites, and communication websites. The main objective of self-service websites is to present customers to access their information and perform certain operations such as internet banking websites, e-government websites etc. The main objective of information websites is to present information, advertisement or publicity such as personal websites, organization/company websites, news and magazine websites, search
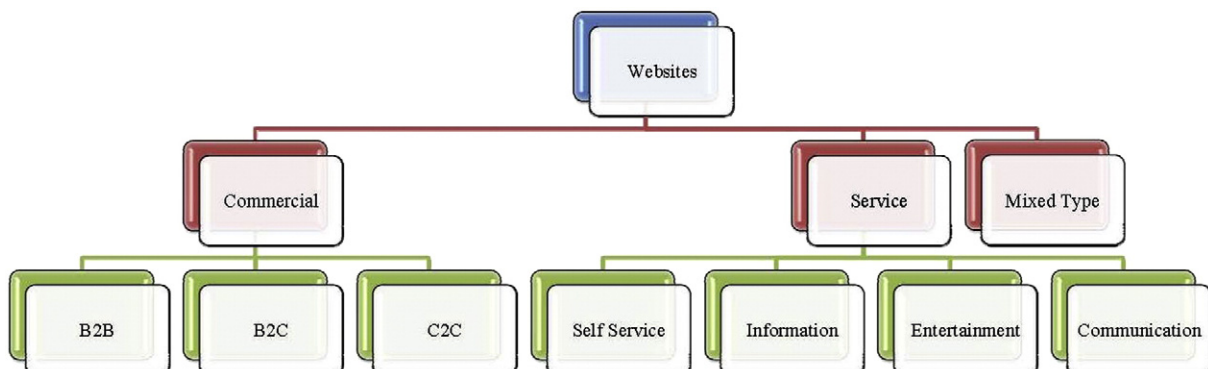

Fig. 1. Classification of websites.