Article

The Maturity of Corporate Websites as a Digital Communication Channel in Portuguese SMEs' Process of Adopting E-Commerce

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Abstract: This study aims to determine the maturity of the websites of Portuguese small and mid-sized enterprises (SMEs) as a basic form of digital communication in the sequential process of incorporation of e-commerce. The starting premise is that there is a relationship between the level of maturity reached in the SMEs' websites as digital tools that allow firms to communicate effectively, and the adoption of e-commerce. To study this, a representative sample of 381 SMEs located in Portugal and selected through stratified random sampling was analysed. To assess the degree of maturity of the websites, a sequential validation model, the extended model of internet commerce adoption (E-MICA), was applied. This information was crossed with some descriptive variables such as the volume of business, the location, the number of employees, and the sector of activity of the SMEs. The results showed that, in general terms, there predominant websites that limit their interaction to promoting products and services thus present a low level of maturity. While the sector of activity, the volume of income, and the location of the firm are decisive for the maturity of the websites as a form of digital communication in the process of incorporating e-commerce, the number of employees is not.

Keywords: digital; SME; E-MICA; websites; Portugal; e-commerce; interactivity

1. Introduction and Motivation

The small and mid-sized enterprise (SME) concept encompasses very heterogeneous firms from very diverse sectors, with a very uneven distribution of turnover and employee numbers. They stand as an element of territorial and social cohesion of the first order, in most countries being the predominant type of firm [1] and providing many employment opportunities [2]. This is why the development of communication tools that can help these types of firms is considered essential to address the socioeconomic problems that afflict developing countries [3]. Despite their importance and being an object of growing interest, few studies have addressed the use that SMEs make of the so-called Web 2.0 and digital communication tools [4–7], and examples of their use of the internet for internationalization remain sparse [6].

SMEs are firms undergoing constant change [8], but which have many organizational limitations [9] such as those deriving from technological, organizational/cultural, external, and financial problems [10]. In general, these include budgetary limitations for communication [11] as well as difficulties in justifying the significant investment associated with the development of websites, given the low historical returns obtained through e-commerce [12].

Before the emergence of the internet, firms competed in close geographical environments where traditional communication actions were sufficient. Nonetheless, the internet

"allows scalability, interactivity, flexibility, brand management and personalized production tailored to the consumer, in a business world organized in a network" [13] (p. 93), which means that firms must accept that they function in a globalized environment where their competitors are just one click away [14–16]. The internet has changed the business models and communication strategies of many firms, since e-commerce has reduced transaction and contact costs, facilitating the relationship among users from anywhere in the world, and eliminating the geographical barriers that existed in traditional trade [17]. One aspect of this change has been SMEs' incorporation of website tools as part of their path towards internationalization [6].

Clearly, SMEs need to adapt and incorporate new digital communication tools into their business models in order to survive in the era of the digital economy [7] where websites play a fundamental role [18]. It is therefore necessary to assess the maturity of their websites to determine what characteristics these should have as an ideal means of communication with the firm's target public [19]. For SMEs that wish to be present in broader markets, the internet improves access conditions, facilitates the search for information, and gives even the smallest of them the possibility to make itself known globally [20]. Nonetheless, the fact of being present on the internet, or having a corporate website, does not always imply a better digital communication strategy or a greater volume of sales [21].

Commercial success not only requires incorporation into different social media on the internet (websites, blogs, social networks, apps . . .) but also a digital communication strategy that allows different publics to be reached so as to ensure the firm's development (see Figure 1). Of these, a corporate website is the most important primary element with which to initiate any digital communication since it has been established that it is an integrative tool that synthesizes the firm's strategy in an effective way [22].
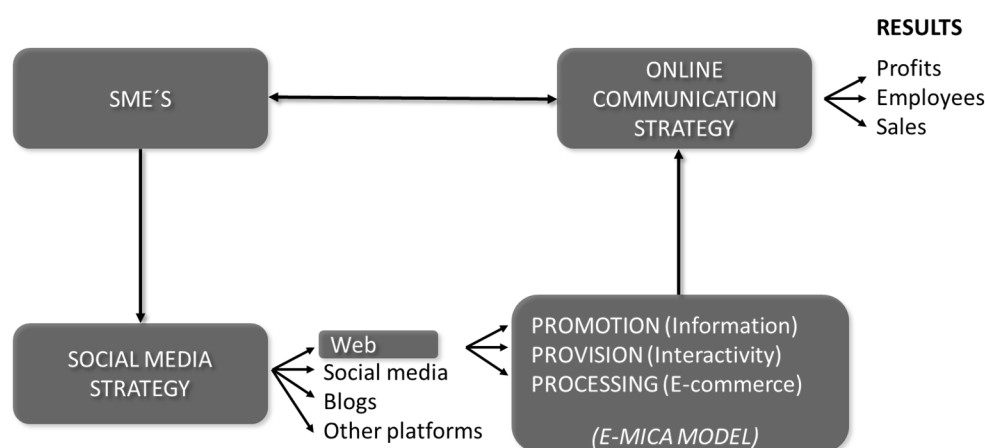

Figure 1. Relationship between PYMES, websites, and online communication strategy. Source: The authors.

This study was aimed, therefore, at determining the maturity of the websites of Portuguese SMEs as a basic form of digital communication in the process of adopting e-commerce. The starting premise was that there is a relationship between the level of maturity reached in the SMEs websites, as digital tools that allow firms to communicate effectively, and the adoption of e-commerce. This is taken to be a sequential process in which the firms that have the most effective websites as part of their digital strategy are those that reach the highest levels of development (not just by adding functionalities) and hence the highest levels of maturity, and consequently also the highest levels of e-commerce adoption. The study's objectives were the following:

- To determine the maturity of the websites of Portuguese SMEs as a form of digital communication.

- To describe the characteristics of Portuguese SMEs based on the level of maturity of their corporate websites.

2. Contextual Framework: The Current Situation of Portuguese SMEs

The Portuguese reality is similar to that of the rest of Europe since 99.9% of Portuguese business are SMEs, and around 96% are micro-SMEs [23]. Micro-enterprises play a determining role in its economy, being the predominant type of firm (approximately 866,000 in number) [24]. Lisbon and Porto are the two regions with the most firms, and eight out of every 10 SMEs operate in the service sector.

Portugal, like the rest of the countries of Europe, is accepting the challenge of digitalization [25], and the COVID-19 situation has encouraged the implementation of e-commerce in order to avoid real contact [26]. However, Portuguese SMEs are still bearing the consequences of the intervention by the International Monetary Fund (IMF) in 2011, which greatly slowed down the country's economic development by establishing conditions that were not conducive to economic growth, and this has marked the evolution of Portuguese firms over the last several years.

Despite the fact that scientific production on SMEs is relatively high in Portugal compared to other countries [27], the reality is that each country faces very different challenges. Nonetheless, it is necessary to know the reality of any given country in a descriptive way in order for it to advance in the adoption of effective digital communication strategies. Work along these lines has led to the conclusion that digitalization has a positive influence on the management of Portuguese SMEs, and the results have shown that the relationship with customers through digitalization is crucial [28].

Digital communication in general and through websites in particular is configured as a set of tools that can represent a differential value in the relationships with customers, as recognized in the incentive program for the evolution of firms in the digital context called "Pymes Digital", created by the Ministry of Economy and focused on helping Portuguese micro-, small-, and medium-sized firms to be more competitive in their digital environment. The objective of this program is to empower SMEs by strengthening the skills necessary to face critical competitive factors, in particular, promoting innovation associated with digital transformation [29].

Therefore, this study set out with the following starting premises:

1. There exists a relationship between the level of maturity reached in the SMEs' websites as part of their digital communication strategy and the possibility of e-commerce.

The weight of SMEs in the European economy encourages entrepreneurship and innovation, and helps to promote competitiveness, economic growth, and employment in Europe. Adopting new technologies plays an important role in the development of SMEs [18] since it allows them to jump from the physical to the virtual world [30], and obtain more revenue, a stronger customer base, and a greater presence in the increasingly digital European market. To help firms, policymakers and business leaders must create solutions that include investments to increase training and internet access for small businesses [31]. Even if Jean and Kim [6] found that platform and web capabilities are positively related to export marketing and export performance, new technologies are not a magic bullet for SMEs. The possibilities offered by websites are also related to the capacity to export, for example [6]. In other words, the SME must possess the necessary entrepreneurial, innovation, and export capacities on its own before embarking on exploiting any digital communication that would allow it to reach new markets. The presence of these functionalities on its websites will announce the existence of that degree of maturity. Thus, previous studies [32] have considered that offering e-commerce on the corporate website implied a greater degree of maturity.

However, it must be borne in mind that the mere possibility of offering e-commerce is not synonymous with having a good communications strategy, with it being necessary to rise through different stages that give the website its real level of maturity (see Figure 1).

Currently, SMEs lack models of analysis adjusted to their reality that allow them to verify that the adoption of e-commerce is the highest level of maturity. For this reason, in this study the E-MICA model will be taken as an instrument to measure the degree of maturity of Portuguese SME websites. In this model, the maximum level of maturity is represented by the possibility of carrying out transactions, which means that those SMEs that carry out e-commerce through their websites would attain a better level of online communication as long as they have surpassed the previous stages (Table 1).

Table 1. The E-MICA model. Source: The authors, after Burgess & Cooper (1998).

Levels	Indicators	Features	Criteria for Transition and Permanence: Minimum Values to Rise in Level
Level 1: Promotion	Basic information (low level of maturity)	1. Company name 2. Telephone number 3. Company address	Scores_Level_1 $\geq$ 2
	Rich information (low level of maturity)	4. Logo 1. Company photos 2. Email or simple contact form 3. Basic information about products and services 4. Different languages 5. Company news 6. FAQS 7. Job vacancies 8. Mission 9. Vision 10. Corporate Social Responsibility 11. Company event information 12. Offline promotions 13. Product catalogue in PDF 14. Information about the sector	Scores_Level_1 $\geq$ 2 & Scores_Level_2 $\geq$ 4
Level 2: Provision	Low interactivity (low level of maturity)	1. Web map (Google) 2. Adaptation to all screen formats (PC, mobile . . .) 3. Complete contact form 4. Site map	Scores_Level_1 $\geq$ 2 & Scores_Level_2 $\geq$ 4 & Scores_Level_3 $\geq$ 3
	Medium interactivity (medium-low level of maturity)	1. Search engine on the website 2. Navigable service catalogue 3. Breadcrumbs (graphical navigational aid for the user to keep track of their location on the website)	Scores_Level_1 $\geq$ 2 & Scores_Level_2 $\geq$ 4 & Scores_Level_3 $\geq$ 3 & Scores_Level_4 $\geq$ 2
	High interactivity (high level of maturity)	1. Forums 2. Multimedia functionalities 3. Newsletter via email	Scores_Level_1 $\geq$ 2 & Scores_Level_2 $\geq$ 4 & Scores_Level_3 $\geq$ 3 & Scores_Level_4 $\geq$ 2 & Scores_Level_5 $\geq$ 4

Table 1. *Cont.*

Levels	Indicators	Features	Criteria for Transition and Permanence: Minimum Values to Rise in Level
Level 3: Processing	Processing (high level of maturity)	1. https (if it is a secure page that allows secure payment) 2. Registration (if it allows user registration) 3. User generated content (if the user can upload content or images) 4. Products or services (if the product catalogue can be freely browsed) 5. Comments (if users can post comments or product evaluations)	Scores_Level_1 $\geq$ 2 & Scores_Level_2 $\geq$ 4 & Scores_Level_3 $\geq$ 3 & Scores_Level_4 $\geq$ 2 & Scores_Level_5 $\geq$ 4 & Scores_Level_6 $\geq$ 2

2. The corporate websites of Portuguese SMEs are digital tools with a minimum of functionalities that allow them to communicate at a medium level.

Being present on the internet seems essential for the continuity of the firm, and is often also seen by the public as proof of the firm's existence [21]. Nonetheless, in a competitive context, the adoption of communication strategies with increasingly unlocalized audiences, who expect personalized attention, is key to the success of the online communication strategy in general and, especially, in the context of the strategy of social media where interaction and dialogue form the basis of communication.

Any digital communication plan is based on the firm's own website [16]. The website also constitutes an iconic representation of the organization, through which it interacts with all its stakeholders in the online environment.

The novelty of other platforms such as social networks has led to a large theoretical corpus in the context of SMEs [33,34]. Nonetheless, websites continue to be the firm's main online showcase and are the ideal place on which to carry out transactions, since the adoption of e-commerce is especially relevant in the context of SMEs that have a limited geographic scope [12]. Therefore, the importance of corporate websites as instruments of communication between firms and their stakeholders is evident [35,36].

According to Figure 1, although it seems generally accepted that websites are part of the online corporate communication strategy and of the social media mix, the mere existence of a corporate website does not guarantee that it really responds to an effective online communications strategy. It is necessary to achieve the three levels that allow completion of the business communication process: the promotion of the products and services and of the firm itself, the interaction with the target public, and the possibility of acquiring the service or product being sold (e-commerce understood in the broad sense). The model that guarantees the maturity of the website must be sequential, and it is possible to affirm that the firms that have the most effective online strategies are those that reach the highest levels of development sequentially [37,38].

3. Material and Methods

This study is framed in the field of models to measure the maturity of websites. In the general field of assessing the effectiveness of a website, the authors consider the quality of the website to be an important area for research, where what is valued is not the characteristics of the website but its functionalities [36].

There seems to be a consensus in the literature on how SMEs adopt and develop e-commerce following a phased approach. Thus, the first basic phase comprises email communication and displaying a static website with basic product/service information and contact details. This evolves to a mature stage in which the firm fully integrates the

commercial website into its business strategy. There is little empirical evidence that SMEs reach this final stage [39].

3.1. E-MICA Model

Among the different models to measure the maturity of websites, the E-MICA model has been widely used [19,39–41]. E-MICA is a sequential model that is applied in different stages [42]. In this sense, the relationship of the E-MICA model with the communication process is that they follow the same information-interaction-action scheme (in parallel with the E-MICA phases of promotion (information), provision (interaction), and processing (action in the form of e-commerce)), and that this could represent a "ladder" of functionalities that must be completed in the communications process of a firm, where any communication action must provide information, achieve interactivity to the highest degree which will culminate in the action, its maximum representation being the sale of a product or service.

The Extended Adoption Model for Electronic internet Commerce (E-MICA) [43] illustrates how organizations often start out simply by establishing their internet presence (information function). The functionality of the website increases over time as the firm's experience in the use of internet technologies increases, including and improving the interaction and, consequently, the action (e-commerce). Therefore, the original model consists of three stages: promotion, provision, and processing. As the website moves from promotion to processing through provision, more complexity and functionality gets added to it [44].

The sequentially of the model requires that to move from one level to another and consolidate its position, a website must collect a minimal number of attributes [45]. In this way, each website will move up in level, provided that it has previously met the criteria for the immediately preceding one. This form of assessment in the E-MICA model is called "analysis of the levels in a related way", which was selected in this research as opposed to "analysis of the levels independently". The main reason for this choice was to try to overcome one of the main drawbacks of the E-MICA model, which is that a website can be on two levels at the same time [19].

In addition, according to the nature of online strategic communication, it is not possible to attain the maximum level, going from one level to another, without completing the previous one, since this means that the website is not respecting the basic principles of planned communication. Therefore, any website that offers the possibility of e-commerce without respecting the sequencing cannot be considered effective.

Similar to the E-MICA model is the four-dimensional model (information, interactivity, online processing, functionality) which includes the last level to assess the adaptation of the website to a mobile version or to mobile applications (APPs) [21].

Currently, SMEs lack models of analysis to verify the adoption of e-commerce [43]. The E-MICA model will be taken as an instrument to measure the degree of maturity of websites, with the maximum level of maturity being represented by the possibility of carrying out e-commerce, which means a better level of online communication as long as they have surpassed the previous levels. For this, each website in the sample has been analysed according to the phases and levels proposed by the E-MICA model.

3.2. Promotion Level

This first phase focuses on the use of the website as an information instrument for SMEs regarding their target public. It is characterized by a low level of functionality and by basic content of a visual and informative nature

It is structured around two sub-levels: the first requires that a minimum of two of the four functionalities proposed are passed, and the second requires four or more of the 14 possible functionalities (Table 1).

3.3. Provision Level

At this stage, the website becomes a dynamic interactive system, in turn considering three sub-levels (Table 1):

- The first sub-level has low interactivity, incorporating online catalogues and links with detailed information. Surpassing this level requires three functionalities of the four proposed.
- The second sub-level is of medium interactivity, offering more complete product catalogues, as well as online help for users. Surpassing this level requires two functionalities of the 3 proposed.
- Finally, there would be the sub-level of high or greater interactivity, which includes chats, discussion forums, multimedia content, and newsletters that are distributed by e-mail. Surpassing this level requires four functionalities of the four proposed.

3.4. Processing Level

In this last phase, the website allows its users to do online transactions. To this end, it requires user identification and a higher level of security than the preceding phases. Surpassing this level requires two functionalities of the five proposed.

The E-MICA model assumes the progressive need to make websites more complex, where organizations normally start with a simple online presence and reach their maximum level by adopting e-commerce functionalities [46] (Table 1).

To adjust the E-MICA model to the reality of Portuguese SMEs, minimal adjustments were made in the functionalities (Table 1). Previously, other authors had adapted the model to verify the maturity of corporate websites from fields as diverse as universities [46], accommodation firms [47], agri-food cooperatives [48], museums [49] or golf courses [19], among others.

In order to validate the consistency of the indicators of the model itself, the standardized Cronbach's α was calculated. The value obtained was 0.725, thus affirming that the questionnaire presented reasonable consistency [50].

3.5. The Sample

To assess the maturity level of Portuguese SME websites, it was necessary to select a sample of the population. For this purpose, the SABI (Iberian Balance Analysis System) database was used, taking into account the criteria established in the study—to be counted as an SME in accordance with the European legal framework, and to carry out its activity in Portugal, and to have an active and accessible website.

The first search yielded a total of 45,270 SMEs that met the requirements for inclusion in the study. In order to find a solution that would allow the sample to be narrowed down in a statistically representative and feasible way, a random sampling procedure representative of the population at a 95% confidence interval was carried out, resulting in a total of 381 cases (Table 2). These cases were then stratified by geographical area (districts of Portugal) to achieve proportionality in the representation of the number of SMEs for each stratum. For this, the coefficient of the stratum was calculated by dividing the number of firms in the sample (381) by the total population (45,270), obtaining the value of 0.00841617. Subsequently, the size of each stratum was calculated by multiplying the number of SMEs in each district by the coefficient of the stratum, and the final sample was obtained (Table 3).

Table 2. Calculation of the sample. Source: The authors.

Population Size	Margin of Error	Estimators	Confidence Level	Sample (*n*)
45,270	5%	0.5	95%	381

Table 3. Final sample by district. Source: The authors.

Stratum (Portuguese District)	Nº of SMEs	Sample by Stratum (Rounded Values)
Aveiro	3547	30
Beja	257	2
Braga	3839	32
Bragança	302	3
Castelo Branco	482	4
Coimbra	1471	12
Évora	432	4
Faro	1759	15
Guarda	397	3
Leiria	2727	23
Lisboa	13,354	112
Portalegre	193	2
Porto	9291	78
Santarém	1539	13
Setúbal	2285	19
Viana Do Castelo	707	6
Vila Real	457	4
Viseu	1063	9
Madeira (autonomous region)	671	6
Açores (autonomous region)	497	4

The E-MICA model thus made it possible to evaluate the evolutive status of the websites, and to determine to what extent they integrate functionalities that allow e-commerce, or whether, on the contrary, the interaction and the desire for dialogue of the organization is limited to the informative presentation of content. The binary analysis of the presence or absence of the functionalities was carried out in October 2019, obtaining final results that yielded a score corresponding to each firm.

4. Results

According to the E-MICA data (Table 4), most of the SMEs have implemented functionalities of the first level (promotion). Of the two sub-levels considered in this first step of the model, most of the Portuguese SME websites easily exceeded the minimal requirements inherent to the first stage (basic information), reaching a mean score of 4.28, with a standard deviation of 1.002 and a variance of 1.004. 26.6% of the firms exceeded the level with the maximum score. Only 2% of the firms analysed did not exceed this level.

With respect to the second sub-level within the first level (enriched information), a mean score of 5.8 and a standard deviation of 2.337 were obtained. Of the 14 indicators proposed in the model, 0.7% of the websites did not present any of these functionalities and 0.1% reached the maximum. Therefore, a great disparity in results was evident, with a decrease being observed in the functionalities included in the websites.

At the next level (provision) where the degree of interaction is what determines the move to the next level, there are websites with a mean value of 2.13 in the low level of interactivity, and a deviation of 1.248. 19% of the websites met a total of 3 of the 4 indicators analysed at this level. With respect to the average level of interactivity, we found a mean value below 1, i.e., 0.91, and a deviation of 1.004. Moving towards the high level of interactivity, the decrease in the number of firms that present functionalities is more marked, obtaining a mean value of 0.33 and a standard deviation of 0.6111.

Finally, at level 3 (processing), the mean score is 1.12 and the standard deviation is 1.388, with the presence of some functionalities related to electronic commerce.

Table 5 presents the number of Portuguese SMEs that surpassed each level, indicating the percentage of the total sample that they represent (381 SMEs). It is important to note that none of the SMEs managed to reach the last two levels of the model, High Interactivity

and Processing. Most of the SMEs studied have corporate websites that offer a limited degree of maturity for promotion and a low level of interactivity (Figure 2).

Table 4. Mean scores. Source: The authors.

		Mean Score	Deviation	Variance
Level 1: Promotion	Basic information	4.28	1.002	1.004
	Rich information	5.80	2.337	5.460
Level 2: Provision	Low interactivity	2.13	1.248	1.556
	Medium interactivity	0.91	1.004	1.008
	High interactivity	0.33	0.611	0.374
Level 3: Processing	Processing	1.12	1.388	1.927

Table 5. Descriptive summary of the E-MICA results. Source: The authors.

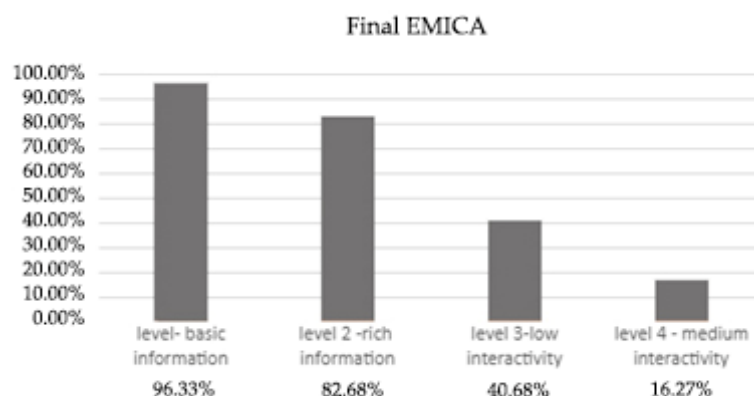|		Firms Reaching the Level	SMEs of the Whole Sample	Districts with Most SMEs at the Level	Predo-Minant Sector at Each Level	Predomi-Nant Workforce Number	Predomi-Nant Business Volume
Level 1: Promotion	Basic information	367/381	96.3%	Lisboa	Services	150–200	€500,000–€1,000,000
	Rich information	315/381	82.7%	Porto	Industry	100–200	€1,500,000–€2,000,000
Level 2: Provision	Low interactivity	155/381	40.7%	Lisboa	Commerce	150–200	€1,500,000–€2,000,000
	Medium interactivity	62/381	16.3%	Lisboa	Industry	150–200	€2,000,000–€3,000,000
	High interactivity	0	-	-	-	-	-
Level 3: Processing	Processing	0	-	-	-	-	-

Figure 2. Final E-MICA results. Source: the authors.

If one relates the first phase of E-MICA (basic information) with the districts of Portugal, the SMEs that have headquarters in Lisbon and Porto stand out. Of the 112 firms located in Lisbon, a total of 108 met the requirements to pass this first level, while in Porto 77 of the 78 firms analysed did so.

Tables 6 and 7 present the numbers of firms that have or have not managed to pass the first level of the E-MICA model. The value "0" means that they did not meet the necessary criteria to pass this level. A total of 14 firms distributed over all the districts did not reach the minimum score required in Table 1. The firms that failed to pass the level belonged to Braga (4 firms did not appear at this level), one from Coimbra, one from Faro, one from Portalegre, two from Setubal, four from Lisbon, and one from Porto.

Table 6. Level 1-E-MICA. Source: The authors.

		Frequency	Percent	Valid Percent	Cumulative Percent
		Level 1-E-MICA			
Valid	0	14	2.0	3.7	3.7
	1	367	51.2	96.3	100.0
	Total	381	53.1	100.0	
Missing	System	336	46.9		
Total		717	100.0		

Table 7. Level 1-E-MICA basic content. Source: The authors.

		Level 1-E-MICA Basic Content		Total
		0	**1**	
Districts	Aveiro	0	26	30
	Beja	0	2	2
	Braga	4	28	32
	Bragança	0	2	3
	Castelo Branco	0	4	4
	Coimbra	1	11	12
	Évora	0	4	4
	Faro	1	14	15
	Guarda	0	3	3
	Leiria	0	23	23
	Portalegre	1	1	2
	Viana do Castelo	0	5	6
	Vila Real	0	4	4
	Santarém	0	15	15
	Setúbal	2	17	19
	Madeira	0	7	7
	Açores	0	4	4
	Lisboa	4	108	112
	Porto	1	78	79
	Viseu	0	2	2
Total		14	367	381

In the same way, the firms that surpass sub-level two of the first level (enriched information) continue to be those of Lisbon and Porto, given that they are also the districts with the largest numbers of firms in the sample and the most developed (Tables 8 and 9).

Table 8. Level 2-E-MICA. Source: The authors.

		Frequency	Percent	Valid Percent	Cumulative Percent
		Level 2-E-MICA			
Valid	0	66	9.2	17.3	17.3
	1	315	43.9	82.7	100.0
	Total	381	53.1	100.0	
Missing	System	336	46.9		
Total		717	100.0		

Table 9. Level 2-E-MICA rich content. Source: The authors.

		Level 2-E-MICA Rich Content		Total
		0	1	
Districts	Aveiro	4	21	30
	Beja	0	2	2
	Braga	6	26	32
	Bragança	1	2	3
	Castelo Branco	1	3	4
	Coimbra	2	10	12
	Évora	1	3	4
	Faro	4	11	15
	Guarda	0	3	3
	Leiria	7	16	23
	Portalegre	0	2	2
	Viana do Castelo	4	2	6
	Vila Real	0	4	4
	Santarém	5	10	15
	Setúbal	4	15	19
	Madeira	2	5	7
	Açores	0	4	4
	Lisboa	1	98	113
	Porto	4	77	81
	Viseu	1	1	2
Total		66	315	381

With respect to the next level, low interactivity, the predominance of Lisbon and Porto continues, although it is noteworthy that there are a greater number of firms that no longer reach this level. A total of 226 firms did not meet the criteria, with the greatest losses being recorded in the districts of Lisbon and Porto, as well as in such districts as Aveiro, Braga, and Leiria with more than half of the firms not meeting the criteria (Tables 10 and 11). At the fourth level of the model (medium interactivity), there was a significant decrease in SMEs. A total of 319 firms did not meet the minimum requirements to pass the level in all districts without exception. Nonetheless, Lisbon and Porto continue to be the area with the most SMEs with medium interactivity (Tables 12 and 13). Regarding the fifth and sixth levels of the model (high interactivity and e-commerce), no firm managed to reach the minimum criteria to move from the medium level of interactivity to the high level, or from the high level of interactivity to the level of e-commerce or "Processing" phase.

Table 10. Level 3-E-MICA. Source: The authors.

		Frequency	Percent	Valid Percent	Cumulative Percent
			Level 3-E-MICA		
Valid	0	226	31.5	59.3	59.3
	1	155	21.6	40.7	100.0
	Total	381	53.1	100.0	
Missing	System	336	46.9		
Total		717	100.0		

Table 11. Level 3-E-MICA. Low interactivity. Source: The authors.

		Level 3-E-MICA Low Interactivity		Total
		0	**1**	
	Aveiro	19	11	30
	Beja	2	0	2
	Braga	18	14	32
	Bragança	3	0	3
	Castelo Branco	3	1	4
	Coimbra	7	5	12
	Évora	3	1	4
	Faro	9	6	15
	Guarda	2	1	3
Districts	Leiria	15	8	23
	Portalegre	0	2	2
	Viana do Castelo	4	2	6
	Vila Real	3	1	4
	Santarém	9	6	15
	Setúbal	10	9	19
	Madeira	4	3	7
	Açores	3	1	4
	Lisboa	66	47	113
	Porto	44	37	81
	Viseu	2	0	2
Total		226	155	381

Table 12. Level 4-E-MICA. Source: The authors.

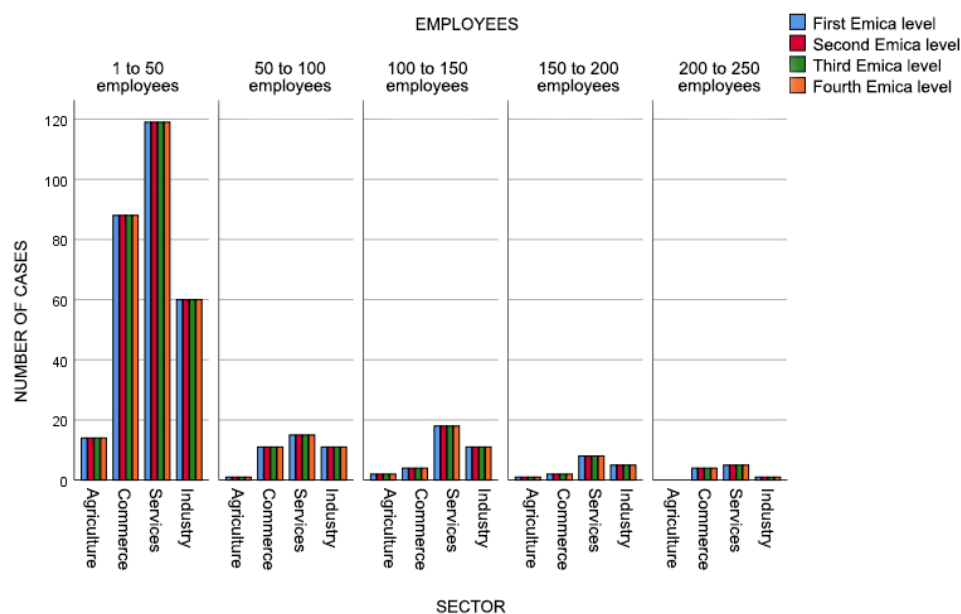|		Level 4-E-MICA			
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
	0	319	44.5	83.7	83.7
Valid	1	62	8.6	16.3	100.0
	Total	381	53.1	100.0	
Missing	System	336	46.9		
Total		717	100.0		

In the relationship between the maturity of the websites and the predominant sector, the SMEs of the services sector stand out among those that reach the level of basic information. Nonetheless, the industrial sector SMEs are those that achieve the highest level of enriched information. The commerce sector is predominant at the level of low interactivity, and the industrial sector is once again the most representative at the level of medium interactivity. Jorge, Chivite and Salinas [25] also found that the activity sector and the organisational dimension were determining factors in the digital transformation process.

With respect to the number of employees, firms with between 150 and 200 employees stand out at the level of basic information, which is the dominant segment for both low and medium interactivity. Only for enriched information is it observed that the firms with between 100 and 200 employees stand out.

Crossing the sector and the number of employees, we find that the service sector is dominant at all the E-MICA levels (Figure 3), especially in the range of 1–50 employees.

Table 13. Level 4-E-MICA. Medium interactivity. Source: The authors.

		Level 4-E-MICA Medium Interactivity		Total
		0	1	
Districts	Aveiro	25	5	30
	Beja	2	0	2
	Braga	28	4	32
	Bragança	3	0	3
	Castelo Branco	3	1	4
	Coimbra	11	1	12
	Évora	4	0	4
	Faro	14	1	15
	Guarda	3	0	3
	Leiria	22	1	23
	Portalegre	1	1	2
	Viana do Castelo	4	2	6
	Vila Real	4	0	4
	Santarém	11	4	15
	Setúbal	14	5	19
	Madeira	6	1	7
	Açores	4	0	4
	Lisboa	95	18	113
	Porto	63	18	81
	Viseu	2	0	2
Total		319	62	381

Figure 3. E-MICA levels, sectors and employees. Source: authors.

Considering the turnover volume, it can be said that firms with more immature websites (basic information) bill between €500,000 and €1,000,000, although the line fluctuates hardly at all for all the revenue levels (Figure 4).

As one goes up steps in the model, one observes firms with a higher level of turnover. Thus, firms taking in between €1,500,000 and €2,000,000 predominate at the levels of enriched information and low interactivity. Firms whose websites offer a medium interaction usually have a turnover volume between €2,000,000 and €3,000,000.

The decrease in firms is noteworthy as the model moves up to the highest levels of maturity, where there are no firms that manage to surpass the level of processing.
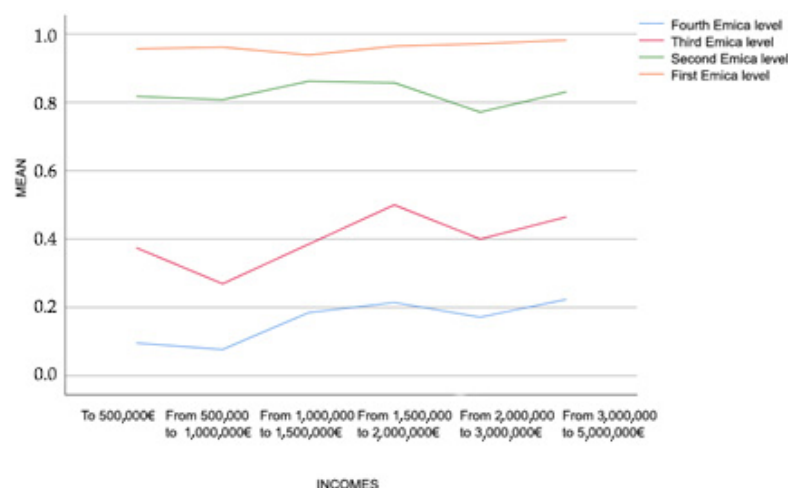
Figure 4. E-MICA levels and revenues. Source: authors.

5. Discussion

The progressive loss of firms that is observed as the requirements to consider that a website is mature enough to offer e-commerce tighten shows that Portuguese SMEs are mainly interested in offering basic information about their products and services, and lacking functionalities that imply a greater interaction and with a low level of maturity. This is in the same line as that of previous studies about e-commerce adoption among SMEs [10] together with the factors influencing their readiness to adopt such technology. The study showed that e-commerce adoption is affected by technological, financial, and organizational/cultural factors. The financial and technological factors appear as the most critical, followed by the cultural and organizational factors.

Thus, it can be said that in the present work technological factors are present when it is shown that the information offered is very informative and does not require frequent updating and advanced website functionalities. In addition to that, Portuguese SMEs do not present much information related to more complex aspects such as corporate identity and culture, corporate social responsibility, or information on the sector, which require greater management effort on the part of the organization [37]. Therefore, the level of maturity that websites contribute to the effectiveness of the online communication strategy is very limited due to the same problems referred to by Dahbi and Benmoussa: [10] the lack of management support and perceived need for e-commerce, employees' lack of IT knowledge, customers' lack of confidence in technology, lack of financial resources, external problems, and location.

The relationship between the maturity of the websites and the location of the firm seems clear in the European context [25]. In the Portuguese context, the two regions with most economic capacity in the country, Lisbon and Porto, stand out. It is there where there exist a greater number of more developed firms, confirming the relationship between the maturity of the websites and the organization's performance [36].

However, we do not agree with Jorge-Vázquez, Chivite-Cebolla and Salinas-Ramos [25] when they say that agri-food cooperatives of greater size clearly present a higher level of digitalization in the two dimensions of analysis observed-commerce and web services offered, due to the fact that it cannot clearly be said in the present work that the number of employees is a determining factor for the maturity of the website, since medium-sized firms have more mature websites. We can also say that the level of digitalization has a positive influence on size but not vice versa. Nevertheless, we conclude in concordance with those authors that there is a similar correlation between the turnover volume of the cooperatives and digitalization.

The turnover volume appears to be a determining factor of the degree of maturity of Portuguese websites. It is observed that those firms with greater economic capacity allocate more resources to offer websites with functionalities that favour interaction. It is

known [12] that the greater the cost of the website and the greater the need for specific skills on the part of the managers, the higher the level of functionalities, to which can be added that SMEs with high levels of technical knowledge are therefore able to maintain and develop their own websites very comfortably, without cost being a big problem [21].

As has already been noted in the literature [47], the lack of scoring at the highest levels of the model does not indicate the absence of e-commerce. From the results obtained, it cannot be said that Portuguese SMEs do not offer the possibility of carrying out transactions through their websites, since there are firms which do offer e-commerce on their corporate websites but did not pass the model sequentially. This work has assessed the maturity and quality of websites as tools for online communication, based on a model that considers e-commerce as the maximum exponent of the maturity of a website. E-commerce implies more complex financial, cultural, managerial, technological, and external factors and functionalities [10] and a greater willingness and capacity for dialogue on the part of the organization with its customers, which results in a better online communications strategy.

The results show that Portuguese SMEs have websites where the "promotion" of information is prioritized without this implying interaction between users and the firm, reaching a low level of maturity. The lack of dialogue and interactivity observed on the websites may be a major limitation when it comes to reaching new markets. A predisposition towards maximum interactivity shown by an organization on its website will be fundamental for the perception it will generate in new contexts. In this line, we agree with Jean and Kim [6] when they say that managers should be aware of the contingencies of different internet capabilities to realize their firms' potential effectively and efficiently for the generation of superior export outcomes. Thus, it is confirmed that, as observed by Jorge-Vázquez, Chivite-Cebolla and Salinas-Ramos [25] the existence of a heterogeneous degree of digitalization of European SMEs is clearly conditioned by the wealth of the country. In this situation, the promotion of public policies that guarantee an improvement in digital skills is recommended.

6. Conclusions

First, there exists a relationship between the level of maturity reached in the SMEs' websites, as part of their digital communication strategy, and the possibility of e-commerce. Secondly, the corporate websites of Portuguese SMEs are digital tools with a minimum of functionalities that allow them to communicate at a low level. For that reason, it has been found that Portuguese SMEs need to make changes in their digital communications strategy with their publics in order to be more competitive [51] and to reach a high level of maturity in the context of their digital communication.

Nonetheless, it is necessary to recognize some limitations of the E-MICA model. This model only assesses the presence or absence of a functionality but does not address other issues such as navigability or the time to localize the resource. In addition, the constant updating of the websites' content means that the results also need to be frequently updated.

In the future, comparison of the situation of Portuguese SMEs with those of other countries could be of interest, as well as evaluating the contribution of corporate websites to the economic recovery of SMEs in Portugal after the pandemic.

With respect to the practical implications of this work, it is recommended that the managers of Portuguese SMEs' corporate websites pay attention to certain issues that could improve relations with their customers through their online communications strategy.

1. It is suggested that they design websites that favour the participation of and dialogue with the visitors, since this could have an impact for a higher level of the public's engagement with the organization [52]. Increasing the website's relationship capacity is possible when the functionalities surpass the high level of interactivity, with the incorporation of forums, chats, multimedia functionalities, the possibility of receiving newsletters, etc.
2. It is necessary to show content that offers differential and enriched values about corporate identity and culture, since the simple promotion of the products gives a

static and not very dynamic, vision of the website, and this can generate a lack of credibility and poor brand image. In today's context, therefore, not only the presence of rich content but the quality of that content are determinants [53].

3. For websites to be an effective channel of online communication within the firm's digital communications strategy, it is necessary for Portuguese SMEs to take a step beyond their mere presence on the internet and favour the possibility of generating content by integrating functionalities characteristic of the so-called Web 2.0. SMEs need websites capable of combining the firm's communications activities through all of its online communication channels (social networks, apps, etc.). SMEs therefore need a strategy of enriched online communication. This means that, even though they might include other channels of digital communication, these must necessarily be linked to their website, since this medium is the most important digital communication channel.

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