

Framework for Evaluation of E-Commerce Websites

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Abstract

Now days, the use of websites for the different purposes in different areas such as education, health, government and business touches top of the graph. The main objective of this study is to construct the website evaluation structure for the E-Commerce websites. E-Commerce has become most valuable mercantile activity. The trend of using E-commerce websites for the various purposes is expanding every day, so the tremendous advancement in the use of E-commerce websites also increases the need to evaluate them. In this paper we address this issue by developing a framework on which E-Commerce websites can be analyzed. The quality factors of the E-commerce websites are identified, and the new framework is constructed. The framework composed of a five high Quality factors, each with their sub quality factors.

Keywords *Electronic-Commerce, Evaluation, Framework, Quality factors, Website quality.*

1. Introduction

The main challenge for the E-commerce websites is to fulfill the customer's requirement in every perspective. A poor web and weaken the organization's position [19]. Website which do not provide positive experience may cause customers to visit the physical store [1]. E-commerce is a key point of interaction between businesses across various sectors and their clients and stakeholders [15]. The quality of the website makes a website valuable, so there is a need of measurement criteria to evaluate the points related to the quality in use [7]. This paper proposes a general comprehensive framework for evaluating the quality of E-Commerce website by analyzing their merits and demerits. It is to propose a high-level structure for a global quality evaluation of a website, by an extensive study on the existing website evaluation structures and necessary quality factors. On the basis of this new framework different E-Commerce Websites could be analyzed.

2. E-Commerce Websites

Website development has been growing at a fast rate for the wide ranges of objectives in different domains such as education, government, business, health, and entertainment [6]. One of the area where today it is mostly used is in E-Commerce. Although E-commerce is a very recent phenomenon of the late 1990s, it already has a brief chaotic history [16]. E-Commerce is swelling across the globe. Increasing turnover of e-commerce in the world points out the significance of research of the e-commerce web sites evaluation, design solutions, and quality assurance. [3]. The quality of a website makes a website profitable, user friendly and accessible, and it also offers useful and reliable information, providing good design and visual appearance to meet the users' needs and expectations [17]. This can be done by defining the measurable website criteria [18][19]. Therefore there is a need to design a specific structure for evaluating the E-Commerce websites.

3. Website Evaluation Quality Factors

Website evaluation is the assessment and measurement of the websites. As the dependency on web services increases, the need to assess characteristics with website quality and success increases. Websites characteristics are important; they have been a constant concern of research in different domains and they were widely studied in the e-commerce literature [7].

Christophe Bezes [2] distinguishes three major website evaluation approaches, analyzing websites as information systems, as communication channels, or as retailing channels. E-commerce websites were first analyzed as information systems. a second approach evaluated websites as a distribution and advertising channel. . Finally, a third and last approach, evaluates e-commerce websites as retailing channels, measuring e-satisfaction, however Vida Davidaviciene [3] proposed a quality evaluation model for the e-commerce websites. The five most important criterion groups were identified (easy to use, navigation, security assurance, real time help, and content). The comparison of different e-

commerce is done on these key elements and quality evaluation model is developed. The real and virtual environments are separated in the model. Quality evaluation is mainly concerned with the virtual environment which consists of user level and developer level, whereas Caelos, Raquel et al. [4] in 2008 focused on e-commerce website's success showed that website design is the key factor for the success of a website it gives emphasis on the idea that successful website design or factors affecting the usability of a website enhance the level of a user satisfaction.

Wang and Huang [5] summarized the factors websites in three quality factors content design and technology, each main factor has their sub quality factors. On the other hand Coral [6] have created a web classification framework to check the quality of the websites. This framework includes usability, presentation, operation and maintenance as the main quality factors, whereas

Layla Hasan [7] develop a theoretical, comprehensive, and measurable framework for assessing the quality of websites. The dimensions of the proposed criteria are content quality, design quality, organization quality, and user-friendly quality.

Rian van der marwe [8] proposed a framework and methodology for evaluating the e-commerce websites. In order to evaluate the performance of the websites not only individually but with the comparison of other websites also by focusing on two objectives: by developing a framework and criteria for the comprehensive evaluation of e-commerce websites and to use this framework to develop to method to evaluate the websites quantitatively, to develop a framework for the evaluation of the websites customer buying cycle is analyzed, however Vassilis S.Moustaki [9] proposed hierarchical framework, which supports website quality assessment. This framework includes content, uniqueness, structure and design, appearance and multimedia, and navigation, but Mei Cao [10] identify that what makes a web site effective. For that they examines and integrates four sets of factors that capture ecommerce web site quality using an IS success model: system quality, information quality, service quality, and attractiveness, on the other hand, HASAN [11] to develop a methodological usability evaluation framework for e-commerce websites. A multiple-case study (comparative design) was used, where three usability methods (user testing, heuristic evaluation and web analytics) were applied whereas, Paul A. Walcott [12] proposed a paper to determine the readiness of e-commerce websites by developing framework. Website Evaluation Framework which consisted of six categories; these categories were: company information and function, product/service information and promotion, buy / sell – transactions, customer services,

ease of use and innovation in services and technology, Many of the existing website evaluation methods and criteria for evaluating website quality are not able to effectively assess the performance and quality of a website, and there is no specific lining between the quality factors in a particular domain.

4. Proposed Framework

By analyzing the existing evaluation framework and the quality factors in the website models identify high level quality characteristics. The high level quality factors in any website is considered as

- Usability
- Design
- Performance
- Functionality
- content

4.1 Usability is the ease with which one can use a human-made object such as a tool or device. In software engineering, **usability** is the degree to which software can be used by particular customer to achieve quantified goals with effectiveness, efficiency, and satisfaction in a quantified context of use.

ISO defines usability as "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." The word "usability" also refers to methods for improving ease-of-use during the design process. Usability in general is defined as a quality characteristic that assesses how easy user interfaces is to use [20]. Website usability is defined as a combined effect of several design goals like easy to learn, easy to remember, easy to understand, easy to defined and effective to use it. It consists of these quality components. Understandability, Learnability, memorability, accessibility and operability, as sub characteristics of Usability.

Sub Characteristics under usability are:

4.1.1 Understandability a website should make it easy to help users understand how to use the website for a specific task under specific context of use. The organization of the website also forms part of this sub quality factor. The arrangements of the labels, links and terms used in the website should match to the user's terms so as not to confuse the user of the website [21].

4.1.2 Learnability the website should not be cumbersome for users to learn how to use it. Necessary help documents other supplemental materials describing how to use the website, how to find the particular kind of information or how to perform a certain type of task on

the website should be available to help users easily learn to use the site [22].

4.1.3 Operability it indicates the capability of a website to be easily operated by users. Users of the websites must be comfortable with the manner through which services and content are presented in the website and be able to use the website easily without being frustrated or confused [22].

4.1.4 Accessibility it can be viewed as the "ability to access" and benefit from particular system or entity. The concept focuses on enabling access for people with disabilities, or special requirements, or enabling access through the use of assistive technology; however, research and development in accessibility brings benefits to everyone. Web Accessibility is strongly related to universal design which is the process of creating websites that are usable by people with the widest possible range of abilities, operating within the widest possible range of situations. This is about making things accessible to all people (whether they have a disability or not).

4.1.5 Memorability it is a measure of how easy a website is to remember after a substantial time-lapse between visits. Once a user has taken the time to learn how to navigate a website and find what they are looking for; they need to be able to remember how to do it when they come back. A website needs to have high memorability. If a website has good Learnability and memorability, visitors are sure to keep coming back for more. When we are designing a website we try to maximize the memorability by creating logical steps and consistent design throughout the site.

4.2 Design the presentation is the capability of the website that how to present it in front of users. The new technology should be applied on the website. It should be attractive. The sub factors under presentation are: Design, Technology, formatting, and multimedia, attractiveness.

4.2.1 Attractiveness the user interface of the website should be attractive, enjoyable and pleasant enough for users to create an emotional appeal to use the site [21]. In addition, the choice of color, label names and font types must be consistent through the website. Except for titles, the fonts used are the same throughout the website the Web pages should also not be crowded, white spaces should be effectively used to avoid overcrowded pages [24].

4.2.2 Formatting Website performance measures the speed of service requests completion. It can be measured in terms of throughput, response time latency and execution time [25].

4.2.3 Multimedia in the past 5 years the bandwidth to the customers has expanded. Web multimedia has been

receiving near exponentially increasing attention. The explosion of YouTube and the emergence of internet TV are creating enormous interest in the use of online communication such as video and advertising medium [26]. Multimedia creates an outlet for this demand. This is why it is so important to incorporate an effective multimedia design scheme.

4.3 Performance Web performance refers to the speed in which web pages are downloaded and displayed on the user's web browser. Web performance optimization (WPO) or website optimization is the field of knowledge about increasing web performance. Performance is mainly concerned with the reliability of the website.[22]. Reliability is all about the performance of the website and the performance of the website starts with the fact whether website to recover quickly at times of any kind of problems [27].

Sub quality factors under performance are:

4.3.1 Availability it measures the readiness of websites. The website should be ready and available immediately when it is invoked [28].

4.3.2 Fault tolerance the capability of the website to keep certain level of performance even when there are major faults. A website should not have dead links. Links should work properly to lead users to the places he/she wants to go in the website [29][21].

4.3.4 Recoverability the capability of the website to recover the website to a previous state after the occurrences of faults or errors [22].

4.4 Functionality it indicates to the capabilities that the product can perform based on the stated or implied need of users [30]. The functionality of a website is the interactive part of the site - that which allows the visitor to respond in some way, thus turning the visitor into a customer. In information technology, functionality (from Latin *functio* meaning "to perform") is the sum or any aspect of what a product, such as a software application or computing device, can do for a user. A product's functionality is used by marketers to identify product features and enables a user to have a set of capabilities. Sub quality factors included in functionality are: suitability, navigation, and search. Functionality is decomposed into the following sub characteristics:

4.4.1 Navigation A good navigation structure helps user to browse through the website in finding the information they look for without getting lost or being frustrated [31]. The web in general is perceived as a space to move around in, an environment where we can get things done, despite the fact that it cannot be touched, smelled or tasted [32]. This space can be compared with the environments one can find in a store building parks or museums. People need a clearly marked path to move

around and do what they want to do without unnecessary barriers

4.4.2 Search The search functionality in the website that helps users look for different kinds of information through various search options. Search functionality should also be available to assist users find information easily. Although search is considered mostly as one type of navigation, it is sometimes considered as a separate functionality of a website to easily understand the two functionalities [31].

4.4.3 Suitability in ISO model, suitability is defined as, “the appropriateness of the functionalities the website provides to users” [22]. In other words, users must be satisfied in the functionalities provided by the website to be use in a particular context of use.

4.5 Content it is the information provided on a website. Most authors articulate the importance of this characteristic with this motto “content is king”. The main nature of web applications is that they are a combination of information, services and functionalities. Information provided on a website should be relevant, engaging and appropriate to users [33]. Content is the most critical part of the website. Users come to a website primarily looking for a special kind of information; they give less attention to the navigation, visual design and interactivity of the site.

After reorganizing the sub characteristics into categories based on their definition, the following sub quality factors are identified:

4.5.1 Relevance of information data provided in the website should be relevant and engaging to users. Unless the information in the website is important to user, the interest to use the website may decrease. As a result, the website may not achieve its objective.

4.5.2 Accuracy of the information users rely on the information in the website and hence it is important to ensure the accuracy of the information made available on the website. Information should be correct to not to mislead the users. Grammar and spelling errors that could be alter the meaning of the information should be avoided [34]. If the content of the website is accurate, this can boost the confidence of the users to rely on the information the website offers.

4.5.3 Up-to date information the website must deliver current information related to current situation. There should also be some means of users to know that the website is updated. Displaying the date when exactly the content is last updates is one approach to help users recognize that the specific time when the information is released and hence relate to the situation that occur during the specific time[35].

4.5.4 Authority the information about authors who edit the contents of pages in the website should be available

for any kind of reference users would lie to make. Making available these information increase the credibility of the content [36].

4.5.5 Identity the logo of the website must be available and clearly visible in every page. Website identity is important for user safety. While encryption is important, knowing who you are encrypting to is paramount when conducting online transactions. While many users can identify the green bar/lettering associated with an Extended Validation (EV) certificate, recent user interface (UI) changes by browsers make it more difficult to differentiate these certificates from low value, domain validated certificates. This makes it a challenge to figure out the true owner of the website [23].

The proposed framework constructed is shown below in TABLE.

E-Commerce Website Evaluation Framework

High quality factors	Sub quality factors
Usability	Operability, understandability, Learnability, Accessibility, and memorability
Design	Attractiveness, formatting and multimedia
Performance	Availability, fault tolerance and recoverability
Functionality	Search, navigation and suitability
Content	Accuracy of information, relevance of information, identity, Authority.

5. CONCLUSION

Analyzing the previous work done on the framework of the websites we identified five high level factors (usability, presentation, performance, and content). Each high level quality factor has its own sub quality factors.

On the basis of this framework, user based analysis and tool based analysis on the e-commerce websites could be done.

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