The impact of digitalization on marketing activities in manufacturing companies

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Abstract

Purpose – The purpose of the paper is to present an empirical study that examines the impact of digitalization on informative, strategic and operational marketing activities in manufacturing companies from the entrepreneurial perspective.

Design/methodology/approach – A research project was carried out in 205 Italian manufacturing companies by using the questionnaire method. An exploratory research study was conducted with hierarchical cluster analysis.

Findings – The analysis shows the existence of seven clusters of manufacturing companies that differ by the impact of digitalization on marketing activities from the entrepreneurial perspective. Two clusters have a high positive impact of digitalization, primarily on informative and strategic marketing activities. Two clusters are characterized by a low positive impact of digitalization and three clusters perform an intermediate level of digitalization. Furthermore, these groups of clusters differ in terms of the influence of digitalization on customer value.

Research limitations/implications – The small size of the sample and the geographic origin of the companies imply limited generalizability; further research on the topic is thus recommended.

Practical implications – The study suggests that companies should digitalize many key marketing activities to increase marketing effectiveness and customer value. To achieve high levels of digitalization and thus increase their competitiveness, manufacturing companies should consider the importance of relevant technologies and skills.

Originality/value – By focussing on the impact of digitalization on informative, strategic and operational marketing, which has not yet been empirically investigated, the present study reveals many new elements concerning the marketing process in the digital era from the entrepreneur's point of view.

Keywords Digitalization, Digital marketing, Marketing activities, Customer value, SMEs

Paper type Research paper

1. Introduction

Digitalization and customer satisfaction are central goals for all enterprises wishing to create and maintain a competitive advantage in the market (Sundararajan *et al.*, 2022). To achieve these goals, enterprises should urgently integrate new digital technologies with traditional business strategies (Ardito *et al.*, 2019).

The digital revolution has had a significant impact on marketing. Today, consumers not only look for products that meet their expectations (Caliskan *et al.*, 2021), but they also share feedback and opinions on products or brands on social networking sites and the Internet more broadly (Rosário and Dias, 2022). Marketers must consider this feedback in their marketing strategy.

New digital technologies have increased the number of touchpoints (websites, apps, social media, e-commerce platforms, etc.) in the customer journey (Lemon and Verhoef, 2016). Marketers are thus asked to integrate offline and online customer-company interactions in order to develop strong relationships that improve business and social life (Rosário and Dias, 2022).

In the marketing literature, many contributions focus on the transformation of specific marketing topics through the digital revolution. However, there is scant empirical research on this topic. For example, one research stream focuses on real-time collection and analysis of market data and information sharing between parties (Ardito *et al.*, 2019; Giannakis *et al.*, 2019). Some studies summarize the challenges of digitalization in marketing in terms of motivations and implications (Bettiol *et al.*, 2017) as well as the transformation of the organizational aspects of the marketing function (Vassileva, 2017). Other studies are focussed on the change in marketing practices caused by Industry 4.0 (Shkurupska and Litovchenko, 2016; Sunday and Vera, 2018).

Literature reviews on digital marketing have investigated the phenomenon from different perspectives; for example, how digital marketing has evolved over time (Cham *et al.*, 2022), themes and trends in the sector (Rosário and Dias, 2022) and, more specifically, artificial intelligence (AI), machine learning (ML) and Industry 4.0.

Further studies have investigated specific aspects, including the impacts of digitalization on marketing mix theory (Caliskan *et al.*, 2021), on the relationship between supply chain management and marketing integration (Ardito *et al.*, 2019) and on the development of long-standing firms (Rossato and Castellani, 2020).

However, despite the growing attention on this topic, there are very few empirical contributions aimed at understanding the real impact of digital marketing on manufacturing companies. In this paper, we discuss an empirical study that contributes to filling this gap.

The paper proposes a new angle of analysis – how digitalization impacts key marketing activities and customer value from the entrepreneurial perspective. The first goal of the study is to classify small and medium-sized manufacturing companies with respect to the impact of digitalization on key marketing activities – informative, strategic and operational marketing – thus highlighting any significant differences concerning the relationship between the size, sector and type of a company and the level of innovation and investment in digital communication. The second goal is to analyse how the impact of digitalization on such marketing activities influences the entrepreneur's perception of customer value.

Therefore, instead of looking at the impact of digitalization on each marketing activity, the study adopts a more holistic perspective by considering the key marketing activities that emerge from the definition of digital marketing. Due to the significant role of marketing in business organizations, it is essential to examine the transformation of these key activities brought about by the digital revolution.

The main aim of the paper is to present the impact of digitalization on marketing activities in Italian manufacturing companies taking a holistic perspective. To do this, the transformation of each key activity is investigated and presented based on the literature. Then, cluster analysis is performed to identify how these companies differ from each other in terms of the impact of digitalization on key marketing activities and some company variables. Regression is then performed to identify the influence of digitalization on customer value from the entrepreneur's perspective.

The paper is structured as follows. The first part discusses the theoretical background of the marketing changes in the new digital age; it also describes the transformation of key marketing activities. The next section sets out the methodology of the research project carried out among Italian manufacturing companies. This is followed by the analysis and the results. The last part discusses the findings and presents the conclusions.

2. Theoretical background

2.1 From marketing to digital marketing

Kotler and Keller (2016) define marketing as the process of identifying and satisfying consumers' human and social needs while maintaining the company's profitability. Marketers create, communicate, deliver and exchange offerings that provide customers, partners and society with value based on their specific needs (Rajagopal, 2020).

Marketing can also be defined as "the art and science of choosing target markets and getting, keeping, and growing customers through creating, delivering, and communicating superior customer value" (Kotler and Keller, 2016). These definitions identify three key activities in the marketing management process: informative, strategic and operational marketing (Kotler, 2004; Lamb *et al.*, 2007; Mullins and Walker, 2005). *Informative marketing* refers to the analysis of the external environment, mainly consisting of customers and competitors. *Strategic marketing* is about developing a marketing strategy that establishes target segments and their needs, which the company tries to meet, as well as brand positioning (i.e. the distinguishing characteristics of the brand). Finally, *operational marketing* concerns the development and implementation of the marketing mix, or the 4 Ps of marketing, to fulfil the selected target markets. The "4 Ps" is a marketing concept (McCarthy, 1960) that summarizes the four key factors of any marketing strategy: product, price, promotion and place.

Digitalization has strongly impacted marketing and all business functions (Almada-Lobo, 2016); it has also increased the productivity of the company and the role of customers (Bettiol *et al.*, 2017). The emerging technologies that primarily impact marketing focus on information processing; they include the Internet of things (IoT), cloud computing, big data analytics and customer profiling and AI (Rosário and Dias, 2022).

Digitalization is defined as the application of information technologies (IT) or digital technologies that allow the optimization of existing business processes through more efficient coordination of processes and/or create additional customer value by improving user experiences (Pagani and Pardo, 2017). Digitalization is also defined as the use of IT and new digital technologies to save costs and improve customer experience (Verhoef *et al.*, 2021).

The literature has provided many definitions of marketing in the digital era. For example, Chaffey and Ellis-Chadwick (2019, p. 10) described digital marketing as follows: "Achieving marketing objectives through applying digital media, data and technology". Similarly, Bala and Verma (2018, p. 323) proposed the following definition: "Digital marketing is the use of technologies to help marketing activities in order to improve customer knowledge by matching their needs".

The term Marketing 4.0 may be considered a synonym of digital marketing as it is described as the new generation of marketing strategies that combine offline and online interactions for a seamless consumer experience (Sundararajan *et al.*, 2022).

Kotler *et al.* (2021) define Marketing 5.0 as the use of human-mimicking technologies to create, communicate, deliver and enhance value in the overall customer experience. According to the Authors, companies should balance human and computer intelligence and use technology to appease all generations, thus avoiding the creation of divides or resentment.

The American Marketing Association (AMA) gives the following definition: "Digital marketing is the use of digital or social channels to promote a brand or reach consumers. This kind of marketing can be executed on the Internet, social media, search engines, mobile devices, and other channels. It requires new ways of marketing to consumers and understanding the impact of their behavior". Therefore, it seems that digital marketing essentially concerns the management of the company's online presence by using a variety of technological tools with the aim of reaching marketing objectives and developing offers that generate value for customers, the company and its stakeholders. Digital marketing also provides a more effective way of reaching a wider audience and enlarging the customer base by engaging existing and potential customers (Rosário and Dias, 2022).

2.2 The impact of digitalization on marketing activities

To understand the extent to which digitalization is impacting marketing, it is important to analyse the transformation of the main informative, strategic and operational marketing activities in the digital revolution. These activities may be identified in many definitions of marketing and digital marketing. Therefore, the transformation of the key informative (customer and competitor analysis), strategic (market segmentation and brand positioning) and operational (4 Ps) marketing activities in the new digital age represents the conceptual framework of this study. The following sub-sections summarize this transformation.

2.2.1 The impact of digitalization on informative and strategic marketing activities. In recent years, digital technologies have continuously increased the complexity of customers' tastes and preferences; they have also improved businesses' capacity to analyse customers, competitors and the external and internal environments (Rosário and Dias, 2022). Today, the collection of data on customers and competitors, as well as its accurate and timely analysis (key informative marketing activities), and market segmentation and brand positioning (key strategic marketing activities) are facilitated by the availability of huge amounts of data and new digital technologies, such as big data analytics and customer profiling techniques (Sundararajan *et al.*, 2022). Big data are the data stored in social media (Wang *et al.*, 2016), the cloud/blockchain, customer reviews and websites (Sundararajan *et al.*, 2022). Every digital activity on the Internet/social media and mobile apps that is transmitted through systems, sensors and portable devices produces data (Oztemel and Gursev, 2020).

Similarly, Rosário and Dias (2022) claim that such technologies have significantly contributed to the transition towards market-driven marketing approaches that involve formalized techniques for acquiring accurate and timely information on customers, the market, products and the general business environment. These days, data analysis is more about AI and ML with the use of big data (Ardito *et al.*, 2019). This type of analysis discovers patterns, classifies textual data, and offers tremendous inputs on customer needs, customer expectations/trends, market segmentation, customer profiling, market performance, etc (Sundararajan *et al.*, 2022).

Industry 4.0-enabling technologies, such as big data analytics, allow the collection and analysis of consumer, competitor and market information for improved decision-making and marketing planning. These technologies allow BtoB and BtoC to develop faster buyer-seller relationships, quickly understand customers' needs, predict their behaviours and respond to their desires (Ardito *et al.*, 2019; Obal and Lancioni, 2013). Thanks to social media platforms such as Facebook, Instagram and YouTube, brands can reach new and different markets outside their target audience, as well as easily access more clearly defined audiences through search engine optimization and Internet advertising (Bahcecik *et al.*, 2019). Furthermore, digital technologies help companies to achieve better brand positioning as they can build and reinforce their positioning through social media, online advertising and communication (Bahcecik *et al.*, 2019). For example, social media platforms (e.g. Facebook, Instagram,

YouTube) provide a digital marketing environment where consumers can see what brands are talking about without intermediaries and establish one-to-one relationships with them, thus affecting buyer decision-making process and customer satisfaction (Bahcecik *et al.*, 2019).

2.3 The impact of digitalization on operational marketing activities
According to the literature, digital transformation is impacting operational marketing policies/activities, also known as the 4 Ps – product, price, promotion and place (McCarthy, 1960).

Concerning *product* policy, many scholars argue that technologies such as e-mail, websites, blogs, social networks and web mining can be used in innovation activities (ideation, concept, development, pre-launch, launch and support), mainly with regard to the development of new products (Su *et al.*, 2006; Yan *et al.*, 2009). For example, on their websites, companies can collect ideas from customers for developing new products or feedback regarding novel concepts. Artificial and augmented reality increases customer participation in the new product design stage (Mourtzis and Doukas, 2012); 3D printing does the same in the new product development phase with the help of digital design files (Holmstrom and Partanen, 2014). The integrated use of digital technologies, such as IoT, big data analytics and the cloud, can support digital "servitization" (Sklyar *et al.*, 2019; Gebauer *et al.*, 2021), as well as the gathering of data on product operation and user behaviour, to generate a new service portfolio that encompasses advanced and customized services and increases customer value (Zheng *et al.*, 2021).

Among other innovations, smart packaging technologies allow businesses to observe, check and keep a record of changes in a product or environment, as well as react to these changes (Yousefi *et al.*, 2019).

Industry 4.0-enabling technologies, such as big data analytics, allow not only to understand and predict consumer needs/trends but also to define *price* policies. Instead of fixed pricing, which takes into consideration supply, demand and location, prices in the digital era are dynamic. They change every hour for each customer; they focus on the product and, more importantly, on the customer thanks to advanced analytics that generates optimal revenue and develops a satisfactory relationship with the customer (Caliskan *et al.*, 2021). These analytical tools (e.g. AI, ML) are used in real-time and personalized quotes (Bodea and Ferguson, 2014).

Communication policy has been strongly impacted by digitalization. Unlike traditional marketing, contemporary internet-based communication allows consumers to communicate instantly with companies, share feedback and opinions on a product or a brand, and be directly involved in developing marketing strategies (Cham *et al.*, 2022). Companies can use many different forms of online media to offer users a total digital experience, such as websites, mobile apps and social media pages (e.g. Facebook, Instagram, LinkedIn). They can also use online communication techniques, including search engine marketing, online public relations, online partnerships (e.g. affiliate marketing and co-marketing), online display advertising, email marketing (Cham *et al.*, 2022; Rosário and Dias, 2022) and social media marketing (Tuten and Solomon, 2020). Businesses consider marketing automation, especially content automation, to be one of the marketing activities with the greatest commercial impact (Bala and Verma, 2018).

These online techniques aim to provide the best service to existing customers and attract prospective customers in order to develop a strong customer relationship and brand image (Chaffey and Ellis-Chadwick, 2019).

Marketers can personalize communication for each customer and develop promotional activities for them (Başyazicioğlu and Karamustafa, 2018). Thanks to marketing data

analysis tools (e.g. Google Analytics), marketers can optimize their marketing campaigns and reduce the costs associated with promotional activities, thus providing businesses with a sustainable, long-term approach (Cham *et al.*, 2022).

Therefore, digital marketing can offer a more effective way to reach a wider audience and expand the customer base by engaging existing and potential customers (Rosário and Dias, 2022). Strategic investment in social media marketing can help to improve customer satisfaction and perceived value (Chen and Lin, 2019), co-creation (Zhang *et al.*, 2017) and brand loyalty (Laroche *et al.*, 2013).

With respect to *distribution* policy, the digital revolution has completely changed distribution channels. The Internet allows marketers to use electronic commerce (e-commerce) to sell and market products and services (Rosário and Dias, 2022). Companies such as YouTube, Google, Yahoo, Alibaba, and Amazon have revolutionized digital marketing by allowing trading and increasing access to product information, advertising space, stock trading and software programs. The Internet, mobile phones and foreign trade have supported cross-border e-commerce development. Today, it is easier to go across invisible borders to shop online and use convenient international forms of payment (Adyen, 2015).

The omnichannel approach allows customers to receive whatever they want at their preferred time and place (Murfield *et al.*, 2017).

Many scholars have highlighted the increase in investment in digital marketing, which improves brand awareness, lead generation, consumer loyalty and revenue (Lamberton and Stephen, 2016; Tuten and Solomon, 2020).

Digitalization, therefore, can influence positively key marketing activities as well as the aim of marketing itself, which is value creation for customers, the company and its stakeholders.

Our empirical study aims to contribute to analysing the impact of digitalization on key marketing activities and customer value. In particular, the research questions are as follows:

RQ1. How do manufacturing companies differ from each other in terms of the impact of digitalization on marketing activities?

RQ2. How does the impact of digitalization on marketing activities change according to a company's size, type, sector, revenues, level of innovation and investment in digital communication?

RQ3. How much does the impact of digitalization on marketing activities relate to customer value creation today and in the next three years from the perspective of the entrepreneur?

3. Data and methodology
3.1 Tools and data collection
To answer the research questions above, a survey was conducted on a sample of Italian manufacturing companies. A questionnaire was designed based on the key marketing activities and their transformation in the digital revolution as identified in the literature. To improve the questions, a pilot test was carried out on three entrepreneurs; the questionnaire was also reviewed by academics. Based on their recommendations, some questions were modified and some options for multiple-choice questions were added.

The final version of the questionnaire consisted of three parts. The first part contained questions about the manufacturing company's profile: company type (BtoB, BtoC, mixed BtoB and BtoC), company size (small or medium), sector (furniture, textiles, mechanics, etc.) and revenues.

The second part was aimed at identifying the impact of the Internet and digital technologies on eight key marketing activities (e.g. Kotler, 2004; Kotler and Keller, 2016; McCarthy, 1960): customer analysis, competitor analysis (informative marketing), customer segmentation, brand positioning (strategic marketing), and policies related to product, price, promotion and place (operational marketing).

In particular, the question was "*How positive is the impact of the Internet and digital technologies on the company's marketing activities?*".

The items corresponding to the marketing activities were the following:

(1) Customer analysis *(digitalization allows businesses to collect vast amounts of data on customers from the cloud/blockchain, social networks, websites, etc. and analyse them with big data analytics and other digital technologies)* (Ardito *et al.*, 2019; Wang *et al.*, 2016; Sundararajan *et al.*, 2022).

(2) Competitor analysis *(digitalization allows businesses to collect vast amounts of data on competitors from company websites, mobile app(s), social media company pages and online communication techniques [e.g. online display advertising, social media] and analyse them with big data analytics and other digital technologies)* (Sundararajan *et al.*, 2022; Rosário and Dias, 2022; Ardito *et al.*, 2019).

(3) Customer segmentation *(digitalization allows businesses to profile significantly better online customer segments and identify new segments by using, among other means, big data analytics and customer profiling techniques)* (Obal and Lancioni, 2013; Ardito *et al.*, 2019).

(4) Brand positioning *(digitalization has increased the opportunities for companies to build and reinforce their brand positioning with respect to competitors thanks to websites, social media, online advertising, etc. and to enhanced direct interactions with customers)* (Bahcecik *et al.*, 2019).

(5) Product policy *(digitalization has improved product innovation and management; information collected through emails, websites, blogs, social networks, web mining, etc. [e.g. customers' ideas on new products, feedback on product concepts] can be used for innovation activities [ideation, concept, development, pre-launch, launch and support])* (Su *et al.*, 2006; Yan *et al.*, 2009).

(6) Price policy *(digitalization allows the adoption of dynamic prices that are tailor-made for customers)* (Caliskan *et al.*, 2021; Bodea and Ferguson, 2014).

(7) Promotion or communication policy *(digitalization has increased the opportunities to communicate and interact with customers thanks, for example, to the use of company websites, mobile app(s), social media company pages [e.g. Facebook, Instagram, LinkedIn] and online communication techniques, such as search engine marketing, online public relations, online display advertising, email marketing and social media marketing)* (Cham *et al.*, 2022; Rosário and Dias, 2022; Chaffey and Ellis-Chadwick, 2019).

(8) Place or distribution policy *(digitalization has increased the opportunity to distribute products/services thanks to the adoption of e-commerce and, more generally, to an omnichannel approach that allows customers to buy both offline and online by using many touchpoints)* (Rosário and Dias, 2022; Murfield *et al.*, 2017).

Respondents were asked to indicate the positive effect of the Internet and digital technologies on the above activities by using a 7-point Likert scale where 1 represented "not at all positive" and 7 represented "very positive".

Furthermore, the following definitions of digitalization and digital marketing were included in the questionnaire:

(1) *Digitalization* consists of the application of IT or digital technologies to optimize existing business (save costs) and/or improve customer experience (Verhoef *et al.*, 2021);

(2) *Digital marketing* consists of achieving marketing objectives by applying digital media, data and technology (Chaffey and Ellis-Chadwick, 2019).

The third part of the questionnaire aimed to understand, from the entrepreneur's perspective, the level of innovation of the company, the investment in digital communication (percentage of communication budget), and the positive influence of the digitalization of marketing activities on customer value, in the present and in three years.

Respondents were asked to answer by using a 7-point Likert scale, where 1 represented "not at all" and 7 represented "very much".

3.2 Sample
The criteria for selecting the manufacturing companies were their location in the Marche region of Italy, the inclusion of BtoB and BtoC, and small and medium sizes. Starting with the complete database of the regional Chamber of Commerce, we extracted a smaller database consisting of all the small and medium-sized manufacturing companies active in the Marche region with a size of 11–250 employees (approximately 10,000 enterprises as of 31 March 2021). All the companies with fewer than 250 employees and a turnover of up to 50 million euros, which were representative of the Marche region, were selected. To guarantee the best representativeness in terms of the set of companies surveyed, a probabilistic sample of 2,705 companies was constructed and stratified according to the province (Ancona, Pesaro-Urbino, Fermo, Macerata and Ascoli Piceno) of the respondent company and its size (small or medium) in terms of employees (11–250). The chosen sample size allowed us to limit the statistical error to within 5.7% (at a confidence level of 90%) given the estimates at the level of the whole sample. The company's entrepreneur/owner was asked to fill out the questionnaire. In the end, a sample of 205 useful responses was obtained.

4. Findings
4.1 Sample characteristics
The sample is made up of 205 manufacturing companies from the Marche region and is stratified by company size and province. Table 1 shows the distribution of the enterprises by type (BtoC, BtoB and mixed BtoC/BtoB), size and sector. The sample reflects quite well the distribution of the overall manufacturing companies in the Marche region since the universe/sample variations are almost irrelevant. BtoB companies make up 62% of the sample, BtoC companies 20% and mixed BtoC/BtoB companies 8%. Most of the enterprises are small (61%); among the medium-sized enterprises (51–250), those with 51–100 employees are prevalent (27%). The companies in question manufacture metal products (16%), leather items and similar articles (11%), textiles and clothing (9%), wood and cork (8%), rubber and plastic articles (7%), mineral products (7%), food (7%), furniture (6%), computer and electrotechnics (5%) and electronics (5%). Finally, companies with revenues between 1 and 4.9 (38%) and 10–49.9 (30%) million euros prevail.

4.2 Data collection
The survey process was web-based. It consisted of making telephone contact and collecting the details of potential respondents (personal data, email address), sending emails that

	N	%
Company type		
BtoB	127	62
BtoC	19	9
"Mixed" BtoB and BtoC	59	29
Company size		
Small (11–50 employees)	126	61
Medium (51–100 employees)	55	27
Medium (101–200 employees)	20	10
Medium (201–250 employees)	4	2
Sector		
Metal	33	16
Leather	22	11
Textile and clothing	19	9
Wood and cork	17	8
Rubber and plastic	15	7
Minerals	15	7
Food	15	7
Furniture	13	6
Computer and electronics	11	5
Electrical appliances	11	5
Other	25	3
Revenue (million euros)		
<1	25	12
1–4.9	77	38
5–9.9	34	17
10–49.9	61	30
>50	8	4
N = 205		
Source(s): Table by authors		

Table 1.
Sample descriptive
statistics

presented the survey and the link to the questionnaire, and making telephone reminders until the foreseen quotas were reached. The questionnaire was administered from July to September 2021.

4.3 Cluster variables derived from the literature

The companies in the sample were classified and described according to fourteen criteria. The first eight variables were the architects of the clustering and indicate the key marketing activities (customer analysis, competitor analysis, customer segmentation, brand positioning, product policy, price policy, promotion policy and place policy); the last six variables were used as descriptors and indicate the company's profile characteristics and its level of innovation and investment in digital communication.

(1) Company type: identified through three categories (BtoB, BtoC, mixed BtoB/BtoC).

(2) Company size: indicated through two macro-categories of small (10–50 employees) and medium size (51–250 employees); the latter was divided into three subcategories (51–100, 101–200 and 201–250 employees).

(3) Sector: the prevalent sectors were selected (i.e. metal products, leather items and similar articles, textiles and clothing, wood and cork, rubber and plastic articles, mineral products, food, furniture, computer and electrotechnics and electronics.

(4) Revenue: measured through five discrete units: <1, 1–4,9, 5–9,9, 10–49,9, >50 (calculated in millions of euros).

(5) Level of innovation: how much the company considers itself innovative using a 7-point Likert scale from 1 ("not at all") to 7 ("very much").

(6) Expenditures for digital communication: measured by how much the company spends on digital communication as a percentage of the communications budget.

4.4 Tandem approach for clustering: a pure, data-driven view of opinion data
The methodology adopted for the clustering of respondents' opinions was the classic strategy of the tandem approach to cluster analysis, which is very useful for selecting only the essential part of the variability. This makes it a producer of orthogonal spaces of the multivariate opinions of the respondents. A hierarchical technique of unsupervised segmentation with variance reduction, such as the Ward algorithm, was then adopted. By doing so, an automatic classification of the units can be obtained that is as natural as possible, which maximizes the variability between the groups while minimizing that within the groups. The reading and interpretation of the dendrogram, therefore, constitute the analytical steps that allow the definition of k natural groups within the database of answers provided at the same time as the k stimuli of the questionnaire, without having starting hypotheses about the number of subjects to be placed in clusters, in a purely data-driven approach (Lebart *et al.*, 2000).

In an opinion survey, the calculation of dissimilarities may become difficult. To overcome this problem, methods that combine dimension reduction (i.e. that reduce the set of variables by either selecting a subset of variables or using some function to reduce the dimensionality) with cluster analysis have been proposed. The most popular way of applying dimension reduction and cluster analysis is simply to execute them sequentially. First, the original data are transformed using dimension reduction; then, cluster analysis is applied to the transformed data. This method is also known as the tandem approach or "themascope" approach (Aluja and Morineau, 1999). As part of a sequential (tandem) approach, the analyst can initially apply a dimension reduction technique and then subject the low-dimensional orthogonal solution to a clustering algorithm (Lebart *et al.*, 1984). In our case, the tandem strategy was applied to the answers given to the 8 items that represent the marketing activities on which the internet and digital technologies could have had an impact. Technically, it was therefore a question of diagonalizing the data matrix by means of principal component analysis and studying the structure of the correlations generated by the respondents concerning our eight items.

As is well known from the literature and practical applications, in opinion surveys, the evaluation of intangible constructs is conditioned by the perception of the measurement scale suggested to respondents. The respondent's level of involvement is often the real cause of the first strong principal component (effect size), which is related only to the perception of the opinion scale. By using a particular transformation of the data, it is possible to eliminate effect size, thus isolating the essential part of the variability that is useful to generate clusters based on a trade-off between what is important for respondents above the individual average and what is not important below the individual average – a sort of raw standardization of the data (Camillo, 1999). After checking for the presence of effect size, by using this transformation, it is possible to eliminate the bias generated by the subjective use of the suggested scale in the survey. The new scale will be between −1 and +1, with 0, by definition, being the correspondent average individual level implicitly generated by each respondent.

In our case, effect size was very strong and manifested itself, as usual, on the first principal component, which was correlated with the individual average value for a correlation coefficient equal to 0.9998.

After effect size removal, by adopting the tandem approach for new opinion variables, the dendrogram shown in Figure 1 was obtained. By using the finest of the three possible tree-cut levels, seven company clusters were generated. Multivariate statistics indicated that statistically significant differences existed between the seven clusters.

The semantic content of the seven groups of companies was obtained from a statistical description of each of the clusters by using both the variables that algorithmically determined the clustering (active variables) and the descriptors listed above (illustrative variables). The statistical technique of description is based on the calculation of an adequate test value to measure the probability that the difference between the single cluster and the entire sample is random. For the quantitative variables, we rely on the t-test, while for the characterization provided by the single categories of a qualitative variable, we rely on a hypergeometric distribution penalized with the dimensions of the single cluster (Lebart *et al.*, 1984).

5. Findings

5.1 Classification of the manufacturing companies through hierarchical cluster analysis

The findings contain seven different groups of manufacturing companies, comprising 47 individuals in Cluster 1, 30 individuals in Cluster 2, 22 individuals in Cluster 3, 38 individuals in Cluster 4, 12 individuals in Cluster 5, 27 in Cluster 6 and 29 in Cluster 7. A clustered-based typology of manufacturing companies is presented below, which offers an overall characterization based on the adopted criteria. The results of the clusters' statistical description for our eight active variables are displayed in Table 2. This table shows the values of the t-test adjusted by adopting as a hypothesis the simultaneous random extraction of the respondents in a cluster; that is, equality between the judgement expressed on the single item by the specific cluster and that expressed on average by the entire interviewed sample. It should
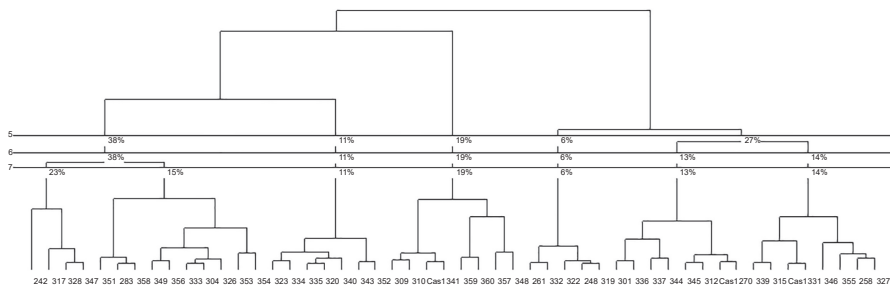
Source(s): Figure by authors

Figure 1.
Dendogram of
hierarchical cluster
analysis using ward
linkage

Variable	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Analysis of customers	1,066	−1,033	3,319	3,067	−4,750	0.532	−3,921
Analysis of competitors	−3,014	−6,099	4,121	3,397	2,889	2,807	−2,295
Communication policy	−1,817	5,475	1,153	4,071	−3,390	−4,207	−2,558
Distribution policy	2,445	2,147	−3,956	5,435	−3,102	−2,376	−3,278
Customer segmentation	0.454	−4,381	0.638	4,895	−1,873	4,124	−4,870
Brand positioning	−4,828	−0.832	0.992	3,411	−6,437	2,151	4,231
Price policy	5,526	−0.660	−0.982	−5,636	−2,066	4,413	−1,731
Product policy	2,965	2,255	7,147	−2,929	−1,085	−2,566	−5,724
Source(s): Table by authors							

Table 2.
A synthesis of cluster
analysis results

be remembered that for test values greater than about 2, the probability that a difference has been observed between the cluster and the sample tends to zero; therefore, that item can be said to significantly characterize (positively or negatively) the analysed cluster (Lebart *et al.*, 1984).

The seven clusters created with the eight active variables are described in detail in Appendix 1.

The following table (Table 3) summarizes the categorical descriptive variables of each cluster according to a probabilistic ranking criterion.

The average perception of the level of innovation and of the impact of digitalization on the creation of value (using a 7-point Likert scale) for each cluster are described in Appendix 2.

Variable label	Characteristic categories	Test-value	Histogram
Group: CLUSTER 1/7 (Count: 47 - Percentage: 23)			
% of investment on digital comm	0%	2.39	******************************
Revenue	1.000.000–4.999.99	2.34	******************************
Sector (in short)	Leather articles	1.79	************************
Sector (in short)	Wood	1.52	********************
Group: CLUSTER 2/7 (Count: 30 - Percentage: 15)			
% of investment on digital comm	up to 50%	2.13	***************************
Sector (in short)	Food	1.79	************************
Sector (in short)	Plastic	1.65	**********************
Revenue	0–999.999	1.39	******************
Group: CLUSTER 3/7 (Count: 22 - Percentage: 11)			
Revenue class 2	5.000.000–9.999.99	1.49	*******************
Company type	B2B	1.35	*****************
Group: CLUSTER 4/7 (Count: 38 - Percentage: 18)			
% investment in digital comm	up to 20%	2.05	***************************
Sector (in short)	Computer	1.83	************************
Sector (in short)	Print	1.69	***********************
% of investment in digital comm	up to 30%	1.62	**********************
Group: CLUSTER 5/7 (Count: 12 - Percentage: 6)			
Company type	B2B	2.79	**************************************
% of investment in digital comm	0%	2.29	*******************************
Sector (in short)	Clothes	1.96	**************************
Sector (in short)	Textile	1.59	*********************
Group: CLUSTER 6/7 (Count: 27 - Percentage: 13)			
Sector (in short)	Metallic products	2.68	*************************************
Employees	more than 51	1.31	*****************
Group: CLUSTER 7/7 (Count: 29 - Percentage: 14)			
Company type	B2C	1.82	************************
% of investment on digital comm	up to 5%	1.35	*****************

Source(s): Table by authors

Table 3.
A synthesis of cluster analysis results (categorical illustrative variables)

5.2 Cluster 1 – Digital price and product leaders

The first cluster represents 23% of the whole sample ($n = 47$). This cluster was named "Digital price and product leaders" as the impact of the Internet and digital technologies on the companies' price (0.108) and product (0.122) policies is significantly above average, followed by the distribution policy (−0.170). The impact of digitalization on brand positioning (−0.110), analysis of competitor (−0.043) and communication (−0.172) is significantly below average. With respect to the sample, companies that do not invest in digital communication, belong to the leather and wood sectors, and with revenues between 1 and 5 million euros prevail. The respondents declare a level of innovation (4.128) below average (4.298), and the impact of digitalization on customer value today and in three years (3.809 and 4.404) is significantly below average (4.260 and 5.327).

5.3 Cluster 2 – Small digital communicators

The second cluster is smaller and represents 15% of the entire sample ($n = 30$). The impact of digital technologies is significantly above average on the communication policy (0.715), followed by product (0.122) and distribution policies (−0.136). However, digitalization has a significantly below-average impact on analysing competitors (−0.496) and identifying new market segments (−0.588), according to the perception of the respondent. Digital technologies are not important to carry out strategic marketing activities. How are the companies in this cluster characterized? As expected, companies that spend up to 50% of their overall communications budget on digital communication prevail. Further, companies that belong to the food and plastics sectors and with a turnover of under one million euros are prevalent. They are small businesses that presumably do not use digital technology for analytical and strategic marketing but mostly for communication and activities related to the product policy (e.g. ideas or feedback from customers) and distribution (e.g. e-commerce). The level of innovation (3.733) is significantly below average while the impact of digitalization on customer value today (4.867) is above average and in three years in line with average.

5.4 Cluster 3 – Digital product and analysis leaders

Cluster 3 accounts for 11% of the entire sample ($n = 22$). For these enterprises, digital technologies impact significantly above average for product policy (0.888) and carrying out the analysis of competitors (0.813) and customers (0.417). Digital impact on distribution policy (−0.949) is significantly below average. There is a higher presence with respect to the sample of BtoB companies with turnovers from 5 to 10 million euros. They perceive themselves as slightly more innovative than the average (4.545) and believe that digitalization today impacts customer value slightly below the average (4.591) but that it will do so a little above the average in the future (5.591).

5.5 Cluster 4 – Digital informative and strategic distributors

The fourth cluster represents 18% of the whole sample ($n = 38$). In these companies, the highest and most significant impact of digitalization is on distribution policy (0.169), but digitalization has had a significantly higher-than-average impact on all the information and strategic marketing activities; for this reason, we have called this cluster "Digital informative and strategic distributors". Digital technologies impact significantly above average on the identification of market segmentation (0.495), the positioning of the brand or consumers' perception of the brand (0.864), the analysis of competitors (0.579). The impact on communication (0.464) is also much above average and significant. The impact is on price (−0.937) and product (0.463) policies is significantly below average. There is a

prevalence of companies producing computer, electronic and optical products, or printing and reproducing recorded media and of companies that invest up to 30% of their communications budget in digitalization. They feel a little more innovative (4.605) and consider the impact on customer value both today (5.711) and in three years (6.237) to be far above average.

5.6 Cluster 5 – Digital competitor analysts

Cluster 5 is the smallest and accounts for 6% of the sample ($n = 12$). It is made up of companies with a significant impact of digital above-average only for the analysis of competitors (0.798) and all the remaining items are significantly below average. In particular, the impact is significantly below-average for brand positioning (−0.952) and analysis of customers (−1.000), followed by communication policy (−7.22) and distribution policy (−1.000). For this reason, we have used the label "Digital competitor analysts". With respect to the sample, the following companies' characteristics prevail: BtoB and mixed BtoB/BtoC enterprises, textiles and clothing packaging sectors and absence of investment in digital communication. They are companies that also produce intermediate products and that have not been impacted by digitalization, as they continue to work in a traditional way. They mostly use the Internet to study competitors. They are not considered to be particularly innovative, given that this value is below average (3.750), as are the values that respondents assign to the impacts of digital technologies on the current creation of value for customer (3.667) and that occurring in three years (5.000). They are above average for the BtoB sector and the textiles and clothing sector.

5.7 Cluster 6 – Medium digital experts in price and customer segmentation

This cluster represents 13% of the sample ($n = 27$). In these companies, digitalization impacts significantly above average on price (0.166) and on nearly all the informative and strategic activities, especially on customer segmentation (0.512), followed by the analysis of competitors (0.583) and brand positioning (0.603). Digital technologies significantly impact below average, in the respondents' opinions, on communication (−0.572), product (−0.485) and distribution (−0.689) policies. There is a prevalence of medium-sized companies and of companies that operate in the metal products sector. They are perceived to be more innovative than average (4.556). For the respondents, the impact on customer value is well above average today (5.074) and in three years (6.111).

5.8 Cluster 7 – Digital brand positioning leaders

Finally, Cluster 7 represents 14% of the sample ($n = 29$). In this cluster, according to the respondents, the consumer's perception of the brand (0.846) is significantly well above average, while the rest of the items are all below average. The impact is significantly below average especially for product (−0.865), customer segmentation (−0.661) followed by the analysis of customers (−0.535), distribution policies (−0.786) and communication (−0.333) policies. With respect to the sample, there is a strong presence of BtoC companies in this cluster, which make small investments in digital communication (up to 5%). These are traditional enterprises that probably believe they can make themselves visible to customers thanks to the Internet, thus obtaining a more precise positioning in the consumer's mind. However, this does not happen through investment in digital communication, such as sponsored campaigns on social networks, email marketing or other digital tools. These companies perceive themselves to be more innovative (4.552) than the average, and they feel that digitalization impacts customer value to a much lower extent than the average, both at present (4.241) and in three years (4.931).

As a final cluster description analysis, an analysis of variance (regression with zero-sum parameters) was performed to validate the hypothesis that respondents' opinions about the importance of digital tools in creating value for the customer may depend on which of the seven clusters belongs to the company overall.

The regression has a goodness-of-fit index of 21%, and the F-test of simultaneous nullity of the parameters has a p-value of less than 0.0001 (Table 4). The estimation method used the zero-sum parameter approach. This is very simple to interpret since each parameter is the positive or negative difference with respect to the baseline, which is the average judgement detected in the entire sample on a scale of 1–7 compared to the increase in value for the customer.

Table 4. Results of the regression: the influence of digitalization on customer value.

6. Discussion and implications

This study had three aims. First, we wanted to classify manufacturing companies based on the impact of digitalization on key marketing activities. Second, we sought to understand if there were significant differences regarding the relationship between the impact of digitalization on marketing activities and company characteristics (firm size, sector, etc.). The third aim was to analyse whether the digitalization of marketing activities influenced customer value from the entrepreneurial perspective. The first step of our work was to conduct a hierarchical cluster analysis based on eight active variables relating to key marketing activities: customer analysis, competitor analysis, customer segmentation, brand positioning, product policy, price policy, communication policy and distribution policy. Six descriptive variables were used to describe the seven clusters: four variables relating to company characteristics (type, size, sector and revenues) and two relating to the level of innovation and investment in digital communication (percentage of the communications budget). From this analysis, we derived seven groups of manufacturing companies. In the second step, we performed regression studies to test the relationships.

This study, therefore, offers an initial empirical contribution to research on the impact of digitalization on key marketing activities, which is a recent topic in the marketing literature (e.g. Bala and Verma, 2018; Rosário and Dias, 2022; Ardito *et al.*, 2019). Empirical work in this area is still rare (e.g. Bettiol *et al.*, 2017; Caliskan *et al.*, 2021). Furthermore, this study adopts an interesting perspective that has been seldom investigated in the literature: the relationship between marketing activities, digitalization and customer value from the entrepreneur's point of view.

Seven different clusters of manufacturing companies were identified, which reveal a heterogeneous impact of digitalization on key marketing activities. Still, three macro groups

Parameter label	Coefficient	Standard deviation	p-value	Test-value
Cluster 4	1.1450	0.259	0.000	4.31
Cluster 6	0.5085	0.297	0.088	1.71
Cluster 2	0.3011	0.284	0.291	1.06
Cluster 3	0.0254	0.323	0.938	0.08
Cluster 7	−0.3242	0.288	0.262	−1.12
Cluster 5	−0.8989	0.423	0.035	−2.11
Cluster 1	−0.7570	0.239	0.002	−3.12
Constant	4.5655	0.125	0.000	20.09
Source(s): Table by authors				

Table 4.
Results of regression:
the influence of
digitalization on
customer value

of clusters can be identified. The first one is formed by Clusters 3 and 4. This group is characterized by a higher-than-average impact of digitalization on marketing activity; digitalization positively impacts six out of eight marketing activities, especially informative and strategic activities.

In this group, companies with high revenues (5–10 million euros), computer and print sectors, BtoB company type and a higher-than-average investment in digital communication prevail. Furthermore, most of these companies perceive a higher-than-average level of innovation. The best-performing group shows differences. For example, in Cluster 3, entrepreneurs state that digitalization has a higher impact on product policy and the analysis of competitors and customers. It is very likely that these companies, which show a higher presence of BtoB ones, cooperate through websites and social networks toward product co-creation. In these companies, distribution remained traditional. Instead, in Cluster 4, the strongest impact is on distribution and on all the informative and strategic activities, as well as communication. Product policy remained traditional. Furthermore, these companies exhibit the highest degree of confidence regarding the influence of digitalization on customer value.

These results show that as their level of perceived innovation and size grows, companies increase the use of digital technologies in downstream operational policies (distribution and communication) and in all strategic and informative marketing activities, which is necessary to improve brand positioning (Bahcecik *et al.*, 2019) and competitiveness.

The second macro group is made up of Clusters 5 and 7. This group is characterized by a lower-than-average impact of digitalization on marketing activity, in the perception of respondents; digitalization has a positive impact only on one out of eight marketing activities. The investment in digital communication and the impact of digitalization on customer value is among the lowest of the sample. However, clusters show differences. Entrepreneurs of Cluster 5 believe that the effect of digitalization is mostly felt in competitor analysis. In this cluster clothes and textile sectors and a low level of innovation prevail. Most probably these companies use the website and social media to analyse competitors with a low investment and are not interested at all to improve customer knowledge or brand positioning. The companies of the small Cluster 7 have the lowest level of digitalization for all marketing activities except brand positioning. However, compared to the other cluster, these companies, in prevalence BtoC, are perceived as more innovative. Probably, these businesses think that a very small investment in digital marketing (e.g. a website) is sufficient to make them more visible to customers; furthermore, they do not invest at all on digitalization of product policy.

Most probably for companies of Clusters 5 and 7 the digital transformation process of marketing activities is considered not urgent, or difficult to implement for different reasons such as lack of economic and human resources, absence of digital marketing culture, poor confidence in returns on investment, etc. Most probably they have a reactive rather than a proactive management approach.

Finally, the third macro group is made of Clusters 1, 2 and 6. It is characterized by an intermediate impact of digitalization on marketing, with respect to the other groups, as digitalization positively impacts between three to five out of eight marketing activities. In Cluster 1 and 2, the strongest impact is on operational activities and in Cluster 6 on price and informative and strategic activities.

The impact of digitalization on customer value in cluster 1 and 6 is among the lowest of the sample.

Companies of this group exhibit heterogenous revenues, sectors, level of innovation and investment in digital communication. However, these companies are characterized by scarce resources and insufficient managerial skills, or little awareness of the benefits of digitalization as they chiefly focus on operational marketing or mainly on strategic marketing (Vassileva, 2017) by adopting an incomplete approach to digitalization.

Hence, the identification of seven clusters captures the heterogeneity of the digitalization of marketing in the companies analysed.

The results show that digitalization has different impacts on marketing activities in the seven clusters.

This result shows that the most digitalized group of companies (Cluster 3 and 4), made of more than one-third of the sample, with a prevalence of companies with higher revenues, of dynamic sectors such as computer and printer, and investing more in digital communication, pay attention to digitalization of all kinds of marketing activity. These firms probably have a stronger marketing and digital culture and more resources and skills, together with a more structured marketing function. Conversely, the least digitalized group of companies (Cluster 5 and 7), less than one-third of the sample and characterized by the prevalence of companies that invest less in digital communication, belong to more traditional sectors such as textile and clothes, are less inclined to invest in digitalization and most probably have a weaker marketing culture and fewer digital skills. The heterogenous companies of the remaining clusters (half of the sample) show an intermediate level of digitalization. These companies could have reached a higher level of awareness of the importance of investing in such technologies with respect to companies of Cluster 7 and 7, and started a process of digitalization after the most digitalized ones (Clusters 3 and 4).

This confirms that digitalization of SMEs companies is still scarce and incomplete, and to fully benefit from digitalization, as many activities as possible in all three kinds of marketing activity – informative, strategic and operational – should be digitalized (e.g. Chaffey and Ellis-Chadwick, 2019; AMA).

Furthermore, the study shows that according to the first group of clusters (companies characterized by a higher impact of digitalization on marketing), digitalization positively influences customer value to a higher-than-average degree. The second group (lower impact of digitalization on marketing) perceives a lower-than-average positive influence.

This confirms the opinion of most scholars who stress the positive relationship between digitalization, marketing and performance (e.g. Surarandarjan et al., 2022; Rosário and Dias, 2022; Bettiol et al., 2017; Bahcecick et al., 2019; Chen and Lin, 2019) and therefore the positive influence on value for both customers and companies (i.e. competitiveness).

With respect to theoretical contributions, the present study enriches the literature in two ways. First, it contributes to the literature by conceptualizing Marketing 4.0, as it provides a holistic framework to understand the transformations of key marketing activities in the digital era rather than focussing only on one or a few such activities. This holistic framework covers the key activities related to informative, strategic and operational marketing. Second, the study offers empirical evidence on the impact of digitalization on marketing activities in SMEs and how this relates to customer value from the entrepreneur's perspective. This evidence advances the still small body of research on the topic (e.g. Bettiol et al., 2017; Caliskan et al., 2021; Ardito et al., 2019).

With regard to managerial implications, the study suggests that companies should invest in the simultaneous digitalization of all the informative, strategic and operational marketing activities in order to fully benefit from the digital transformation and increase value for their customers and themselves.

The study identified a heterogenous picture; that is, clusters with different levels of marketing digitalization. Therefore, companies that already invest in the digitalization of the informative and strategic areas should develop the operational area. The companies that invest mostly in the digitalization of operational marketing activities should strengthen informative and strategic marketing.

To achieve high levels of digitalization and increase customer experience, engagement and loyalty (Pagani and Pardo, 2017; Bahcecik et al., 2019) as well as company competitiveness, manufacturing enterprises should develop a strong and widespread

Marketing 4.0 culture starting from top management. It is fundamental to take a planned and strategic approach to marketing and to digital marketing (Kotler *et al.*, 2021; Caliskan *et al.*, 2021). Marketing managers should view as fundamental the digitalization of all marketing activities and invest in it. Every marketing activity requires specific digital technologies and skilled personnel (Verhoef *et al.*, 2021; Cham *et al.*, 2022).

As the convergence of marketing processes and digitalization increases the degree of servitization of value propositions, companies could increase the level of customer relationship management services through new digital technologies such as AI (e.g. chatbots). Furthermore, the convergence of marketing and digitalization can be an opportunity for many small businesses to rethink the traditional business model by adopting omnichannel approaches and innovate internationalization processes (Veglio *et al.*, 2020).

Regarding policymaker implications, the study suggests that favourable legislation and public funds could contribute to the digitalization of marketing in SMEs. In particular, economic incentives could help to develop a Marketing 4.0 culture of management aimed at acquiring new digital tools (e.g. websites, social media pages, online advertising, e-commerce) and developing marketing staff's skills connected to the use of these tools. Government intervention plays a key role in providing territories with digital infrastructures capable of supporting the digitalization of businesses, institutions and citizens, thus increasing value for all the stakeholders of the digital ecosystem. For nations, the new sources of competitive advantage depend on their territories' endowment of digital resources and the capacity of industry to develop successful digital marketing strategies.

Finally, in the new digital era, the role played by universities and the education and training system is fundamental in providing the young with the digital skills necessary to master new complexities, as well as updating the technological skills of non-digital native workers in line with the perspective of long-life learning.

7. Conclusions
The main finding of this study is that a high impact of digitalization on marketing activities, especially on a large number of informative (customer analysis, competitor analysis) and strategic activities (segmentation and brand positioning), positively influences customer value. This means that the adoption of a complete and mature marketing approach involving all the activities, both strategic and operational ones (e.g. Kotler, 2004; Kotler and Keller, 2016; Lamb *et al.*, 2007; Mullins and Walker, 2005), and its transformation through the adoption of digital technologies (e.g. Bettiol *et al.*, 2017; Rosário and Dias, 2022; Vassileva, 2017) significantly impacts customer value.

The major theoretical contribution of this study is the empirical investigation of marketing activity digitalization in manufacturing companies, which is still rarely conducted, and of the relationship between digitalization, marketing activities, company characteristics and customer value, which has not yet been examined in the literature. By adopting an entrepreneurial perspective, this investigation reveals many differences between highly and poorly digitalized companies.

Highly digitalized enterprises tend to be more innovative and larger and invest more in communication and digital marketing. Poorly digitalized ones are in prevalence less innovative and smaller and invest less in digital technologies. Furthermore, the investigation has highlighted that when trying to understand the impact of digitalization on marketing, a series of differentiating variables must be taken into account, such as size, sector and type of market (B2B or B2C). These variables allow better segmentation of the vast and complex world of SMEs, which invites us to reject homogenizing approaches and conduct more accurate research to understand the phenomenon.

This study is exploratory in nature and has some limitations. The small size of the sample and the geographic origin of the companies do not allow our results to be generalized. Future research on the topic is thus recommended.

However, there are currently no studies that empirically investigate the relationships we have looked at. Our work, therefore, can be considered a starting point that uses a wide angle of analysis.

Future research could expand the conceptual framework by including, for example, the control of marketing performance. Furthermore, the answers of the entrepreneurs are highly subjective. The definitions used in the questionnaire can be understood differently based on the entrepreneurs' specific marketing culture and digital culture.

Future research could analyse the digitalization of marketing by using objective company data (number of digital technologies adopted, level of investment in digital marketing, etc.).

Finally, it is important to understand through in-depth qualitative research (especially case studies) corporate goals and missions, process of marketing digitalization, the primary digital technologies adopted in the different activities, the level of digital skills among staff, the main incentives and the obstacles that impede the transformation of marketing in the digital age.

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Appendix

Characteristic variables	Cluster mean	Overall mean	Cluster Std. deviation	Overall Std. deviation	Test-value	Probability
Cluster 1/7 (Weight = 47.00 Count = 47)						
Price policy	0.108	−0.374	0.354	0.681	5.53	0.000
Product policy	0.122	−0.153	0.290	0.721	2.96	0.002
Distribution policy	−0.170	−0.390	0.361	0.700	2.45	0.007
Analysis of customers	0.040	−0.057	0.323	0.707	1.07	0.143
Customer segmentation	0.005	−0.038	0.359	0.742	0.45	0.325
Communication policy	−0.172	0.007	0.363	0.766	−1.82	0.035
Analysis of competitors	−0.043	0.229	0.335	0.702	−3.01	0.001
Brand positioning	−0.110	0.329	0.319	0.709	−4.83	0.000
Cluster 2/7 (Weight = 30.00 Count = 30)						
Communication policy	0.715	0.007	0.469	0.766	5.47	0.000
Product policy	0.122	−0.153	0.712	0.721	2.25	0.012
Distribution policy	−0.136	−0.390	0.854	0.700	2.15	0.016
Price policy	−0.450	−0.374	0.656	0.681	−0.66	0.255
Brand positioning	0.229	0.329	0.741	0.709	−0.83	0.203
Analysis of customers	−0.181	−0.057	0.743	0.707	−1.03	0.151
Customer segmentation	−0.588	−0.038	0.596	0.742	−4.38	0.000
Analysis of competitors	−0.496	0.229	0.509	0.702	−6.10	0.000
Cluster 3/7 (Weight = 22.00 Count = 22)						
Product policy	0.888	−0.153	0.271	0.721	7.15	0.000
Analysis of competitors	0.813	0.229	0.371	0.702	4.12	0.000
Analysis of customers	0.417	−0.057	0.676	0.707	3.32	0.000
Communication policy	0.185	0.007	0.763	0.766	1.15	0.125
Brand positioning	0.471	0.329	0.639	0.709	0.99	0.161
Customer segmentation	0.058	−0.038	0.803	0.742	0.64	0.262
Price policy	−0.509	−0.374	0.679	0.681	−0.98	0.163
Distribution policy	−0.949	−0.390	0.231	0.700	−3.96	0.000
Cluster 4/7 (Weight = 38.00 Count = 38)						
Distribution policy	0.169	−0.390	0.736	0.700	5.43	0.000
Customer segmentation	0.495	−0.038	0.566	0.742	4.90	0.000
Communication policy	0.464	0.007	0.744	0.766	4.07	0.000
Brand positioning	0.684	0.329	0.624	0.709	3.41	0.000
Analysis of competitors	0.579	0.229	0.540	0.702	3.40	0.000

Table A1.
Characterization by continuous variables of clusters of cut "a" of the tree e into 7 clusters

(continued)

Characteristic variables	Cluster mean	Overall mean	Cluster Std. deviation	Overall Std. deviation	Test-value	Probability
Analysis of customers	0.261	−0.057	0.722	0.707	3.07	0.001
Product policy	−0.463	−0.153	0.588	0.721	−2.93	0.002
Price policy	−0.937	−0.374	0.166	0.681	−5.64	0.000
Cluster 5/7 (Weight = 12.00 Count = 12)						
Analysis of competitors	0.798	0.229	0.554	0.702	2.89	0.002
Product policy	−0.373	−0.153	0.895	0.721	−1.09	0.139
Customer segmentation	−0.428	−0.038	0.826	0.742	−1.87	0.031
Price policy	−0.769	−0.374	0.516	0.681	−2.07	0.019
Distribution policy	−1,000	−0.390	0.000	0.700	−3.10	0.001
Communication policy	−0.722	0.007	0.636	0.766	−3.39	0.000
Analysis of customers	−1,000	−0.057	0.000	0.707	−4.75	0.000
Brand positioning	−0.952	0.329	0.158	0.709	−6.44	0.000
Cluster 6/7 (Weight = 27.00 Count = 27)						
Price policy	0.166	−0.374	0.656	0.681	4.41	0.000
Customer segmentation	0.512	−0.038	0.545	0.742	4.12	0.000
Analysis of competitors	0.583	0.229	0.562	0.702	2.81	0.003
Brand positioning	0.603	0.329	0.569	0.709	2.15	0.016
Analysis customers	0.010	−0.057	0.658	0.707	0.53	0.298
Distribution policy	−0.689	−0.390	0.576	0.700	−2.38	0.009
Product policy	−0.485	−0.153	0.490	0.721	−2.57	0.005
Communication policy	−0.572	0.007	0.513	0.766	−4.21	0.000
Cluster 7/7 (Weight = 29.00 Count = 29)						
Brand positioning	0.846	0.329	0.410	0.709	4.23	0.000
Price policy	−0.578	−0.374	0.734	0.681	−1.73	0.042
Analysis of competitors	−0.049	0.229	0.847	0.702	−2.30	0.011
Communication policy	−0.331	0.007	0.779	0.766	−2.56	0.005
Distribution policy	−0.786	−0.390	0.505	0.700	−3.28	0.001
Analysis of customers	−0.535	−0.057	0.653	0.707	−3.92	0.000
Customer segmentation	−0.661	−0.038	0.646	0.742	−4.87	0.000
Product policy	−0.865	−0.153	0.419	0.721	−5.72	0.000

Source(s): Table by authors

Table A1.

Characteristic variables	Category mean	Overall mean	Category Std. deviation	Overall Std. deviation	Test-value	Probability
Cluster 1						
Level of innovation	4.128	4.298	1.298	1.316	−1.01	0.157
Customer value (today)	3.809	4.620	2.059	1.767	−3.57	0.000
Latent variable	−0.512	0.000	1.173	1.000	−3.99	0.000
Customer value (in three years)	4.404	5.327	2.049	1.738	−4.14	0.000
Cluster 2						
Customer value (today)	4.867	4.620	1.648	1.767	0.83	0.204
Latent variable	0.048	0.000	0.979	1.000	0.29	0.388
Customer value (in three years)	5.233	5.327	1.726	1.738	−0.32	0.375
Level of innovation	3.733	4.298	1.289	1.316	−2.54	0.006
Cluster 3						
Level of innovation	4.545	4.298	1.305	1.316	0.93	0.175
Customer value (in three years)	5.591	5.327	1.302	1.738	0.75	0.226
Latent variable	0.067	0.000	0.700	1.000	0.33	0.370
Customer value (today)	4.591	4.620	1.193	1.767	−0.08	0.468
Cluster 4						
Customer value (today)	5.711	4.620	1.355	1.767	4.21	0.000
Latent variable	0.594	0.000	0.732	1.000	4.05	0.000
Customer value (in three years)	6.237	5.327	1.223	1.738	3.57	0.000
Level of innovation	4.605	4.298	1.368	1.316	1.59	0.056
Cluster 5						
Customer value (in three years)	5.000	5.327	1.581	1.738	−0.67	0.251
Latent variable	−0.384	0.000	0.916	1.000	−1.37	0.086
Level of innovation	3.750	4.298	1.233	1.316	−1.48	0.069
Customer value (today)	3.667	4.620	1.700	1.767	−1.92	0.027
Cluster 6						
Customer value (in three years)	6.111	5.327	0.916	1.738	2.51	0.006
Latent variable	0.364	0.000	0.649	1.000	2.02	0.021
Customer value (today)	5.074	4.620	1.359	1.767	1.43	0.076
Level of innovation	4.556	4.298	1.227	1.316	1.09	0.138
Cluster 7						
Level of innovation	4.552	4.298	1.101	1.316	1.12	0.131
Customer value (today)	4.241	4.620	1.611	1.767	−1.24	0.107
Customer value (in three years)	4.931	5.327	1.760	1.738	−1.32	0.093
Latent variable	−0.229	0.000	0.951	1.000	−1.33	0.092

Source(s): Table by authors

Table A2.
Characterization by continuous variables of categories of level of innovation and customer value