

# Weaknesses and strengths of online marketing websites

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## Abstract

**Purpose** – Websites are the most important element of company strategy in the digital space. Therefore, establishing strategic management of online business is essential to improve firm connectedness and competitiveness and to achieve global company reach. This paper aims to propose the analysis of technical and content quality of websites to identify the main weaknesses and strengths of online business.

**Design/methodology/approach** – An innovative measurement instrument called IWebQEI is designed to measure web quality level. This instrument is validated with data from 104 international companies. The results are used to verify whether there are quality differences between informative and e-commerce websites.

**Findings** – The main findings indicate that e-commerce websites achieve greater levels of technical and content quality than informative sites, and companies implementing e-commerce pay more attention to the content quality dimension. In contrast, companies using an informative website are more focused on the technical quality dimension. Based on these results, practical insights are offered to improve the strategic management of e-commerce.

**Originality/value** – Few studies have focused on analysing the technical and content quality of websites to identify the main weaknesses and strengths of online business. The results offer important theoretical and practical contributions for companies on how to manage their website to improve firm connectivity and competitiveness.

**Keywords** Web content quality, Web technical quality, Website strategy, E-commerce, Online business

**Paper type** Research paper

## Debilidades y fortalezas de los sitios web de marketing online

### Resumen

**Propósito** – Los sitios web son el elemento más importante de la estrategia digital de la compañía. Una gestión estratégica del negocio online es esencial para mejorar su conectividad, competitividad y para conseguir su alcance global. Este trabajo propone el análisis de la calidad técnica y de contenido de sitios web para identificar las principales debilidades y fortalezas del negocio online.

**Metodología** – Para medir el nivel de calidad web, se ha diseñado un innovador instrumento de medición, denominado IWebQEI. Este instrumento se valida con datos de 104 empresas internacionales. Los resultados se utilizan para comprobar si existen diferencias de calidad entre las webs informativas y los e-commerce.

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**Resultados** – Los resultados indican que los e-commerce alcanzan mayores niveles de calidad técnica y de contenido que las webs informativas, y las empresas que implementan un e-commerce prestan más atención a la calidad de contenido. En cambio, las empresas que implementan una web informativa se centran más en la calidad técnica. A partir de estos resultados se ofrecen ideas prácticas para mejorar la gestión estratégica del e-commerce.

**Originalidad** – Pocos estudios analizan la calidad técnica y de contenido de los sitios web para identificar las principales debilidades y fortalezas del negocio online. Los resultados ofrecen importantes contribuciones teóricas y prácticas sobre cómo gestionar los sitios web para mejorar la conectividad y la competitividad de la compañía.

**Palabras clave** – Calidad de contenido, Calidad técnica, Estrategia web, E-commerce, Negocio online

**Tipo de artículo** – Trabajo de investigación

网络营销网站的弱点和优势

### 摘要

目的 – 企业网站是公司在数字空间中战略的最重要元素。因此, 建立在线业务本身的战略管理对于提高公司的连通性和竞争力以及实现公司的全球影响力至关重要。本文提出对企业网站的技术和内容质量进行分析, 以确定在线业务的主要弱点和优势。

设计/方法/途径 – 设计了一个创新的测量仪器, 称为IWebQEI, 用于测量网络质量水平。该仪器通过104家国际公司的数据进行验证。结果被用于检查信息网站和电子商务网站之间是否存在质量差异。

研究结果 – 主要研究结果表明, 总体而言, 电子商务网站的技术质量和内容质量水平高于信息类网站, 实施电子商务的公司更注重内容质量维度。相比之下, 实施信息型网站的公司则更注重技术质量维度。基于这些结果, 为改进电子商务的战略管理提供了实际的见解。

原创性 – 以前的研究很少关注分析企业网站的技术和内容质量, 以确定在线业务的主要弱点和优势。研究结果为企业提供了重要的理论和实践贡献, 即如何管理企业网站以提高公司的连通性和竞争力。

关键词 – 网站内容质量, 网站技术质量, 网站战略, 电子商务, 在线业务

论文类型 – 研究论文

## 1. Introduction

Organisations are taking advantage of the latest advances in information and communication technologies (ICTs) to implement better ways of communicating and distributing products/services, thus facilitating their global reach. The use of websites is now a standard practice by which companies can improve their connectivity and competitiveness (Falciola *et al.*, 2020), hence becoming the most essential element of any company on the internet (Paul and Rosenbaum, 2020). This fact was intensified during the COVID-19 pandemic, shifting consumer purchasing behaviour towards online channels (Oliver Wyman, 2021) and consequently increasing competitiveness in the digital ecosystem. Therefore, companies' websites should be the first element analysed in depth for the strategic management of any online business. To conduct such an analysis, this paper proposes analysing technical and content quality of websites to identify the main weaknesses and strengths of online business.

The most widely used approaches to assess website quality are based on three dimensions:

- (1) technical/system quality;
- (2) content/information quality; and
- (3) service quality (DeLone and McLean, 2003; Rocha, 2012).

The *technical/system quality dimension* considers the technical characteristics of a website as a digital information system (IS), the *content/information quality dimension* considers the

relevance of the information presented on a website, while the *service quality dimension* considers the level of service provided on the website from an external point of view. Due to the variety of approaches, there is no globally accepted measurement indicating which website characteristics should be jointly considered to properly evaluate quality (López-Miguens and Vázquez, 2017). Previous approaches were also designed to evaluate company websites in a particular industry (Fernández-Cavia *et al.*, 2014), and most of them are based on users' perceptions (Chen *et al.*, 2017). Moreover, due to the constant evolution of ICTs, some of the characteristics used in previous research to assess website quality should be updated (López-Miguens and Vázquez, 2017). Furthermore, most of the previous research focused on developing web quality measurement instruments fails to make use of these advances to identify the main weaknesses and strengths of online businesses to promote improvements in the strategic management of e-commerce. The analysis of website quality proposed in this research covers these research gaps.

For this task, an innovative measurement instrument called Internal Web Quality Evaluation Index (IWebQEI) was designed to measure web quality level. This instrument was validated with data from 104 international companies, and the results were used to verify whether there were quality differences between informative and e-commerce websites. This comparison is motivated by the fact that, due to the continuous changes in the environment, many organisations are adapting their website strategy, transitioning from informative websites to e-commerce platforms (e.g. Zara, Ikea) (Karray and Signé, 2018). Based on the results of the comparison, this paper offers practical insights into the strategic management of e-commerce. These practical insights become even more relevant when considering how all the aforementioned technical and content quality characteristics can influence users' perceptions of a website or brand/company, their buying intentions and even their brand feelings (Flavián, 2009; Flavián-Blanco, 2011; Orús *et al.*, 2017).

To accomplish these objectives, this paper begins by presenting a review of previous literature. Next, detailed descriptions are provided of the research model, the methodology used in the empirical study and the results. Finally, the discussion section and final conclusions are presented.

## 2. Conceptual framework and hypotheses

Websites have changed the dynamics of the relationships between customers and companies, giving way to the interaction between users/customers and websites, thus facilitating the way companies communicate and distribute products/services. This situation has led to the coexistence of different types of website strategies, depending on the strategic goals of the company (Roy and Sharma, 2021; Weltevreden *et al.*, 2005). Subsequently, these goals evolved in parallel to web technology itself as a way of improving company competitiveness (Falconi *et al.*, 2020). To better understand this new context, Falconi *et al.* (2020), focusing on the capabilities of businesses, offer a theoretical framework of firm competitiveness in which the use of a website indicates that companies are connected to the environment, gathering and exploiting information and knowledge.

Falconi *et al.* (2020) consider that the concept of competitiveness implies that companies need to develop capacities to meet the needs of their target market, doing so in sustainable manner while also maintaining close contact with updated market information. In this sense, their model comprises three principal dimensions of firm competitiveness:

- (1) compete;
- (2) change; and
- (3) connect.

The *competence dimension* focuses on firm operations. The *change dimension* refers to the company's ability to respond to market forces. The *connect dimension* centres on information, content and knowledge access, gathering and management.

This study extends the firm competitiveness framework established by [Falciola et al. \(2020\)](#) by delving into the *connect dimension* through the analysis of website quality. These authors assess connectivity by only indicating the usage of a website. This study considers that to improve strategic management for e-commerce connectivity and, consequently, competitiveness, companies should ensure an appropriate level of technical and content website quality.

### 2.1 Website quality

Website quality has been widely studied in different contexts, and its definition depends on the dimensions considered, the key attributes identified and the way it is measured. Although numerous proposals have been presented, there is currently no universally accepted measurement based on up-to-date criteria ([López-Miguens and Vázquez, 2017](#)). However, among the earliest works that considered website quality to be comprised of several dimensions, several approaches stand out for their holistic nature based on the models by [DeLone and McLean \(2003\)](#) and [Rocha \(2012\)](#). These proposals explain website quality based on three key elements/dimensions which encompass:

- (1) service quality;
- (2) technical/system quality; and
- (3) content/information quality.

The *service quality* dimension is based on a perceptual vision that considers the level of service provided on a website from an external quality perspective and subjective point of view. Within this dimension, both service and technical characteristics involved in user-website interaction are assessed ([Rodríguez et al., 2020](#)). *Technical/system quality* refers to the way in which content and service characteristics are presented on a website. It considers technical aspects related to access speed, ease of use, interface and navigation, offering an internal quality perspective. This assessment can be based on website performance as an IS from an objective point of view (internal assessment from the company perspective based on objective evaluations) ([Olsina et al., 1999](#)) or an external point of view or perceptual vision ([Al-Geisi et al., 2014](#)). Finally, from an internal quality perspective, *content/information quality* considers the presence of relevant, sufficient, accurate and up-to-date information on the website ([Miranda and Bañegil, 2004](#)). This approach is based on three basic content areas: informative (corporate information), transactional (considering issues related to distribution) and communicational (related to means by which the company fosters the exchange of information). The evaluation of these quality aspects has also been addressed from both an objective point of view ([Miranda and Bañegil, 2004](#)) and by applying users' perceptions (subjective point of view) ([Chen et al., 2017](#)).

This research develops a holistic method of evaluating web quality from an internal perspective of the organisation, which is as objective and up to date as possible. For this purpose, the technical and content dimensions of web quality are adapted for this research. The service quality dimension is not included in this proposal, as it is fundamentally based on objective indicators.

Among the previous studies focused on identifying the most important attributes of technical quality following an IS approach, one of the most notable is the index developed by [Olsina et al. \(1999\)](#) – Website Quality Evaluation Method (WebQEM). These authors based

their index on the ISO9126 software quality standard. In addition, other authors have compiled the most important aspects of technical and content quality dimensions to construct the most objective quantitative measurement indices possible, which allow web quality evaluation from a combined approach (IS and marketing). These indices comprise the Web Assessment Index (WAI) by [Miranda and Bañegil \(2004\)](#) and the Web Quality Index (WQI) by [Fernández-Cavia et al. \(2014\)](#). Table 1 displays an internal comparison of the most important website quality indices (WAI, WebQEM and WQI), which comprise the indicator structure of the index proposed in this research.

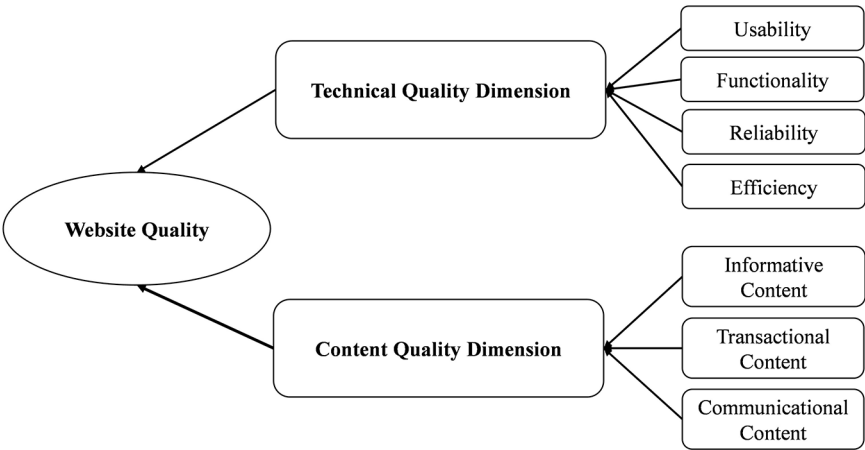
## 2.2 Website strategies and hypotheses

The present study develops a research model based on the analysis of technical and content quality (see [Figure 1](#)).

Proposed i	WAI	WebQEM	WQI
<i>Technical quality</i>			
<i>Usability</i>	<i>Not included</i>	Global site understandability, feedback and help features, interface and aesthetic features and miscellaneous features	Usability, ease of use
<i>Functionality</i>	Site map, keyword, permanent site menu and help page	Search mechanisms and navigability	Information architecture
<i>Reliability</i>	<i>Not included</i>	Non-deficiency	<i>Not included</i>
<i>Efficiency</i>	Speed, accessibility (presence in search engines or web positioning and site popularity)	Accessibility and performance (speed)	Accessibility and web positioning (internal and external) <i>Not included: speed</i>
<i>Content quality</i>			
<i>Informative content</i>	Company story, product/service description, daily news highlights, financial information, job opportunities, check order, search for store or agents, external links and links to firm divisions	<i>Not included</i>	Homepage, languages, content amount and quality
<i>Transactional content</i>	Online orders	<i>Not included</i>	Discourse analysis, branding and marketing (distribution and marketing)
<i>Communicational content</i>	Contact telephone, email, address and fax, receive news by email, free email service, personalisation capacity and entertainment elements	<i>Not included</i>	Mobile communication, interactivity and social web

**Table 1.**  
Index comparison  
WAI, WebQEM and  
WQI

Figure 1.  
IWebQEI  
components



Previous literature provides different classifications of websites based on the type of commercial activity (business-to-consumer/business-to-business) (Xing, 2018), the purpose they serve (Hoffman *et al.*, 1995), the way people use websites (e.g. entertainment/information/communication/commerce) (Lee and Koubek, 2010) or traffic volume (Zviran *et al.*, 2006). Depending on the strategic goals of the company, website strategies can also be categorised into two types:

- (1) informative/non-transactional website strategies; and
- (2) e-commerce/transactional website strategies (Roy and Sharma, 2021; Weltevreden *et al.*, 2005).

Informative websites allow companies to promote products, carry out marketing strategies and supply corporate information that favours online communication and boosts offline sales (van Nierop *et al.*, 2011). As for e-commerce websites, besides being a communication channel, they can be used as an alternative distribution channel, provide accessibility and assortment variety, facilitate product/service customisation and encourage social interaction, thereby promoting both online and offline sales (Karray and Sigué, 2018). Therefore, informative and e-commerce websites have different behavioural associations for the consumer (Roy and Sharma, 2021).

With respect to the *technical quality* dimension, the usability of a website depends, to a large extent, on the website type, the purpose of the site and the characteristics of the users. More specifically, e-commerce websites must direct their efforts towards increasing visit rates, duration of visits and promoting online purchases (King *et al.*, 2016). Web design contributes to positive outcomes and influences user perceptions and behaviours (Flavián, 2009). Indeed, more than 75% of online consumers judge the credibility of an e-commerce based on its design (Sweor, 2021). Likewise, appropriate web design increases the duration of visits and favours the intention to revisit the site, which ultimately facilitates the purchase decision (Garett *et al.*, 2016). Therefore, perceived usability, in addition to being an essential component of the user's experience, represents one of the most important aspects to consider when designing websites, especially for e-commerce, given the positive impact that greater ease of use has on consumer purchase behaviour (King *et al.*, 2016). In this way, the navigability (functionality) of e-commerce must be optimised and simplified to increase its



ease of use (e.g. well-structured visual appeals) (Bataoui, 2022). Furthermore, properties such as quick website response times without errors/broken links (efficiency/reliability) or aspects related to web positioning (efficiency), apart from creating a competitive advantage, are positively linked to consumer satisfaction and attitudes towards purchases, which makes sense considering that users' perceptions and feelings related to the website are influenced by their experience during online searches. The emotions experienced during and after the search are strongly determined by the perception of success (positive emotions) or failure (negative emotions) achieved in this task. Similarly, when users' browsing is interrupted by unwanted sources, such as broken links, they may experience negative emotions (Flavián-Blanco *et al.*, 2011).

Therefore, these elements contribute by both optimising user experience and by sending a positive message to consumers regarding the quality of the product and the vendor itself (Wells *et al.*, 2011). Consequently, website features that comprise technical quality must be implemented better and to a greater extent on e-commerce websites than on informative websites. Thus, the following hypotheses are formulated:

*H1.* E-commerce websites offer greater levels of technical quality than informative websites.

*H1a.* E-commerce websites offer greater levels of usability than informative websites.

*H1b.* E-commerce websites offer greater levels of functionality than informative websites.

*H1c.* E-commerce websites offer greater levels of reliability than informative websites.

*H1d.* E-commerce websites offer greater levels of efficiency than informative websites.

Regarding the *content quality dimension*, given the importance of information offered on websites in e-commerce, it follows that the quality of the information/content will have an impact on consumers' shopping decisions, their satisfaction and their loyalty to websites (Chiu *et al.*, 2014). Currently, most online sales are made on websites, making e-commerce the most important online sales channel and the main source of product awareness (Sleeknote, 2021). Hence, e-commerce websites must include relevant information, for example, about the company and the products/services it sells on its website (informative content) and how to acquire them (transactional content), to increase consumer confidence and purchase intention (Nguyen *et al.*, 2020). The quality and the way in which this information is provided are key aspects for the success of an e-commerce website (Flavián, 2009). For example, presenting a product in a video format enhances consumer response to this product and is a strong determinant of purchase intention (Orús *et al.*, 2017). In addition, transactional features related to personal information privacy, online payment security and an easy shopping process influence customer trust and purchase intention (Wang *et al.*, 2015). Similarly, communicative content features foster more interactive use of websites, providing support to the creation and exchange of user-generated content (Huang and Benyoucef, 2013), with interactivity being a precursor to purchase intention (Nguyen *et al.*, 2020). In fact, the incorporation of interactive characteristics to e-commerce websites, such as functionalities of social media, has a positive effect on website stickiness (Friedrich *et al.*, 2019). This characteristic also improves the user experience, increases the credibility of the website and provides additional communication channels to contact the company (Alnawas and Al Khateeb, 2022). It, therefore, follows that website characteristics that comprise content quality should be implemented better and to a greater

extent on e-commerce websites than on informative sites. Thus, the following hypotheses are proposed:

- H2.* E-commerce websites offer greater levels of content quality than informative websites.
- H2a.* E-commerce websites offer more informative content about the company than informative websites.
- H2b.* E-commerce websites offer more transactional content than informative websites.
- H2c.* E-commerce websites offer more communicative content than informative websites.

### 3. Research method

#### 3.1 Sampling and data collection

The data of 104 international companies, obtained from the SABI database (Dijk, 2017), were analysed based on a series of prerequisites:

- multisectoral companies;
- with a website;
- medium/large in size, for the positive relationship with web adoption (Teo and Pian, 2004); and
- from a specific geographic area.

All companies in the geographic area of Andalusia that met the selection criteria were selected with the aim of expanding knowledge on companies in the region and ensuring the validity of the results.

The data were gathered between December 2017 and February 2018. Initially, data compilation was carried out through manual observation and analysis of website content (Holsti, 1969). Content analysis is one of the most common techniques for analysing written documents, such as websites, as it allows information on a wide range of content characteristics to be collected objectively (Huizingh, 2000). Following specific instructions and a coding manual, two coders manually collected the data for this research: an independent coder (without previous knowledge of the research hypotheses) and a member of the research team. Inter-coder reliability, calculated using Holsti (1969) reliability formula, was satisfactory (reliability = 0.85 > 0.80 minimum threshold). Any discrepancies between coders were examined and solved by another member of the research team.

#### 3.2 Operationalisation of variables

The IWebQEI analyses the two dimensions that comprise the construct – technical quality and content quality. The technical quality dimension is comprised of the following indicators:

- *Usability*: ease of use of a system by the user (effectiveness/efficiency/satisfaction) during the navigation process (ISO/IEC: 29881, 2010; Nielsen, 2003).
- *Functionality*: the set of functions and properties of the system that contribute to the provision of services to satisfy the needs of users (ISO/IEC: 25000, 2014).
- *Reliability*: software capability to maintain a performance level for a period and under established conditions (ISO/IEC: 25000, 2014).



- *Efficiency*: system capability to provide adequate performance based on the resources used and under previously established conditions (ISO/IEC: 25000, 2014). Speed and accessibility. Accessibility was evaluated according to WCAG 2.0 (based on the premises of perceptible/operable/understandable/robust, three levels determine the degree of accessibility: WCGA 2.0 A, WCGA 2.0 AA and WCGA 2.0 AAA, where the WCGA 2.0 AAA is the most accessible). *Web positioning*: search engine optimisation (SEO), search engine advertising (SEA), visibility (total number of external links to a website), popularity (number of visits received by a website) and optimisation (to achieve the first search results).

The content quality dimension is composed of the following indicators:

- *Informative*: company information.
- *Transactional*: possibility to place an order online (simplicity of the forms for placing orders and security in the sending of information).
- *Communicational*: sociability (use of web platforms/social networks) and interactivity (if interactions in the digital environment occur using technology).

The construction of the index was carried out under a holistic approach that encompasses both IS and marketing perspectives. It is based on the identification of the main indicators that determine the quality of the websites, using the indices previously described for reference (Fernández-Cavia *et al.*, 2014; Miranda and Bañegil, 2004; Olsina *et al.*, 1999).

The coding manual is displayed in Table 2, and it includes the criteria used during the coding process.

### 3.3 Methodology applied

The IWebQEI is elaborated using a method based on objective attributes (Totz *et al.*, 2001). This method maintains that web quality can be evaluated by decomposing individual attributes. Therefore, the index developed in this research comprises 70 items organised into five main indicators, as detailed in Figure 1. The formula used to calculate the quality level for each website  $i$  is indicated below:

$$IWebQEI_i = Technical\ Quality_i + Content\ Quality_i$$

Technical and content quality dimensions are calculated as a weighted aggregation of the indicators that comprise each one of these two dimensions using formulas 1 and 6 indicated below. The Delphi method was used to obtain the relative weights of each indicator, using an expert panel composed of 10 specialists from different fields (Ugwu *et al.*, 2006). The values of each weight are included in formulas 2, 3, 4 and 5, used to calculate each primary indicator for technical quality, and formulas 7, 8 and 9, used to calculate each primary indicator for content quality (where  $i$  represents each website).

Technical quality:

$$Technical\ Quality_i = \frac{[Usability_i + Functionality_i + Reliability_i + Efficiency_i]}{\text{number of primary indicators of technical quality}} \quad (1)$$

where each primary indicator is calculated as follows:

Technical quality	Scale
Usability	
<i>Global-site-understandability</i>	0 disorder/1 site map/2 table of contents/3 SM+TC
<i>Labeling/breadcrumbs</i> : checked with:	0/1
Heading-Tag-Checker ( <a href="https://adresults.nl/tools/heading-tag-checker-check-h1-t-m-h6-tags">https://adresults.nl/tools/heading-tag-checker-check-h1-t-m-h6-tags</a> )	
<i>Feedback/help features</i>	0/1
<i>Interface/aesthetic features</i>	0/1
<i>Miscellaneous features (languages support)</i>	0/1
<i>Functionality</i>	
<i>Search-mechanisms</i>	0/1
<i>Navigability</i>	0/1
<i>Reliability</i>	
<i>Non-miscellaneous-errors/drawbacks</i>	0/1
(broken/invalid/unimplemented links): checked with: Xenus-Link ( <a href="https://xenus-link-sleuth.softonic.com/">https://xenus-link-sleuth.softonic.com/</a> )	
<i>Efficiency</i>	
<i>Speed</i> : checked with: Pingdom ( <a href="https://tools.pingdom.com/">https://tools.pingdom.com/</a> )	0/1
<i>Accessibility</i> : checked with: Achecker ( <a href="https://achecker.achecks.ca/checker/index.php">https://achecker.achecks.ca/checker/index.php</a> )	0 no accessibility/1 WCGA2.0A/2 WCGA2.0AA/3 WCGA2.0AAA
<i>Web-positioning</i>	
*SEO: checked with: Alexa (keyword) ( <a href="https://www.alexa.com/login">https://www.alexa.com/login</a> )	0 not appearing among Google's first 10 results
	1 appearing among Google's first 10 results
*SEA: checked with: Alexa (keyword) ( <a href="https://www.alexa.com/login">https://www.alexa.com/login</a> )	0 not appearing as a sponsored link in Google's results
	1 appearing as a sponsored link in Google's results
*Visibility: checked with: Total-Site-Linking-In ( <a href="https://www.alexa.com/siteinfo">https://www.alexa.com/siteinfo</a> )	0 less than/equal to 3
	1 between 4 and 6
	2 between 7 and 12
	3 greater than 13
*Popularity: checked with: Traffic-Rank-Indicator ( <a href="https://www.alexa.com/siteinfo">https://www.alexa.com/siteinfo</a> )	0 less than or equal to 0
	1 greater than 8.210.058
	2 between 2.125.319 and 8.210.057
	3 between 1 and 2.125.318
*Optimisation: checked with: Moz-On-Page-Grader, level A indicates the best search engine optimisation results ( <a href="https://moz.com/tools/onpage-grader">https://moz.com/tools/onpage-grader</a> )	0 error/1 F/2 E/3 D/4 C/5 B/6 A
<i>Content quality</i>	
<i>Informative content</i>	Scale
<i>Informative content</i>	0/1
<i>Product/service description</i>	0 absence/1 basic/2 detailed
<i>Job opportunities</i>	0 absence
	1 JO/ 2 CV submission/3 JO+CV submission
<i>Transactional content</i>	
<i>Transactional functions</i>	0/1

**Table 2.**  
Coding manual

(continued)

Technical quality	
Usability	Scale

*Communicational content*

*Sociability* 0/1

*Interactivity*: checked with: Test-Friendly 0/1  
(<https://search.google.com/test/mobile-friendly>)

**Note:** \*Items that constitute part of a secondary indicator. Coding strategy is indicated for items with \* instead of the secondary indicators, which are not directly measured. Note 2: For 0/1 variables, 0 means absence and 1 presence

**Table 2.**

$$Usability_i = \left( \frac{24 * \sum \text{score obtained in } Usability_i}{\text{maximum score}} * 100 \right) \quad (2)$$

$$Functionality_i = \left( \frac{14.3 * \sum \text{score obtained in } Functionality_i}{\text{maximum score}} * 100 \right) \quad (3)$$

$$Reliability_i = \left( \frac{17.5 * \sum \text{score obtained in } Reliability_i}{\text{maximum score}} * 100 \right) \quad (4)$$

$$Efficiency_i = \left( \frac{18.5 * \sum \text{score obtained in } Efficiency_i}{\text{maximum score}} * 100 \right) \quad (5)$$

Content quality:

$$Content \ Quality_i = \frac{[Informative_i + Transactional_i + Communicational_i]}{\text{number of primary indicators of content quality}} \quad (6)$$

where each primary indicator is calculated as follows:

$$Informative_i = \left( \frac{5.83 * \sum \text{score obtained in } Informative_i}{\text{maximum score}} * 100 \right) \quad (7)$$

$$Transactional_i = \left( \frac{7.02 * \sum \text{score obtained in } Transactional_i}{\text{maximum score}} * 100 \right) \quad (8)$$

$$Communicational_i = \left( \frac{12.85 * \sum \text{score obtained in } Communicational_i}{\text{maximum score}} * 100 \right) \quad (9)$$

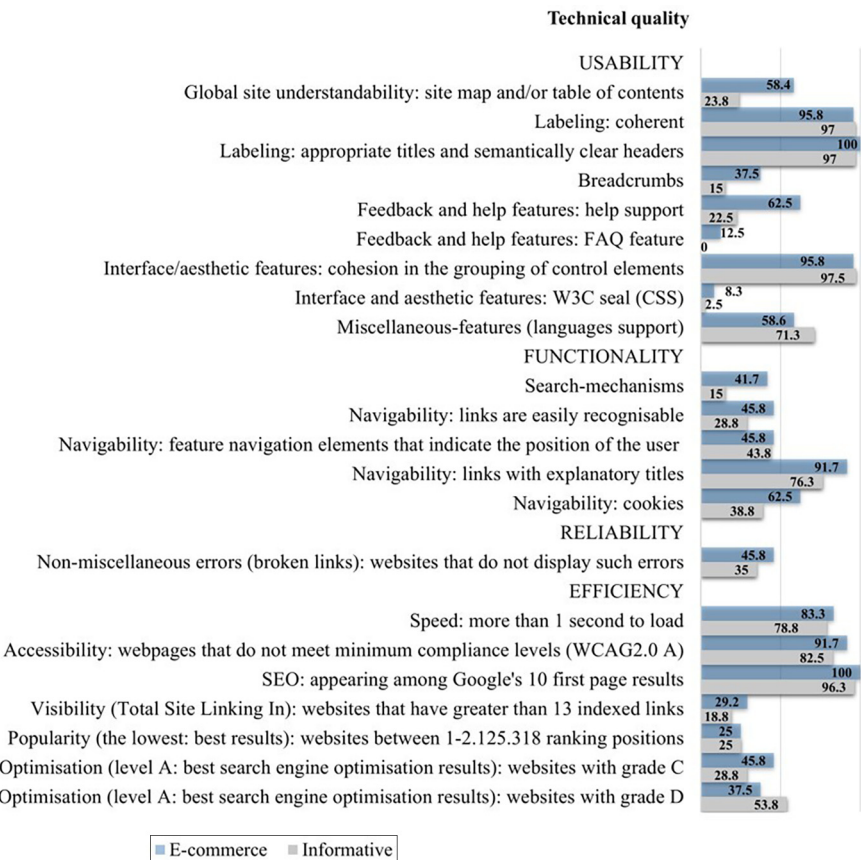
With respect to the calculation of technical quality, to achieve greater objectivity in certain technical components, automatic evaluation tools are applied (for more details, see [Table 2](#)).

Before the application of the two previous formulas, a combined reliability analysis of IWebQEI was conducted by calculating Cronbach's alpha to verify its consistency. The value obtained (0.76), close to 0.8, is good (Nunnally, 1978). During the calculation of Cronbach's alpha, 11 items were eliminated for having zero variance, thereby reducing the total number of items to 59.

Finally, the Mann–Whitney U test was applied to identify significant differences between informational and transactional. This non-parametric technique is the most appropriate in which the variables do not comply with the assumptions of normality and homoscedasticity.

3.4 Results

3.4.1 Descriptive analysis of technical and content quality by website strategy. Figure 2 displays the characteristics of technical quality indicators. For usability, of the 24 e-commerce websites, 58.4% have a site map/table of contents. A total of 37.5% use breadcrumbs, 12.5% have an FAQ feature and only 8.3% have the W3C seal (verifying that the website meets CSS standards: language that guides/organises the visual appearance).



**Figure 2.**  
Characteristics of  
technical quality by  
website strategy

Among the 80 informative websites, 23.8% have a site map/table of contents, about 15% feature breadcrumbs, none have an FAQ feature and only 2.5% have the W3C seal. Regarding *functionality*, search mechanisms are available on 41.7% of e-commerce websites and 45.8% feature navigation elements. Only 15% of informative websites have search mechanisms and 43.8% feature navigation elements. Concerning *reliability*, 45.8% of e-commerce websites and 35% of informative websites do not display non-miscellaneous errors/drawbacks.

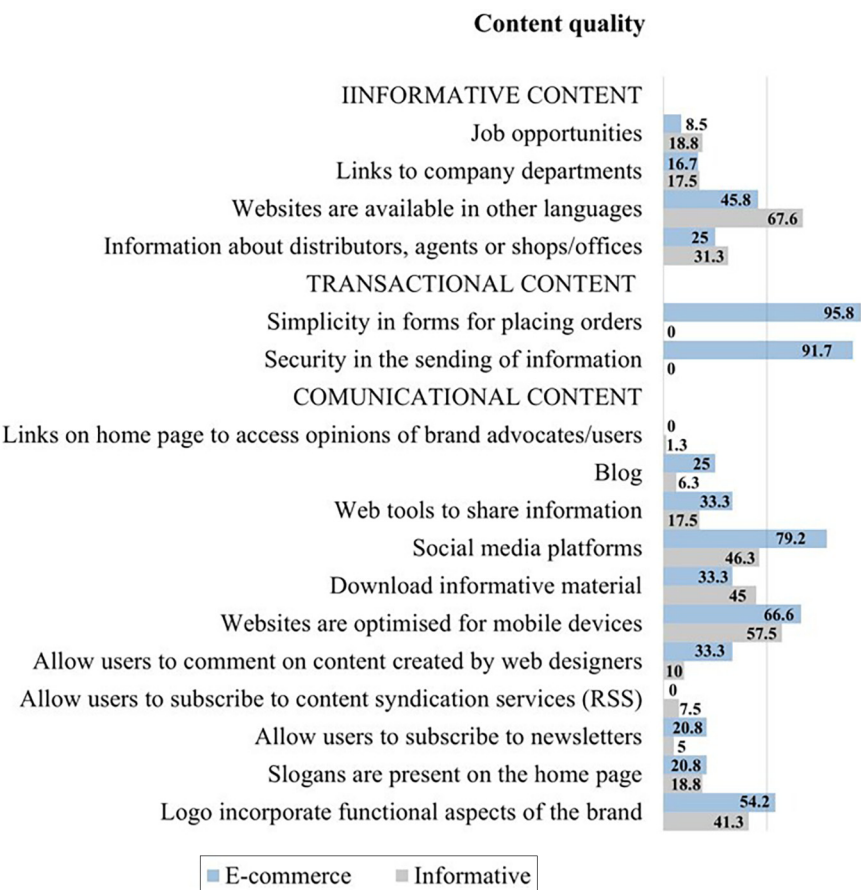
Regarding *efficiency*, 91.7% of e-commerce websites do not reach minimum compliance levels of web accessibility (WCAG2.0 A), and 83.3% take more than 1 s to load. As for visibility, 29.2% of websites have greater than 13 indexed links. With regard to popularity, in which the highest-ranking positions (the lowest) are occupied by the websites with the best results (highest number of visitors and pages served), only 25% of the companies are found among the first 2,125,313 ranking positions. In total, 45.8% of websites obtained a Grade C as their optimisation score (where A is the highest and F is the lowest). In total, 82.5% of informative websites fail to meet minimum compliance levels (WCAG 2.0 A), and 78.8% take more than 1 s to load. In terms of visibility, 18.2% have greater than 13 indexed links. Popularity results show that only 25% of the companies analysed are found among the first 2,125,313 ranking positions. In total, 53.8% of websites obtained a D as their optimisation score (see Figure 2).

Figure 3 shows the characteristics of content quality indicators. With respect to *Informative Content*, 16.7% of the e-commerce websites contain links to company departments and 45.8% are available in other languages. Among the informative websites, 17.5% feature links to company departments and 67.6% are available in other languages. Concerning *Transactional Content*, 95.8% of e-commerce sites offer simplicity in their order forms and 91.7% offer security in the sending of information. None of the informative websites offers the possibility of carrying out online transactions. Regarding *Communicational Content*, 79.2% of e-commerce sites use social media, 25% have a blog and 33.3% allow users to share information. As for interactivity, 66.67% are optimised for mobile devices and 33.3% allow users to comment on content created by the web designers. None of the websites allows users to subscribe to content syndication services (really simple syndication – RSS), and 20.8% allow subscriptions to newsletters. As for informative websites, 46.3% maintain a presence on social media, 6.3% have a blog and 17.5% allow users to share information. With regard to interactivity, 57.5% are optimised for mobile devices, 10% allow users to comment on content created by the web designers, 7.5% of users can subscribe to RSS and 5% allow subscriptions to newsletters.

**3.4.2 Differences in technical and content quality between website strategies.** Table 3 displays the results obtained after applying the non-parametric Mann–Whitney U test to two independent samples using website strategy (informative/e-commerce) as the grouping variable.

The results demonstrate that there are statistically significant differences ( $p < 0.05$ ) between the website strategies (informative/e-commerce) and the levels of technical and content quality. Regarding the indicators, it is observed that there are statistically significant differences ( $p < 0.05$ ) between both the *technical quality* indicators Usability and Functionality and the *content quality* indicators Transactional Content and Communicational Content.

The results indicate that the level of *technical* and *content quality* of the e-commerce websites is higher than that of the informative sites – supporting *H1* and *H2*. Quality is higher for the e-commerce websites for both Usability and Functionality, thereby corroborating *H1a* and *H1b*. The same applies to Transactional and Communicational content quality – confirming *H2b* and *H2c*. In contrast, non-statistically significant



**Figure 3.**  
Characteristics of  
content quality by  
website strategy

**Table 3.**  
Comparison of  
technical and content  
quality between  
informative and e-  
commerce websites

IWebQEI indicators/website type	Mean rank		U	Z Test
	e-commerce	informative		
Usability	77.17	45.10	368.00	-4.59*
Functionality	66	48.45	636.00	-2.51**
Reliability	56.83	51.20	856.00	-0.98
Efficiency	59.19	50.49	799.50	-1.24
Technical quality	67.42	48.03	602.00	-2.762*
Informative content	47.08	54.13	830.00	-1.005
Transactional content	92.50	40.50	0.00	-10.069*
Communicational content	66.65	48.26	620.50	-2.620*
Content quality	90.63	41.06	45.00	-7.059*

**Notes:** Significant at: \* $p < 0.01$ ; \*\* $p < 0.05$

differences exist between website strategies and the *technical quality* indicators Reliability and Efficiency, and the indicator of *content quality* Informative Content. For these indicators, web strategy has no influence on quality – thus failing to support *H2a*, *H1c* and *H1d* (see Table 3).

Table 4 displays the mean levels of *technical quality* and *content quality* according to website strategy (informative/e-commerce), assessed according to the following conditions: very low (0–0.02), low (0.21–0.04), medium (0.41–0.6), high (0.61–0.8) and very high (0.81–1) (Figure 4).

It must be highlighted that e-commerce websites have a medium level of *technical quality*, with a higher average than that of informative websites, which obtain a low general score.

Analysing the quality levels of the *technical quality* indicators, the Usability indicator has a medium quality level for both website strategies. Nonetheless, the average is superior on e-commerce websites. As for the Functionality and Reliability indicators, e-commerce websites have medium quality levels, while informative sites feature low-quality levels. The efficiency indicator displays low-quality levels for both website strategies, albeit with a slightly higher average for e-commerce websites.

Regarding *content quality*, e-commerce websites achieve a medium quality level compared to informative websites, which have a low-quality level. The Informative Content indicator is equal in both cases, displaying medium quality; however, informative websites obtain a slightly higher average. As for the Transactional Content indicator, it displays high-quality levels for e-commerce websites and low-quality levels for informative websites. Finally, in relation to the Communicational Content indicator, the results reveal low-quality levels for both website strategies, although e-commerce websites have a higher average.

#### 4. Discussion

The results obtained indicate that there are significant differences between both website strategies (informative/e-commerce) and the levels of technical and content quality achieved.

Mean values by Website strategy (no. of companies)	Usability Mean (SD)	Functionality Mean (SD)	Reliability Mean (SD)	Efficiency Mean (SD)	Technical quality Mean (SD)
<i>Informative (80)</i>	45.78 (7.41)	34.32 (20.32)	35.00 (47.99)	31.95 (9.84)	36.76 (14.99)
<i>E-commerce (24)</i>	55.90 (9.54)	47.44 (23.36)	45.83 (50.69)	34.95 (9.17)	46.03 (12.13)
<i>IWebQEI Average</i>	48.11 (8.99)	37.35 (21.66)	37.50 (48.64)	32.64 (9.73)	38.90 (14.86)

**Note:** SD = standard deviation

(continued)

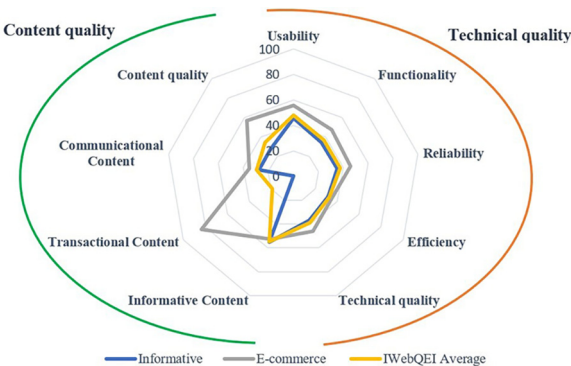
Mean values by Website strategy (no. of companies)	Informative content Mean (SD)	Transactional content Mean (SD)	Communicational content Mean (SD)	Content quality Mean (SD)
<i>Informative (80)</i>	55.43 (17.38)	0.00 (0.00)	27.49 (10.54)	27.64 (7.84)
<i>E-commerce (24)</i>	52.84 (17.04)	83.65 (16.84)	35.23 (12.55)	57.24 (10.73)
<i>IWebQEI Average</i>	54.83 (17.26)	19.30 (36.30)	29.28 (11.45)	34.47 (15.16)

**Table 4.**  
Mean values of  
technical and content  
quality by website  
strategy



Perceived technical quality has a positive influence on satisfaction and purchase intention. Therefore, it is reasonable that e-commerce websites were found to have a higher level of technical quality than informative websites. Similarly, the proposed hypotheses are corroborated for *Usability* and *Functionality*. These results are logical considering that high-quality web design increases the duration of visits and functional benefits of a website, favours the intention to revisit the site and has a positive effect on user perceptions and purchase behaviours (Flavián, 2009; Floh and Madlberger, 2013). More specifically, in terms of e-commerce websites, affective states are influenced by navigation-friendly and perceived usability/aesthetics (Moody and Galletta, 2015). Furthermore, optimum navigability combined with efficient web design favour impulsive shopping behaviours on digital media (Floh and Madlberger, 2013). In contrast, no differences exist between informative/e-commerce website strategies and *Reliability* and *Efficiency* (not supporting the proposed hypotheses). This result supports the idea that enhancing the accessibility and popularity of an e-commerce site improves web positioning (Floh and Madlberger, 2013) and that users' perceptions and feelings related to the website are influenced by their experience during online searches. However, companies are not aware of the strategic importance of improving accessibility and popularity (i.e. users' browsing experience without errors/broken links, obtaining good positions in search engine results pages).

Regarding content quality, e-commerce websites have higher content quality levels than informative websites, as postulated. This is logical if we consider that content quality can significantly influence attitudes and the way users interact with an e-commerce website. For e-commerce, the combination of informational, communicative/relational and transactional features helps to ensure a strong online brand position (Roy and Sharma, 2021). Only for the *Informative Content* are there no quality differences between informative and e-commerce websites (not supporting the proposed hypothesis). It can be deduced that although informative quality and the way in which it is provided positively influence the usefulness of e-commerce, increasing consumer confidence and intention to purchase, companies are aware of the importance of offering relevant and up-to-date content to stimulate both offline/online sales, as said content acts as a brand enhancer, raising awareness of products/services and educating consumers on how to use them (Sohaib et al., 2019). In contrast, e-commerce websites feature more *Transactional* and *Communicational Content*, confirming the hypotheses proposed. For an e-commerce website, to properly develop certain transactional functions, such as payment/personal



**Figure 4.**  
Mean values of  
technical and content  
quality by website  
strategy

information security, it is key to build consumer trust and encourage purchase intention (Wang *et al.*, 2015). These results demonstrate that e-commerce websites take advantage of the social features available on the web, which is in line with previous studies (Friedrich *et al.*, 2019). In addition, these results also show that perceived interactivity positively influences purchase intention and satisfaction (Nguyen *et al.*, 2020).

Finally, although e-commerce websites obtain a medium level of technical and content quality, companies implementing an e-commerce website pay more attention to the content quality dimension. In contrast, informative websites obtain low levels of technical and content quality, and companies implementing this type of website are more focused on the technical quality dimension. These results are reasonable because social media facilitates user-generated content, simplifies the buying process and improves website usefulness (Friedrich *et al.*, 2019).

## 5. Conclusions and contributions

Few studies have focused on analysing website technical and content quality to identify the main weaknesses and strengths of online business. The results herein offer important theoretical and practical contributions for companies on how to manage their website to improve firm connectivity and competitiveness. The theoretical framework of firm competitiveness (Falcioia *et al.*, 2020) was used to explore the connect dimension, as related to websites, as an indicator of connectivity between company/environment. As regards the theoretical contribution to website quality, a new index (IWebQEI) was developed, which provides information about the technical and content quality levels of websites. The subsequent analysis of technical and content quality was used to verify whether there are quality differences between informative/e-commerce websites and offer practical insights.

E-commerce websites have some strengths associated with technical quality. These *strengths* are related to providing service, such as ease of use/web design and navigability. These findings make sense considering that ease of use and navigability improve the online shopping experience (Floh and Madlberger, 2013) and that a satisfactory shopping experience fosters website loyalty (Netshirando *et al.*, 2021). However, the results show *weaknesses* in terms of website accessibility, load time, positioning and performance level. To improve these aspects, the principles of inclusive web design must be considered to facilitate access and, consequently, usability. In addition, navigation efficiency could be improved by reducing website load time, which also improves indexability in search engines and increases visibility and popularity. To improve performance level, it is recommended to reduce the number of broken/invalid/unimplemented links. Also, it is recommended to encourage return visits (e.g. with an attractive design, social bookmarking and search engine retargeting), which increases average session duration, conversion and retention rates (Roy and Sharma, 2021).

As for informative websites, their main *strengths* are related to ease of use and web design in terms of usability. However, there are *weaknesses* in all remaining technical quality indicators. Recommendations for minimising these weaknesses include improving performance level, facilitating navigation with recognisable links and cookies, decreasing website loading time and applying techniques that help to improve visibility to achieve better positioning.

With respect to content quality, e-commerce websites have *strengths* associated with transactional content and the use of social media platforms. Results reveal *weaknesses* in informative content and other aspects of communicational content. Given the importance that providing relevant information has for e-commerce websites to generate value for the customer (Huang and Benyoucef, 2013), e-commerce websites should improve informative content (e.g.

information about company department, agents/shops/offices or job offers) and the way in which information is presented; multimedia formats such as video are a strong determinant of purchase intention (Orús *et al.*, 2017). Regarding the weaknesses of communicational content, companies should find a social network aligned with their communication goals and include reviews from brand advocates/users and a blog. To improve interactivity, it is recommended that websites for mobile devices be optimised due to the rise in the use of smartphones for information searches, entertainment and access to social networks (Huang and Benyoucef, 2013), by allowing users to subscribe to RSS and comment on website content.

As for informative websites, informative content is their main *strength*. However, *weaknesses* exist in communicational and transactional content. Companies must be aware of the key role that social networks play in the buying process. To overcome this weakness, it is proposed to combine social network strategy and SEO positioning to improve indexability. It would be beneficial to implement tools that facilitate interactivity (see Table 5). Concerning transactional content, informative websites should incorporate online business transactions, such as offering online ordering with simple order forms and secure submission of user information.

The present study does feature some limitations that could be addressed in future research. The sample can be expanded in future research by including websites of companies from other countries with other languages or different company sizes. Consequently, it would be advisable to exercise caution before generalising the results for other regions/countries or company sizes. Another limitation concerns the type of data used, namely, cross-sectional data. Unlike this type of data, longitudinal data allow the measurement of changes in data over time. With respect to this limitation, it is interesting to note that websites are not as dynamic and changeable as other digital platforms, such as social networks. Therefore, it is not essential to collect these data very frequently. Finally, although intercoder reliability was high and

Conclusions	Theoretical and practical contributions
<i>Technical quality:</i> <i>Strengths of:</i> E-commerce websites: ease of use/web design and navigability Informative websites: ease of use/web design <i>Weaknesses of:</i> E-commerce and informative websites: accessibility, loading time, positioning and performance level <i>Content quality:</i>  <i>Strengths of:</i> E-commerce websites: transactional content and use of social media  Informative website: informative content <i>Weaknesses of:</i> E-commerce websites: informative content and interactivity Informative websites: communicational and transactional content	  Consider the principles of inclusive web-design Reducing website load-time Avoiding broken/invalid/unimplemented links  Encourage return-visits (attractive design, social bookmarking or search engine retargeting)   Expanding company information (shops/offices or job offers) and the way it is presented (multimedia-format) Align social media with communication goals Implement tools that facilitate interactivity (download material, user-community, optimise websites for mobile, chatbot, subscription to RSS-newsletters or links to sponsors) Improve online business transactions

**Table 5.**  
Conclusions,  
theoretical and  
practical  
contributions

objective automatic evaluation tools were applied to measure some indicators, those that depend on the coder can be purified by developing specific tools that allow for an automatic coding as well. This shortcoming was solved in this study by the usage of several independent judges to ensure intercoder reliability.

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