



External Web content and its influence on organizational performance

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Abstract

Research into the Internet has experienced a tremendous growth within the field of information systems. In this sense, the recent literature focuses on more complex research topics. However, there is a need to further investigate into the more basic and primary use of Internet, the external Web site to interact with stakeholders. By external, we mean publicly accessible contents. This paper develops a framework that allows evaluation of external Web content of business Web sites and examines the influence on firm performance. Here, external Web content is studied according to three Web orientations: e-information, e-communication, and e-transaction. In addition, differences in external Web content are analysed according to two contingency factors: business size and business industry. To achieve these goals, a sample comprising 288 Spanish SMEs firms was employed. The results show a positive relationship between external Web content and firm performance. Furthermore, this research indicates the existence of complementarities among the Web orientations. Thus, existing e-information was found as critical for enabling e-transaction to impact upon firm performance. Additionally, e-information and e-communication (jointly considered) were found to mutually reinforce the impact of e-transaction on firm performance. The results also confirm that external Web content is not related to business size and differs slightly by business industry.

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Introduction

Today, organizations' Web presence is no longer exclusive to large companies or highly innovative firms. This statement is supported by the high rates of Internet adoption among firms. For example, Figure 1 shows 88% of European companies in EU-5 (Germany, Spain, France, Italy, and the U.K.) are connected to the Internet with no difference regarding business size when considering companies with more than nine employees. The literature on Web adoption recognizes the adoption of an e-mail account as the minimum Web adoption level (Teo *et al.*, 1998; Teo & Pian, 2004). These firms are normally connected to the Internet and have an e-mail account that they use to establish links with customers and business partners. Nonetheless, creating a Web site is the starting point for a firm to achieve the benefits derived from using the Internet. The average of firms with Web site in EU-5 is two-thirds, with a clear relationship between having a Web presence and business size (considered as number of employees) (see Figure 1). As a result, only one-third of companies with fewer than 10 employees have a Web site, while this number is doubled when considering businesses with more than 10 employees. The next,

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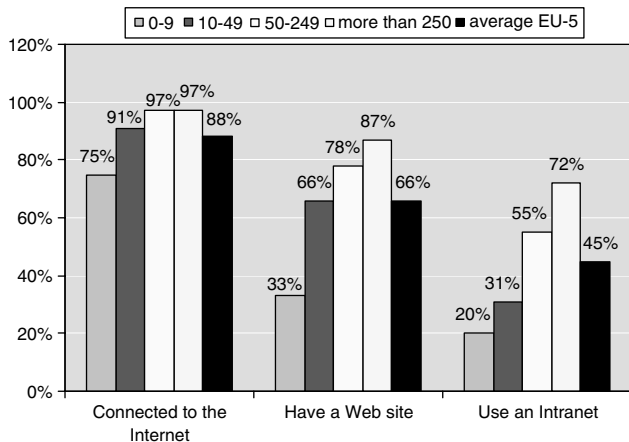


Figure 1 Access and use of the Internet in European firms by number of employees. Source: e-Business Watch (2004).

more advanced, level in the use of the Internet is the establishment of a corporate intranet. Figure 1 shows that 45% of companies in EU-5 have an intranet, with 50 employees the inflexion point at which businesses with an intranet are in the majority.

A great deal of work has been devoted to investigations of the use of Web sites for commercial purposes (e.g. Hoffman *et al.*, 1997; Liu *et al.*, 1997). Web sites can be used for other reasons besides e-commerce. They can provide company information and offer the necessary means to communicate with the company (Young and Benamati, 2000). In this respect, Heldal *et al.* (2004) developed a model that shows how communications can be optimized through the corporate site by improving and developing sustainable relationships. Therefore, it can be argued that corporate Web sites frequently represent the firm's strategic intent to use the Internet (especially when considering SMEs) in order to share information, facilitate transactions, communicate with different stakeholders, and improve customer service.

In recent years, the research area of e-business has experienced an exploding growth because of its relative novelty, global reach, and economic impact. Along these lines, much research has been conducted on different e-business subjects, but mainly in large firms. For example, the adoption of the Internet (e.g. Tan & Teo, 1998; Vadapalli & Ramamurthy, 1998; Mehrrens *et al.*, 2001); business models on the Internet (e.g. Hoffman *et al.*, 1997; Timmers, 1998); e-business and supply chain (e.g. Frohlich, 2002; Sahin & Robinson, 2002; Swaminathan & Tayur, 2003); e-business and business value (e.g. Amit & Zott, 2001; Zhu & Kraemer, 2002; Zhu, 2004; Zhu *et al.* 2004), etc. Nonetheless, in spite of this growth, there is a need to investigate further into more basic and primary uses of the Internet, the external Web site as a mean of interaction with stakeholders. Although other studies (e.g., Huizingh, 2000; Robbins & Stylianou, 2003;

Miranda & Bañegil, 2004) have provided a framework for evaluation of the external Web site, none of them has attempted to analyse its influence on firm performance. In an attempt to cover this research gap, this study employs a methodology that allows evaluation of the external Web content of business Web sites and its impact on firm performance. That is, the main objective is directed to the valuation of the public Web site sections, those which are publicly accessible, according to three Web site orientations: e-information, e-communication, and e-transaction. This approach presents four main contributions. First, it provides knowledge about the presence on the Internet of SMEs. Second, it serves as a benchmarking tool available to companies for Web site evaluation and improvement. Thus, it allows comparisons to be made for the same organization over time or between competitors. Third, the presence of the Web site orientations are analysed according to two contingency factors: business size and business industry. Finally, the effect of external Web content on firm performance is evaluated.

This paper consists of six sections and is structured as follows. The next section presents the study's theoretical foundation and reviews the relevant literature. Within this framework, a conceptual model and associated research hypotheses are then presented. Following this, the methodology used for the sample selection and the data collection is discussed. Then, the data analysis and the empirical results are examined. Finally, the paper concludes with a discussion of research findings, limitations, and contributions from both research and managerial perspectives.

Literature review

The minimum public content in any given business Web site is related to the offering of basic company information such as company name, address, electronic mail, and phone number. In this regard, Teo & Pian (2004) found the presence of contact methods on businesses' Web sites do not differ much among the Web adoption levels. Nonetheless, the businesses that engage in further Web site development usually present content features used for other purposes such as to facilitate corporate information, communicate and establish business relationships (with customers, the general public, etc.), provide information on products and/or services, usually with the aim of selling, or even transactional features for the fulfilment of orders. Therefore, given the different nature of these content characteristics, external Web content presents distinct directions for benchmarking and improvement.

Within the literature on Web adoption, the primary orientations that have been studied for Web content analysis are: information, communication and transactional orientation. In Table 1, a group of studies related to the topic of this paper have been structured according to the type of analysis used. Thus, the content categories considered in each research for the Web site analysis are

Table 1 Content features considered in previous research

Web orientations	Huizingh (2000)	Miranda & Bañegil (2004)	Robbins & Stylianou (2003)	Zhu & Kraemer (2002)
E-Information	Information	Informational	Corporate & Commercial information	Information (products)
E-Communication		Communicational	Communication/Customer support	Interaction
E-Transaction	Transaction	Transactional		Transaction
Other	Entertainment			Supplier Connection

identified and classified according to the mentioned Web orientations. Huizingh (2000) conducted empirical research of a sample made up of companies found on Yahoo and the Dutch Yellow Pages. Huizingh considered information, transaction and entertainment as the main features of content. Robbins & Stylianou's (2003) work is an extension of Huizingh's and was intended to overcome many of its weaknesses. The sampling frame was designed to be a good mix of international companies and a more comprehensive set of content features was employed. Other authors, such as Zhu & Kraemer (2002) used a Web content analysis to characterize a firm's e-commerce capabilities. E-commerce capabilities were measured along four dimensions: information on products and services, transaction, interaction and customization, and supplier connection. They thereby created a total e-commerce capability index by aggregating these four composite metrics. In addition, attempts to evaluate the content quality of a Web site have also been made. Miranda & Bañegil (2004) considered three sets of factors to assess the content quality of a Web site: informational, communicational, and transactional. They thus created a Web assessment Index which focused on four categories (accessibility, speed, navigability, and content).

This study intends to measure external Web content according to three Web orientations: e-information, e-communication, and e-transaction. With this objective in mind, we next present our approach for each of these Web orientations.

E-information

Firms can use their Web sites to disseminate corporate or commercial information to customers, business partners, or other stakeholders (shareholders, employees, the public, etc.) (Huizingh, 2000). Corporate information can provide insight into the background of the company (financial statements, employment offers, quality certificates, etc.) and commercial information implies providing product-related information, such as prices, specifications, terms of delivery, etc. At the same time, corporate Web sites usually present technical characteristics (search engine and site map) which help to locate available information within the company's Web site. Therefore, e-information is considered as a Web orientation that consists of one-way company electronic information directed to one or more stakeholders. This information is of a corporate or commercial nature and is beyond basic business information such as contact

details. The degree of e-information of the business' Web site is thereby reflected by the extent of available information about the firm and its products and services.

E-communication

Internet communications, besides allowing a cost reduction in comparison to traditional communication tools, offer a unique opportunity for interacting with several business agents (both internal and external to the organization). Certain cost-effective and user-friendly applications such as e-mail, the Web forum and the feedback form allow unsynchronized two-way conversations. Moreover, the creation of Web forums could form the basis of online communities where people can exchange views. In this sense, all these Internet technologies facilitate the exchange of information and collaboration. The difference between e-information and e-communication is that the latter permits two-way information exchange. This exchange of information can vary from more structured tools such as the request for information form to more open and interactive forms such as the online chat. As a result, the degree of e-communication of the Web site is estimated by the extent of available communication mechanisms through which a business agent can interact with a firm or with other business agents (using the business' Web site as the Web platform).

E-transaction

Over the past 20 years the economy has rapidly transformed from its traditional base to a new, information-based economy. In this new environment, work has shifted from the creation of tangible goods to the flow of information through the value chain (Basu & Kumar, 2002). The establishment and development of workflow processes has played a fundamental role in this transition. According to the Workflow Management Coalition (WFMC, 2004), a workflow is 'the automation of a business process, in whole or in part, during which documents, information or tasks are passed from one participant to another for action, according to a set of procedural rules'. Internet technology provides great opportunity for automation of processes. Thus, e-transaction is considered a Web site orientation that involves the establishment of electronic processes for the fulfilment of orders through the firm's Web site.

Hypotheses development

This research develops a methodology that allows evaluation of the external Web content of business Web sites. Furthermore, the relationship between external Web content and certain organizational characteristics and firm performance is studied. Below, the hypotheses of the study are formulated.

External Web content and business size

Business size has been consistently supported as an important organizational factor for technology adoption (Damanpour, 1992). This has also been confirmed in e-business literature. For example, Zhu *et al.* (2003) measured business size by the number of employees, which demonstrated that larger size firms are more likely to adopt e-business. Similarly, recent studies by Teo & Pian (2004) used three methods for measuring firm size – number of employees, annual revenue, and number of IT employees – and found that firm size is positively related to Web adoption (Teo & Pian, 2004). Therefore, as larger businesses can allocate greater financial, technological and personnel resources to the development of Web sites, larger firms might be expected to have more externally developed Web sites.

H1: *External Web content is positively related to business size*

H1a: *E-information is positively related to business size.*

H1b: *E-communication is positively related to business size.*

H1c: *E-transaction is positively related to business size.*

This research uses two methods for measuring business size that is the number of employees and annual revenue. These methods are consistent with existing literature (e.g. Brynjolfsson *et al.*, 1994; Teo & Pian, 2004). As noted by Brynjolfsson *et al.* (1994), firm size is normally measured by the number of employees, in fact other interpretations of the term firm size – for instance, in terms of sales, assets, or market capitalization – are less common in the empirical literature.

External Web content and business industry

The industry in which a business operates has been found to influence the business' information processing requirements (Yap, 1990). Thus, firms belonging to the service industries, which rely on the processing of information, depend heavily on information systems (Premkumar & King, 1994). In contrast, retail industries, which rely on the transfer of goods, may have a greater dependence on point-of-sale systems, whereas manufacturing industries depend more on specific information systems related to production such as ERP and CAD/CAM systems. Within the literature on Internet adoption, Goode & Stevens (2000) found business industry significant in the adoption of Internet connection, showing service industries to

be the largest adopters, followed by retailers and then manufacturers. Huizingh (2000) predicted that companies producing or selling information-based products may benefit more from the Internet than manufacturing companies. His results confirmed that Web site development (by business industry) varies across content categories. Thus, although service industries presented more information than manufacturing firms, exactly the opposite occurred when considering transactional characteristics. These arguments suggest that it would be expected that external Web content differs by business industry:

H2: *External Web content differs by business industry.*

H2a: *E-information differs by business industry.*

H2b: *E-communication differs by business industry.*

H2c: *E-transaction differs by business industry.*

External Web content and firm performance

The Web site can potentially provide distinct value propositions to the firm. These come from the offering of information online, the possibility of establishing electronic communications and exchange of information and the conducting of transactions online. With regard to the offering of information online, Web sites present high reach and richness of information (Evans & Wruster, 1999). The Internet connects firms to consumers in geographic areas that were costly to reach before the Internet (Steinfeld *et al.*, 2002). At the same time, Web sites can also be used to gather data on the usage of the information by the Internet user (Layne & Lee, 2001). Some of these mechanisms such as registration and ordering forms are explicit, while other implicit mechanisms for tracking online activities exist (the length of time spent on each page, frequently accessed products, etc.). This tracking information is of great value to the firm as it can be analysed to infer customer preferences and be used to improve the Web site and its offerings.

The business Web site can also be a source of value creation to the firm through communication between an organization and its stakeholders. Efficient communications are necessary when building and maintaining long-term customer relationships (Cannon & Homburg, 2001; Heldal *et al.*, 2004). The feedback form allows collection and response to questions, comments, or suggestions. Thus, many businesses are now competent in terms of offering after-sales support through their Web site. Other alternatives come from the possibility of achieving lock-in by leveraging various interactive applications such as loyalty programs and virtual communities (Amit & Zott, 2001). In this sense, Web forums enable the creation of virtual communities that bond participants to a particular Web site. Web sites therefore facilitate communication, the creation of online communities and the possibility of establishing close relationships. In the

end, these characteristics may enhance transaction frequency and loyalty.

IT is believed to lead to a reduction in the costs of coordinating and executing transactions (Clemons & Row, 1992). As the Web site is the portal through which most of the electronic transactions are conducted (Angehrn, 1997; Kowtha & Choon, 2001), another value proposition to the firm results from conducting e-commerce through the business Web site. The automation of the sales process through the Web site reduces overall load on staff supporting the customer, which allows staff to focus on more complex tasks or on exceptions instead of routine tasks. However, the extent of automation of the sales process will be influenced by the emphasis placed on integrating the business Web site with backend legacy and enterprise systems.

The above arguments suggest that the three Web orientations (e-information, e-communication, and e-transaction) provide value propositions to the firm, which in turn may affect higher levels of firm performance. Thus, the following hypothesis is formulated:

H3: *There is a positive relationship between external Web content and firm performance.*

H3a: *There is a positive relationship between e-information and firm performance.*

H3b: *There is a positive relationship between e-communication and firm performance.*

H3c: *There is a positive relationship between e-transaction development and firm performance.*

The above discussion leads us to believe that complementarities among the distinct Web site value propositions may exist. Consequently, it seems logical to think that the more information-oriented a Web site is, the greater the benefits it achieves from online communications and ordering. Recent studies on e-commerce (e.g. Zhu, 2004) have adopted a similar approach to study complementarities. Zhu found that the complementarity of IT infrastructure and e-commerce capability delivers a value proposition reflected upon firms' performance, which exceeds that of any of these effects individually, hence providing empirical evidence of the complementarity synergy between IT infrastructure and e-commerce capability.

Hence, the fourth hypothesis posits that e-information exhibits a strong reinforcing interaction effect with e-communication and e-transaction.

H4: *The complementarity between e-information and the other two Web orientations is associated with better firm performance.*

H4a: *Greater e-communication orientation, in conjunction with higher levels of e-information, is associated with better firm performance.*

H4b: *Greater e-transaction orientation, in conjunction with higher levels of e-information, is associated with better firm performance.*

Other complementarities may exist between e-information and e-communication (jointly considered) and e-transaction. In this sense, high e-information- and e-communication-oriented firms exhibit a stronger relationship between e-transaction and firm performance than low e-information- and e-communication-oriented firms.

H5: *The complementarity between e-information and e-communication orientations (jointly considered) and e-transaction is associated with better firm performance*

Hypotheses 3–5 suggest the existence of a positive relationship between external Web content and firm performance, both direct effects (H3) and interactions among the distinct Web orientations are evaluated (H4 and H5). As discussed earlier, the benefits of having a Web site with informative, communicational, and transactional features are diverse. Firm performance measurement is an important issue within the area of management information systems. In this sense, firm performance can be measured, fundamentally, by subjective measures (e.g. Grover *et al.*, 1998; Tallon *et al.*, 2000) or by using financial measures (e.g. Zhu & Kraemer, 2002; Zhu, 2004). The firms normally use senior executives as key informants on subjective measures of firm performance. Given the fact that the methodology employed here intends to serve as a benchmarking tool for Web site evaluation and improvement, we decided for an objective financial metric available for all companies. More specifically, firm's added value is used as a financial metric of firm performance. This indicator has been previously employed in existing information systems literature (e.g. Bresnahan *et al.*, 2002) and represents an estimate of the total rents generated by an organization. Nonetheless, limitations exist when measuring firm performance from an overall financial metric which have to be considered when interpreting results. One of the main limitations may be the time lag between web site improvements and their impact on firm performance. In fact, this retard in the creation of business value constitutes one of the arguments attributed to explain the productivity paradox observed in various studies (Brynjolfsson & Yang, 1996; Kohli & Devaraj, 2003). The so-called productivity paradox questions whether IT investment contributes to productivity growth.

Methodology

This study used a content analysis on the company's Web site to determine the presence of Web orientations for interacting with stakeholders. Web site content analysis has been already applied on empirically based investigations relating to the e-business topic in the literature (e.g. Huizingh, 2000; Zhu & Kraemer, 2002; Robbins

& Stylianou, 2003; Teo & Pian, 2004). The main contribution of this technique comes from the possibility of objectively measuring a significant number of content features (Huizingh, 2000). Each element is measured using a binary variable, representing whether or not a Web site has the particular feature.

The organizations selected for this study are SMEs from Spain. SMEs were considered because of their importance for economic growth, employment, and wealth creation in economies both large and small. Currently, SMEs represent around 99% of the total number of firms in Spain (INE, 2005).

Sample

This study used a listing of businesses with Web sites in the Region of Murcia (Spain) facilitated by the Institute for Public Works in Murcia. Organizations belonging to certain activity sectors within the service industry (NACE groups 80, 85, 90–93) as well as agricultural and fishing companies (NACE groups 1–9) were excluded, as some firms within these activity sectors do not conform to the concept of business. The resulting information was crossed with the Amadeus 2003 Database, eliminating from our directory those not present in the Database. After these operations, the number of firms totalled 370. Not all selected Web sites could be analysed and after eliminating the companies with erroneous URL address and those with Web sites under construction the final sample amounted to 288 firms.

Data collection

The questionnaire initially consisted of 15 items evaluating different content characteristics. These items were introduced taking into consideration previous studies within the literature (e.g. Huizingh, 2000; Robbins & Stylianou, 2003; Teo & Pian, 2004). Although two of the selected items, site map and keyword search function,

have been introduced usually as design features (Huizingh, 2000; Robbins & Stylianou, 2003), we introduced them in the questionnaire because these characteristics are useful to locate available information within the company's Web site and, in contrast to other design features, can be measured objectively. This may be the reason why other studies (Liu *et al.*, 1997; Zhu & Kraemer, 2002; Teo & Pian, 2004) have considered them content features. The questionnaire was initially pre-tested on 10 companies. This process was performed to ensure all items broadly measured the Web site's content. After the pre-test three more variables were added (Quality certificates, Registration for newsletters, and Polls). Thus, the final questionnaire consisted of 18 items that were used to measure a firm's Web site content. Table 2 provides an overview of the characteristics measured and the connection of the individual items to the previous research. Each item represented a different content feature and was coded using a binary variable, where 1 was 'yes' and 0 was 'no'. Web sites were analysed by a research team formed of final year students in computer engineering at the University of Murcia (Spain) who were attending an e-business Management course. The research team was previously trained and a Web site containing detailed explanation of each item in the questionnaire was at the students' disposal. Data was gathered and independently coded during October and November 2003. To ensure the validity of the data collected, 20% of the questionnaires were randomly selected for reevaluation. Here, an interrater agreement analysis was necessary. Interrater reliability presents propositional consistency of variance among raters (Kozlowski & Hattrup, 1992). In contrast, interrater agreement represents interchangeability among raters, that is the extent to which raters make the same ratings (James *et al.*, 1993). Cohen's (1960) 'Kappa' – defined as the proportion of agreements between two raters after adjusting for chance

Table 2 Content features used in previous research

<i>Content features</i>	
<i>E-information</i>	<i>E-communication</i>
Corporate information	Request for information [1, 2, 5, 6]
Mission statement [1, 5]	Web forums [4, 6]
Message from the CEO [2, 5]	Registration for newsletter
Financial information [1, 2, 3, 5, 6]	Polls
Employment opportunities [2, 3, 5]	Reserved areas [1, 5, 4, 7]
Quality certificates	
Commercial information	<i>E-transaction</i>
Products/services catalogue [1, 2, 3, 5, 6]	Online ordering [1, 2, 3, 4, 6, 7]
Products/services prices [1]	Electronic payment [3, 4, 6]
List of important customers [1]	Shopping cart [4]
Technical features	
Site map [2, 5]	
Keyword search function [2, 5, 6, 7]	

Note: [1] Huizingh (2000); [2] Liu (1997); [3] Miranda (2004); [4] Meroño (2003); [5] Robbins (2003); [6] Teo (2004); [7] Zhu (2002). Only first authors are listed.

agreements – has been extensively used to measure interrater agreement. The result of the Kappa statistic was 0.7 which indicates ‘substantial’ agreement according to the Landis & Koch (1977) classification. Data on financial performance for the selected businesses was obtained from secondary information sources (the Amadeus 2003 Database). More specifically firm’s added value was introduced as a financial measure of firm performance, while data on business size was collected from two aspects: number of employees and annual revenue.

Results

Respondents’ profile

Table 3 presents the profile of respondents. The majority of the businesses came from the manufacturing industry (51.20%), followed by the commercial and services industry with 32.7 and 16%, respectively. Regarding business size, the sample comprised SMEs with about 24.50% ranging in size between 1 and 10 employees, 26.40% between 11 and 25 employees, 23.80% between 26 and 50, and 25.50% businesses with more than 50 employees.

Web content results

Web content results are reported in Tables 4 and 5. The technical characteristics of Web sites are those features intended to facilitate access to information and navigability around the site. In this sense, the results indicated that only 22.5% of the Web sites had a site map and 12.2% included a keyword search function within the company home site. The kind of information most often available, of all analysed Web sites, was product/service information with about 76.3% of firms containing this feature. Information about the background of the company – financial statements, employment opportunities, list of important customers – was not generally available, but 49.8% of the firms’ Web sites presented

quality certificates. With regard to communication tools, about one-third of all sites contained a form for requesting information. In order to receive information from customers, surveys and polls constitute an effective instrument. However, it was found that only 4.5% of the Web sites included this feature. Similarly, only 3.1% contained a Web forum. Another important aspect found was that 18.1% of the firms had reserved areas, which implies an intention of establishing close relationships with stakeholders (generally customers and employees). Considering e-commerce features, 12.5% showed their product/services price list, 16.7% contained a specific order form, 8% included a shopping cart, and only 3.8% of the Web sites allowed electronic payment. Overall, the results showed that companies use their Web sites primarily to provide information, rather than for interacting with stakeholders.

Data analysis

To begin the data analysis, a bivariate correlation analysis was performed that included all the content variables considered in our study (see Table 5). High correlations

Table 3 Profile of respondents

<i>Profile of respondents</i>	<i>Percentage</i>	<i>Sample size</i>
<i>Industry</i>		
Manufacturing	51.20	147
Commercial	32.70	94
Services	16.00	46
<i>Number of employees</i>		
1–10	24.50	71
11–25	26.40	76
26–50	23.80	69
Over 50	25.30	73

Table 4 Web content results

<i>Content features by Web orientation</i>					
	<i>Percentage</i>	<i>N</i>		<i>Percentage</i>	<i>N</i>
<i>E-information</i>			<i>E-communication</i>		
Corporate information			Request for information	33.33	96
Mission statement	70.13	202	Web forums	3.12	9
Message from the CEO	11.45	33	Registration for newsletter	12.15	35
Financial information	5.20	15	Polls	4.51	13
Employment opportunities	6.60	19	Reserved areas	18.05	52
Quality certificates	49.65	143	<i>E-transaction</i>		
<i>Commercial information</i>			Online ordering	16.66	48
Products/services catalogue	76.38	220	Electronic payment	3.82	11
Products/services prices	12.50	36	Shopping cart	8.00	23
List of important customers	8.00	23			
<i>Technical features</i>					
Site map	22.57	65			
Keyword search function	12.15	35			

Table 5 Bivariate correlation coefficients for Web content variables

Item	Mean	S.D.	Correlation																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
1. Keyword search function	0.12	0.32																				
2. Site map	0.22	0.43	0.17 ^c																			
3. Products/services catalogue	0.76	0.42	0.05	0.07																		
4. Products/services prices	0.12	0.33	0.24 ^c	0.04	0.18 ^c																	
5. Online ordering	0.16	0.37	0.20 ^c	0.10 ^a	0.22 ^c	0.42 ^c																
6. Electronic payment	0.03	0.19	0.31 ^c	0.01	0.11 ^a	0.36 ^c	0.44 ^c															
7. Shopping cart	0.08	0.19	0.31 ^c	0.05	0.11 ^a	0.41 ^c	0.44 ^c	0.52 ^c														
8. Mission statement	0.70	0.45	0.03	0.20 ^c	0.06	-0.01	0.05	-0.02	0.01													
9. Message from CEO	0.11	0.31	0.13 ^b	0.14 ^b	-0.01	0.12 ^b	0.04	0.04	0.04	0.06												
10. Financial information	0.05	0.22	0.19 ^c	0.26 ^c	-0.02	0.14 ^b	0.02	0.19 ^c	0.11 ^b	0.05	0.06											
11. Employment opportunities	0.06	0.24	0.11 ^a	0.20 ^c	-0.01	0.02	-0.01	0.09	0.09	0.08	0.03	0.37 ^c										
12. Request for information	0.33	0.47	0.16 ^c	0.15 ^b	0.03	-0.01	0.05	0.05	0.01	0.07	0.04	0.13 ^b	0.10 ^a									
13. Registration for newsletters	0.12	0.32	0.35 ^c	0.18 ^c	0.13 ^b	0.14 ^b	0.17 ^c	0.14 ^b	0.09	0.03	0.19 ^c	0.24 ^c	0.11 ^b	0.34 ^c								
14. Web forum	0.03	0.17	0.29 ^c	0.12 ^b	0.05	0.11 ^b	0.08	0.17 ^b	0.17 ^c	0.03	0.12 ^b	0.13 ^b	0.11 ^a	0.08	0.30 ^c							
15. Polls	0.04	0.20	0.07	0.10 ^a	0.04	0.01	-0.01	0.04	0.04	0.03	0.13 ^b	0.17 ^c	0.07	0.20 ^c	0.22 ^c	0.34 ^c						
16. Reserved areas	0.18	0.38	0.30 ^c	0.19 ^c	-0.01	0.17 ^c	0.10 ^a	0.18 ^c	0.23 ^c	0.09	0.11 ^a	0.25 ^c	0.23 ^c	0.22 ^c	0.35 ^c	0.17 ^c	0.15 ^c					
17. List of important customers	0.08	0.27	0.16 ^c	0.06	0.10 ^a	-0.03	0.04	0.01	0.01	0.02	0.09 ^a	0.10 ^a	0.17 ^c	0.09	0.08	0.16 ^c	0.05	0.06				
18. Quality certificates	0.32	0.46	0.01	0.13 ^b	0.04	-0.01	-0.02	0.05	0.05	0.04	0.10 ^a	0.07	0.11 ^b	0.13 ^b	0.08	0.17 ^c	0.17 ^c	0.08	0.01			

Significance levels: ^a0.05 < P ≤ 0.10; ^b0.01 < P ≤ 0.05; ^cP ≤ 0.01.

Table 6 Factor analysis for the Web content variables

Item	Factor			
	1	2	3	4
Financial information	0.763	-0.025	0.218	0.128
Employment opportunities	0.812	0.059	0.034	0.025
Mission statement	0.224	0.792	-0.052	-0.097
Products/services catalogue	-0.224	0.607	0.160	0.253
Web Forum	0.050	-0.046	0.752	0.124
Registration for newsletter	0.146	0.171	0.621	0.150
Polls	0.053	-0.018	0.757	-0.078
Online ordering	-0.105	0.212	0.030	0.752
Electronic payment	0.157	-0.098	0.089	0.763
Shopping cart	0.102	-0.047	0.050	0.779
Products/Services price	0.023	0.087	-0.052	0.705
KMO	0.722			
Barlett	0.00			
Variance accounted for by factor (%)	12.95	10.01	14.69	21.68

among many of these items were found, suggesting the data reduction techniques were highly appropriate. To reduce this set to a handful of meaningful constructs, an exploratory factorial analysis was used. Principal components analysis followed by varimax rotation was used for factor extraction. The rule used to determine the number of factors was eigenvalue greater than 1 criterion (Kaiser, 1974). To test the appropriateness of the data set for using

factorial analysis, Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used. Hair *et al.* (1998) recommended a KMO index of >0.6 and Bartlett's $P < 0.5$ as suitable for factor analysis.

The final results of the factorial analysis are presented in Table 6. A total of four factors were extracted; to emphasize the association of specific items with derived factors, the highest loadings of each row are given in

bold. As shown in Table 6, each item loaded strongly (>0.5) on only one of the four factors which indicates high convergent validity, while all other factor loadings for these items remained below the 0.34 criteria recommended by Churchill (1979) as an indication of strong discriminant validity. In addition, to ensure the consistency of the factors obtained, reliability analysis was carried out to eliminate items that were not strongly related to other items in the construct. For each factor, Cronbach α was above the 0.7 standard suggested by Nunnally (1978), thus supporting construct reliability.

Closer examination on the interpretability of these results showed that three of the resulting factors (factor 1, 2, and 3) appeared to clearly reflect the e-information and e-communication orientations originally identified in the second section, with the other (factor 4) representing the intention of the business to accomplish online sales. Factor 1 consisted of variables measuring purely corporate information, while factor 2 was formed of corporate (mission statement) and commercial variables (products/services catalogue). Considering these characteristics and given the presence of the variable products/services catalogue in factor 2, they were named e-corporate information and e-commercial information, respectively. With regard to factor 4, although one of the variables (products/services prices) represents commercial information and was initially described as e-information in the second section, it eventually loaded strongly on factor 4. An explanation of this can be that this variable, in contrast to corporate information and other commercial information, is necessary for conducting online transac-

tions. Furthermore, the other variables grouped in factor 4 (online ordering, electronic payment, and shopping cart) genuinely represent the firm's intent to conduct sales directly through the Internet, which is consistent with the e-transaction orientation previously observed. Therefore, the constructs obtained allow us to measure the three Web site orientations introduced.

Results for the first hypothesis

In order to test whether external Web content is influenced by business size, statistical techniques of group differences were employed. More specifically, the one-way ANOVA test was applied when parametric assumptions as well as homogeneity of group variances (Levene's test significance >0.05) were fulfilled and H-test (Kruskal-Wallis), when they were not. Data representing the size of firm was collected from two aspects: number of employees, and annual revenue. Business size, measured as the number of employees, was introduced as a four-level categorical variable, coding whether the business pertained to group 1 (between 1 and 10 employees), group 2 (between 11 and 25 employees), group 3 (between 26 and 50 employees), or group 4 (more than 50 employees). This granularity was established after considering the sample characteristics (first quartile = 10; second quartile = 24.5; third quartile = 50.5). Business size, measured as the annual revenue, was also introduced as a four-level categorical variable according to the sample characteristics (first quartile = 1098.08 thousand euros; second quartile = 2556.59 thousand euros; third quartile = 7605.04 thousand euros).

Table 7 External Web content and business size (number of employees)

Web orientations	Mean	Levene (Sig.)	F (Sig.)	H K-Wallis (Sig.)
<i>E-corporate information</i>				
Group 1 (from 1 to 10 employees)	-0.221	0.000	—	0.344
Group 2 (from 11 to 25 employees)	-0.164			
Group 3 (from 26 to 50 employees)	-0.108			
Group 4 (Over 50 employees)	0.467			
<i>E-commercial information</i>				
Group 1 (from 1 to 10 employees)	-0.226	0.036	—	0.333
Group 2 (from 11 to 25 employees)	0.007			
Group 3 (from 26 to 50 employees)	0.149			
Group 4 (Over 50 employees)	0.041			
<i>E-communication</i>				
Group 1 (from 1 to 10 employees)	-0.112	0.001	—	0.174
Group 2 (from 11 to 25 employees)	0.014			
Group 3 (from 26 to 50 employees)	-0.106			
Group 4 (Over 50 employees)	0.248			
<i>E-transaction</i>				
Group 1 (from 1 to 10 employees)	0.035	0.195	0.849	—
Group 2 (from 11 to 25 employees)	-0.091			
Group 3 (from 26 to 50 employees)	0.031			
Group 4 (Over 50 employees)	0.017			

Table 8 External Web content and business size (annual revenue)

Web orientations	Mean	Levene (Sig.)	F (Sig.)	H K-Wallis (Sig.)
<i>E-corporate information</i>				
Group 1 (from 1 to 1099)	-0.161	0.000	—	0.522
Group 2 (from 1100 to 2557)	-0.210			
Group 3 (from 2558 to 7605)	-0.91			
Group 4 (over 7605)	0.411			
<i>E-commercial information</i>				
Group 1 (from 1 to 1099)	-0.170	0.174	0.146	—
Group 2 (from 1100 to 2557)	-0.121			
Group 3 (from 2558 to 7605)	0.173			
Group 4 (over 7605)	0.060			
<i>E-communication</i>				
Group 1 (from 1 to 1099)	-0.174	0.000	—	0.451
Group 2 (from 1100 to 2557)	-0.002			
Group 3 (from 2558 to 7605)	-0.055			
Group 4 (over 7605)	0.241			
<i>E-transaction</i>				
Group 1 (from 1 to 1099)	-0.093	0.240	0.811	—
Group 2 (from 1100 to 2557)	0.004			
Group 3 (from 2558 to 7605)	0.063			
Group 4 (over 7605)	-0.019			

Note: Group levels are expressed in thousand of euros.

As presented in Tables 7 and 8, the association between external Web content and business size was not significant for any of the aspects measured: number of employees ($P=0.344$; $P=0.333$; $P=0.174$; $P=0.849$) and annual revenue ($P=0.522$; $P=0.146$; $P=0.451$; $P=0.811$). Here, support for H1 was not provided by any of the Web site orientations (e-information, e-communication, e-transaction). Therefore, hypotheses H1a, H1b, and H1c were rejected.

Results for the second hypothesis

The second hypothesis postulated that external Web content differs by business industry. The one-way ANOVA test was conducted on the mean scores of the three Web orientations when parametric assumptions as well as homogeneity of group variances were fulfilled and the H-test when they were not. Business industry was coded as a three-level categorical variable that represented whether the business belonged to the manufacturing, service, or commercial industry.

Results from ANOVA and H-Test (see Table 9) showed that, within the sample, external Web content was influenced by business industry for the e-information orientation – e-corporate information ($P=0.001$) – and the e-communication orientation ($P=0.006$), while for the e-transaction orientation differences by industry were not found ($P=0.394$). *Post hoc* analysis showed that differences on the e-information – e-corporate information – and the e-communication orientations appeared between service businesses and manufacturing busi-

nesses, with service firms the largest user. Through this analysis, hypotheses H2a and H2b found support, whereas H2c was rejected.

Results for the third, fourth, and fifth hypotheses

The third hypothesis suggested a positive relationship between external Web content and firm performance. The statistical technique used to test this hypothesis was the hierarchical multiple regression analysis. This analysis was considered appropriate given the variables' nature and the hypothesis put forth. Moreover, this method also allowed for checking whether there was an interaction effect attributable to various independent variables.

To assess the value of external Web content, 'added value' was introduced as financial measure of firm performance (dependent variable). Firm's added value (obtained from the Amadeus 2003 Database) was calculated as gross profit plus depreciation of plant and equipment, financial expenses, and wages and salaries. This indicator has been previously employed in the existing information systems literature (e.g. Bresnahan *et al.*, 2002) and represents an estimate of the total rents generated by an organization.

Business industry and business size were introduced as control variables in order to avoid unexpected effects on firm performance. The former identified whether the business was operating at the manufacturing, services or commercial industry and was coded as a dummy variable. The latter minimizes confounding effects from size. Among several possible measures of firm size, such as

Table 9 External Web content and business industry

Web orientations	Mean	Levene (Sig.)	F (Sig.)	H K-Wallis (Sig.)
<i>E-corporate information</i>				
Manufacturing industry	-0.170	0.000	—	0.001
Service industry	0.682			
Commercial industry	-0.147			
<i>E-commercial information</i>				
Manufacturing industry	0.055	0.345	0.366	—
Service industry	-0.017			
Commercial industry	-0.150			
<i>E-communication</i>				
Manufacturing industry	-0.080	0.006	—	0.006
Service industry	0.153			
Commercial industry	-0.194			
<i>E-transaction</i>				
Manufacturing industry	-0.014	0.560	—	0.394
Service industry	-0.148			
Commercial industry	0.102			

annual revenue and number of employees, we chose to use number of employees as a firm size indicator, following the tradition of the IT literature. For example, Brynjolfsson *et al.* (1994) used number of employees as a control for firm size. Our data showed a high correlation among these various size indicators.

The basic econometric relationship may be specified as follows:

$$DV = f(EI1, EI2, EC, ET, EI1 * EC, EI1 * ET, EI2 * EC, EI2 * ET, EC * ET, EI1 * EC * ET, EI2 * EC * ET, \varepsilon) \quad (1)$$

where *EI1* stands for e-corporate information; *EI2* refers to e-commercial information; *EC* denotes e-communication; *ET* represents e-transaction; and *EI1*EC*, *EI1*ET*, *EI2*EC*, *EI2*ET*, *EC*ET*, *EI1*EC*ET*, *EI2*EC*ET* refer to the interaction effects among the Web orientations variables. *DV* denotes the dependent variable (added value). More specifically, the regression equation is:

$$DV = \alpha + \beta_1 EI1 + \beta_2 EI2 + \beta_3 EC + \beta_4 ET + \beta_5 EI1 * EC + \beta_6 EI1 * ET + \beta_7 EI2 * EC + \beta_8 EI2 * ET + \beta_9 EC * ET + (FirmSize + IndustryDummies) + \varepsilon \quad (2)$$

$$DV = \alpha + \beta_1 EI1 + \beta_2 EI2 + \beta_3 EC + \beta_4 ET + \beta_5 EI1 * EC + \beta_6 EI1 * ET + \beta_7 EI2 * EC + \beta_8 EI2 * ET + \beta_9 EC * ET + \beta_{10} EI1 * EC * ET + \beta_{11} EI2 * EC * ET + (FirmSize + IndustryDummies) + \varepsilon \quad (3)$$

where α is the intercept; the β_i 's are coefficients; and ε is the residual term that captures the net effect of all unspecified factors. The model includes both main and interaction effects and suggests that a correlational relationship exists between the DV and the independent variables. Equation (3) shows the interaction effect among the Web orientations (jointly considered).

The analysis was performed in four steps. The dependent variable was initially regressed on the control variables in step 1. Then, in step 2 the three Web site orientations were added. Finally, in steps 3 and 4 the interactions among Web orientations were included. To examine the adequacy of using regression analysis, tests were conducted to assess the normality of residuals and the homogeneity of variance of residuals (Hair *et al.*, 1998). No significant violations of these assumptions were observed.

Regression results are summarized in Table 10. Results in model 1 confirmed that one of the control variables employed (business size) explains the dependent variable. Model 2 showed that the direct effect of Web site orientations on firm performance were significant as the increment in the squared multiple correlation coefficient (R^2) was statistically significant. The effect for two Web orientations (e-communication and e-transaction) upon firm performance was positive and statistically significant. Thus, support for hypotheses H3b and H3c was provided, whereas H3a was rejected. In model 3, interactions effects between e-information (e-corporate information and e-commercial information) and e-communication were not found significant, while positive interactions between e-information and e-transaction were found for e-corporate information. When

Table 10 External Web content and firm performance

	Model 1	Model 2	Model 3	Model 4
Manufacturing industry	-0.085	-0.115	-0.091	-0.001
Service industry	0.006	0.029	0.052	0.027
Number of employees	0.751**	0.692**	0.522**	0.651**
E-corporate information (EI1)		0.065	0.092	0.141**
E-commercial information(EI2)		-0.036	-0.011	-0.014
E-communication (EC)		0.076*	0.128**	0.102**
E-transaction (ET)		0.129**	0.141**	0.306**
Interaction (EI1*EC)			0.051	0.186**
Interaction (EI1*ET)			0.322**	1.068**
Interaction (EI2*EC)			-0.003	-0.055
Interaction (EI2*ET)			0.029	-0.030
Interaction (EC*ET)			0.202**	0.395**
Interaction (EI1*EC*ET)				0.992**
Interaction (EI2*EC*ET)				-0.060
F-value	102.20**	46.86**	34.97**	142.97**
Adjusted R ²	0.556	0.570	0.628	0.891
Δ in R ²		0.021**	0.063**	0.252**

Significance levels: *0.01 < P ≤ 0.05; **P ≤ 0.01.

including interactions among the three Web site orientations (model 4), positive and significant interactions were found among e-corporate information, e-communication, and e-transaction. Mathematically, the interaction effects can be expressed by taking the first derivative of Equation (2):

$$\frac{\partial DV}{\partial EI1} = \beta_1 + \beta_5 EC + \beta_6 ET \quad (4)$$

$$\frac{\partial DV}{\partial EI2} = \beta_2 + \beta_7 EC + \beta_8 ET \quad (5)$$

High e-information-oriented businesses exhibit stronger relationship between e-communication and firm performance than low e-information-oriented firms. The same argument holds for the complementarity between e-information and e-transaction.

The interaction effect among the three Web orientations can be expressed by taking the first derivative of Equation (3):

$$\frac{\partial DV}{\partial EI1 * \partial EC} = \beta_5 + \beta_{10} ET \quad (6)$$

$$\frac{\partial DV}{\partial EI2 * \partial EC} = \beta_7 + \beta_{11} ET \quad (7)$$

This can be interpreted as high e-information- and e-communication-oriented businesses exhibit a stronger relationship between e-transaction and firm performance than low e-information- and e-communication-oriented firms.

To further test the significance of the interaction effects, the incremental R² between the full models (with interaction terms, models 3 and 4) and the partial model (without the interaction terms, model 2) was compared. The result is reported in the lower rows of Table 10. In model 3, the incremental R² was 0.063, meaning that approximately an additional 6% of explained variance has resulted from the inclusion of these interaction effects (Eqs. 4 and 5). In model 4, the inclusion of interactions among the three Web orientations (Equation 6 and 7) showed the incremental R² was 0.315, meaning an increase of about 31% of explained variance with respect to model 2. To compare the partial model against the full models, a Wald test was performed and the differences were found to be statistically significant. Based on this, the partial model was rejected in favour of the full model (Greene, 2000). Through this analysis, moderate support for hypotheses H4b and H5 was provided, while support for H4a was not found.

Discussion

Despite the fact that in the literature e-business adoption has been associated with business size, this study empirically validated that external Web content is not related to business size. Here, business size was measured from two aspects: number of employees and annual revenue. This result partially counters the findings of recent research (Teo & Pian, 2004) that did find evidence of a positive link between Web site adoption and firm size. However, these authors analyse Web adoption in a different manner, not only from the corporate Web site, but also taking into consideration the level of Internet use within the organization, as well as the degree of integration of the Internet strategy within the overall

business strategy. Therefore, our results could be interpreted as showing that Web development measured through content analysis is not related to the business size, while when considering it in conjunction with the level of Internet use within the organization and its incorporation within the business strategy it may be influenced by the business size. Zhu *et al.* (2003) found that larger size firms are more likely to adopt e-business. Nonetheless, these authors found that the impact of firm size on adoption is significantly lower in high e-business intensity countries than in low e-business intensity countries. This implies that in high e-business intensity countries, e-business is no longer a phenomenon dominated by large firms. Our finding also reinforces the general view that Web technology is a low price technology accessible to companies of any size, allowing competition between small and large businesses. In this sense, numerous Web sites of small firms appeared to be similar to those of larger firms, a characteristic not usually noticed in traditional shop windows.

The empirical results also demonstrate that external Web content differs by business industry. The differences appeared for e-information (e-corporate information) and e-communication orientations. These differences were found between service firms and manufacturing firms (Web sites from service businesses seem to have richer information). Therefore, within the sample, external Web content seems to be similar by business industry except for e-information (e-corporate information) and e-communication orientations, where service firms exhibit greater information than manufacturing firms. This finding confirms Huizingh's (2000) research that found that service industries presented more information features on their Web sites than manufacturing firms. Nonetheless, in contrast to this study, differences by industry were not found for transactional features. Therefore, a firm's intention to sell over the Internet is more the result of their particular attitude than pressure on an industry.

Despite the probable existence of a time lag between web site improvements and the impact upon firm performance, the results showed a positive relationship between external Web content (e-communication and e-transaction orientations) and firm performance. A possible explanation to this may be that external Web content is not only a question of financial investment but may be influenced by a firm's continued innovative attitude. Moreover, unlike other IT investments the effects on firm performance may be immediate. Therefore, the efforts devoted to external web content improvements can be considered within the type of incremental innovations. That is, innovations that have a continuous impact on firm performance. Influences on firm performance were observed for two out of three Web site orientations: e-communication and e-transaction. The fact that for the e-information orientation influences were not detected could be interpreted in a way that a merely informative presence on the Internet does not

produce a significant impact on firm performance. In contrast, adopting a more dynamic presence oriented to interact with stakeholders (communicating, selling products, providing customer service, etc.) may be more beneficial. Furthermore, this research showed the existence of complementarities among the Web orientations. Hence, existing e-information was found to be critical to enable e-transaction to impact upon firm performance. E-information and e-communication (jointly considered) were also found to mutually reinforce the impact of e-transaction upon firm performance. Overall, these results strengthen Amit & Zott's (2001) research which pointed to the new opportunities of wealth creation offered by e-business.

Conclusion, limitations and future research

Although much research has been conducted into different e-business issues, there is a need to further investigate into more basic and primary use of the Internet, the external Web site as a means of interaction with stakeholders. To cover this research gap, this paper develops a framework that allows evaluation of external Web content of business Web sites and examines the influence on firm performance. In addition, differences in external Web content are analysed according to business size and business industry. Broadly, this research offers several contributions: (1) it provides knowledge about the presence on the Internet of SMEs; (2) it validates that external Web content is not related to business size and differs slightly by business industry; (3) it shows a positive relationship between external Web content and firm performance and indicates the existence of complementarities among the Web orientations.

The study provides an important implication for managers. The results suggest that external Web content (e-communication and e-transaction orientations) is positively associated with firm performance. Furthermore, not only a positive relationship between external Web content and firm performance was found but complementarities among the Web site orientations were observed. As a result, managers should avoid a simple/static presence on the Internet (merely informational) and instead pursue a more interactive/dynamic presence directed to interaction with different stakeholders. Overall, this study's findings confirm that executives and management need to be aware of the necessity of implementing e-business in their organizations. They need to recognize that their competitors are doing e-business and, if the firm does not respond, it will result in a competitive disadvantage.

While the study's contributions are significant, it has some obvious limitations which can be addressed in future research. First, Web content measures can be further developed and expanded to capture electronic business with suppliers, employees and business partners. Second, the evaluation of firm performance is on the basis of a single overall financial metric 'firm's added value'. Therefore, there is a need in future research to

compare external Web content with specific metrics of firm performance rather than the overall metric. Third, data is collected from both primary and secondary sources. The Web sites were reviewed at one point in time (cross-sectional picture), and then compared with historical data on business size and firm performance taken from secondary sources. Given the Web is a highly dynamic medium. It is likely that during the time period of the performance metrics, the firm had different Web presence to the one evaluated. Thus, a longitudinal study could enrich the findings. Fourth, the sample consisted of SMEs from the Region of Murcia (Spain). Similar studies in different countries are likely to show different results, especially when considering high e-business intensity

countries such as the U.S.A., Finland, and Canada. Therefore, in future research a sampling frame which combines firms from different countries could be used in order to provide a more international perspective to the subject. Fifth, organizations belonging to certain activity sectors within the service industry as well as agricultural and fishing companies were excluded for the study.

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