

Article

Research Challenges in Digital Marketing: Sustainability

Francisco Diez-Martin *, Alicia Blanco-Gonzalez and Camilo Prado-Roman

Department of Business Economics, Rey Juan Carlos University, Paseo de los Artilleros S/N, 28032 Madrid, Spain; alicia.blanco@urjc.es (A.B.-G.); camilo.prado.roman@urjc.es (C.P.-R.)

* Correspondence: francisco.diez@urjc.es

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Abstract: Great progress has been made in the field of marketing and sustainability. Nevertheless, there is still an important gap between the behavior and beliefs of society and markets about sustainability, and companies' capability to understand and face this trend. Digital marketing is key to filling this gap. However, research in digital marketing and sustainability is very scarce. The purpose of this research is to examine the literature in the subject, since 2009 until 2018, and to elaborate a research agenda about digital marketing and sustainability. Through a previous analysis based on bibliometrics, a research agenda has been developed that shows the main challenges for the digital marketing and sustainability field: (1) customer orientation and value proposition; (2) digital consumer's behavior; (3) digital green marketing; (4) competitive advantage; (5) supply chain; and (6) capabilities. This work contributes to the development of the research in digital marketing and sustainability, suggesting various challenges for the field that lead to future lines of research, and favoring the development of a new research approach capable of reducing the existing gap between society and business on sustainability issues.

Keywords: sustainability; digital marketing; agenda; research; trends; bibliometrics; citespace; sustainability gap; intellectual structure; marketing

1. Introduction

Internet is one of the main drivers of the increasing gap between markets and companies [1] and one of the biggest challenges for marketing [2]. Digital marketing has transformed the way companies manage and communicate with their customers and society worldwide. It is becoming a key and necessary instrument to face the challenges that still exist in the field of marketing.

At the same time, sustainability has transformed into one of the biggest challenges for companies since the beginning of 21st century, particularly for marketers [3]. The discussion between marketing and sustainability has been widely treated by researchers [4,5], resulting in the fact that both concepts have mutual things to offer each other. Sustainability favors the obtaining of improvements in the supply chain, the differentiation of products, access to aware investors, or a bigger commitment of the employees [4]. In turn, marketing allows greater behavioral comprehension of the clients and a tool to influence society's attitudes and beliefs [4].

Great progress has been made in the field of marketing and sustainability. This progress was sustained in more than 2000 publications, between 1990 and 2018, with more than 30,500 citations altogether from the Web of Science Core Collection. Specifically, those papers were included on the Social Science Citation Index (SSCI) and the Emerging Sources Citation Index (ESCI). Several issues have been examined: socially-concerned consumers [6,7], environmental advertising [8], ecological and societal marketing [9,10], socially responsible marketing [11,12], green marketing advertising and strategy [13,14], sustainable marketing and development [14], green supply chain management [15].

Nevertheless, there is still an important gap between the behavior and beliefs of society and markets about sustainability, and the companies capability to understand and face this trend. Digital marketing can turn into a key tool to help to mitigate this gap [1]. For example, it has been demonstrated that the union of digital marketing and sustainability reduces risk, uncertainty and distrust in online shopping [16]. However, research in digital marketing and sustainability is very scarce.

The purpose of this research is to examine literature in the subject since 2009 until 2018, and to elaborate a research agenda about digital marketing and sustainability. This work contributes to the development of research in digital marketing and sustainability, suggesting various challenges for the field that lead to future lines of research, and favoring the development of a new research approach capable of reducing the existing gap between society and business on sustainability issues.

In order to tackle the challenges that offers the sustainability field from a marketing digital position, this research relies on bibliometrics. Bibliometric techniques are particularly recommendable for this kind of purposes. Bibliometrics allow to recognize and display the intellectual and dynamic structure of a field of knowledge [17]. Furthermore, they introduce quantitative rigor to the obtained results and also reduce the subjectivity of the researcher [18].

The work is organized as follows. In the next section the methodology is shown. The use of co-citations is justified, and the origin of the data is also specified. The bigger section is the results. Questions about the intellectual structure and the trends on the marketing and sustainability research field are answered. The analysis of these results provides a research framework which is inferred into a research agenda for digital marketing and sustainability. This agenda is shown in the discussion. Finally, the study's limitations are pointed out.

2. Methodology

Research in digital marketing and sustainability is very scarce (less than 30 research works on the web of science). This shortage in research has conditioned the methodology used for the creation of a digital marketing and sustainability research agenda. The development of this agenda has been established in two stages. In the first stage, the goal consisted on showing the state of the art of the marketing and sustainability research. For that purpose, a bibliometric method based in co-citations has been used. In a second stage, these results are moved to the field of digital marketing and sustainability, creating an agenda in which the challenges faces by this field of research have been identified. The experience and the know-how of the researchers are used for that purpose.

Bibliometrics serves to know the current research and the new trends in a research field. The scientifically validated bibliometric method most used is co-citations analysis [19]. Co-citations analysis is able to identify the intellectual structure of a research field and answering matters about the field such as: which are the main research areas, the most active ones, the emerging trends; or the dissemination paths of the knowledge of the domain. This methodology shows two big advantages against others: (1) capability to analyse large amounts of work, (2) and avoiding general problems of subjectivity bias derived from the idiosyncrasies of the reviewers [20].

A co-citation is defined as the frequency at which two works are cited together [21]. Thus, two works are co-cited if they are included in the same document. The frequency at which this situation takes place will show the coupling force of the documents. When two works are cited together, they will probably have some related content, and the influence of the co-cited work in its research field will be bigger. This allows to know a field's school of thought, as well as its interrelations [22].

Some of the most popular softwares to execute this kind of methodologies are: SciMAT, CiteSpace, VOSviewer, CitNetExplorer. These tools have their own advantages and disadvantages see [23]. CiteSpace has been used for this work. It is a detection and scientific visualization software based on Java that allows analysis of the critical changes produced in a research field [24,25]. Through this software, the co-citation networks which reveal the structure of a research field can be known [25].

Data

The construction of the data base was made through the selection of scientific journals papers from the Web of Science Core Collection; specifically, those papers included on the Social Science Citation Index (SSCI) and the Emerging Sources Citation Index (ESCI). These databases were used because they include the areas of marketing and sustainability, as well as the main journals on these topics (e.g., *Journal of Marketing*, *Sustainability*). In addition, SSCI is the most relevant database in bibliometric studies due to its greater coverage, compared to other databases (Scopus or Google Scholar), as well as those most used by researchers in this area [19]. Papers containing the terms “sustainab*” and “marketing” in the title, on the abstract, or on the keywords, were selected. Thus, 2136 publications were obtained. Most of these publications belonged to the areas of Business, Management, and Environmental Studies.

The analysis was developed from 2009 until 2018 (both included) because of different reasons: (i) this period concentrates 88.81% of all the field publications; (ii) because 2009 is the first year when more than 50 papers relating marketing and sustainability were published; and (iii) in order to obtain an integral vision of the evolution and the trends experienced during the last decade by the research field.

The number of papers published in this subject during the 2009–2018 period was 1897, with 89,118 valid references which formed the data sample for the analysis. For the data analysis the following parameters were used in CiteSpace: (1) timeslice from 2009 to 2018 (slice length = 1 year); (2) term source = each bibliographic record contains four textual fields. These fields provide unstructured text that can be processed and analyzed as part of a visual analytic process. The title/abstract/author keywords/keywords plus has been used for the analysis; (3) node type = Indicates the type of network selected for the analysis. In this case cited reference is used, the networks are made of co-cited references; (4) pruning = none; (5) selection criteria = the way to sample records to form the final networks, g-index ($k = 5$) is used.

3. Results

In recent decades, the research flow relating to marketing fields and sustainability has experienced a remarkable increase from 7 publications in 1998, to more than 300 publications since 2017. In this growth process, the increase produced during 2009 and 2015 are particularly important, where the number of publications increases a 57.14% and 104.89%, respectively. All of this shows the transformation of the field in a research stream that is interesting for researchers. Below are the results showing the intellectual structure and trends in marketing and sustainability (2009–2018), from which it is inferred a research agenda in digital marketing and sustainability.

3.1. Main Research Areas in Marketing and Sustainability

The main research areas in marketing and sustainability during the 2009–2018 period are shown on Table 1. It shows 9 big research areas sufficiently different between them (Modularity $Q = 0.7024$). The number of nodes of these 9 clusters accounts for 81.87% of the total (160 nodes and 257 links). In turn, clusters show high degree of homogeneity between the components forming each cluster (Silhouette values > 0.757) [25].

The higher area of research is cluster #1. It has the higher number of members referenced (27). It reveals that most of the research about marketing and sustainability has focused on studying the sustainability strategies in the form of a customer and other stakeholders value proposition [26–28]. In the search for understanding which are the sustainability drivers and how it can be implemented [9,29], the researchers of this cluster demonstrate that generating a value represents one of the main sustainability drivers [30–32]. They suggest that organizations should develop a customer-centric approach to sustainability to get a higher sustainability level, focusing on the values, rules, habits [33] and customers' individual features [34]. This is motivated by the appearance of a consumer mindset of

caring for self, for community, and for nature [35,36], which has resulted in segments of ethically-oriented consumers [12]. The mean year of the publication of the documents concerning this cluster is 2010.

Table 1. Main research areas in marketing and sustainability.

Cluster	Size	Silhouette	Mean (Year)	Label
#1	27	0.757	2010	Customer value proposition
#2	26	0.771	2011	Green marketing
#3	20	0.852	2009	Sustainable values–action gap
#4	16	0.854	2006	Competitive advantage
#5	13	0.951	2007	Sustainable society
#6	12	0.934	2008	Supply chain
#7	7	0.983	2006	Travel behavior
#8	5	0.947	2007	Pro-environmental beliefs
#9	5	0.975	2008	Marketing capabilities

The second biggest research area (cluster #2) is related to green marketing management. Researchers ask themselves about the way green marketing tools influence the consumer's purchase intention. They particularly analyses the influence of eco-labels on the consumers purchase behavior [8,37] and reveal the moderating effect that consumer confidence exerts [38,39]. The mean year of the publication of documents concerning this cluster is 2011. This cluster represents the emerging front and hotspot in the current marketing and sustainability domain (mean year 2011).

The third biggest research area is about the sustainable values–action gap. [40]. In this cluster, the researchers ask themselves why some costumers buy green products, while other customers who support this do not consume them [14,41]. They develop patterns and suggest factors that influence this gap such as: the dedicated required time to be green [42], the moral maturity, the age, the purchase by inertia, the personal limitations, a negative perception about the green product's image or quality, a complete denial of responsibility, and questioning about the individual impact's that can be achieved [7].

Next cluster focuses on the competitive advantage (cluster #4). In this area, researchers examine the connection between the environmental marketing strategies and the business results [43]. They ask themselves whether the strategies of sustainability are a competitive advantage that influence business results [44]. In this way, they point out the need to develop sustainable business models capable of implementing sustainable innovations [45,46].

On cluster #5, the interest focuses on exploring why consumers, companies and governments have had difficulties tackling environmental matters [47]. Researchers notice that society sometimes does not change until it finds itself in a vulnerable situation [43,48]. Besides, they detect that environmental concern largely depends on several aspects, such as: political regulation, funding support for the farmers, national labelling system, the level of the post-materialist culture and environmental concern [49]. In pursuit of possible solutions to obtain a sustainable society [11] they suggest transformations in green marketing execution [50].

On cluster #6, the sustainable supply chain is investigated. The role of the marketing on the supply chain is explored in order to obtain the sustainability goals [51,52].

On cluster #7, researchers explore sustainable behavior in travel. They particularly ask themselves how do sustainability actions influence on current travel performance. For example, how are perceived the reduction measures in contamination that imply limitations in the use of vehicles, [53] or which is the environmental impact's effect of air transport on customers behavior [54–56]. Studies in this field suggest that the attitudes of the individuals transcend their personal features. This has been useful to provide a way to extract homogeneous groups for the design of transport policies [57,58].

On cluster #8, the connection between consumers' environmental values and product purchasing behavior are investigated. Researchers in this area ask themselves what are the values and lifestyles that explain in a better way the respectful behavior with the environment [59]. They highlight the importance of the ethical and environmental dimension on product choice [60]. They also point out

the correlation between pro-environmental beliefs of the consumers in general and their confidence in the performance of green products [61]

The last interesting big area treats the effect of marketing capabilities for sustainability. The researchers explore the marketing capabilities as a precedent of: corporate environmental commitment [62], sustainability based on innovation [63], and sustainable consumption [64].

3.2. Intellectual Turning Points

The intellectual turning points are research works that connect different research areas and shape the spinal column of a research field. It makes them essential works for the study of a research field. This means that a large number of researchers see these publications as an intellectual resource [65]. When a work obtains a betweenness centrality higher than 0.10, it can be considered an intellectual turning point. During the analysis period, 18 turning points appear in this field (betweenness centrality > 0.10).

The research areas that spread the most knowledge and have the most intellectual turning points in marketing and sustainability research areas are clusters #1 and #4 (Figure 1). The research about sustainability as a value proposition is the most centric one in the field of marketing and sustainability. Apart from gathering the highest number of intellectual turning points, this area is closely connected to an other five research fields (#2, #3, #4, #5 and #6). The connection between sustainability as a value proposition and green marketing is materialized in the works “Mindful consumption: a customer-centric approach to sustainability” [35] (#1) and “Investigation of green marketing tools effect on consumers purchase behavior” [66] (#2). A large proportion of green marketing researchers use these works in conjunction as an intellectual source of their research.

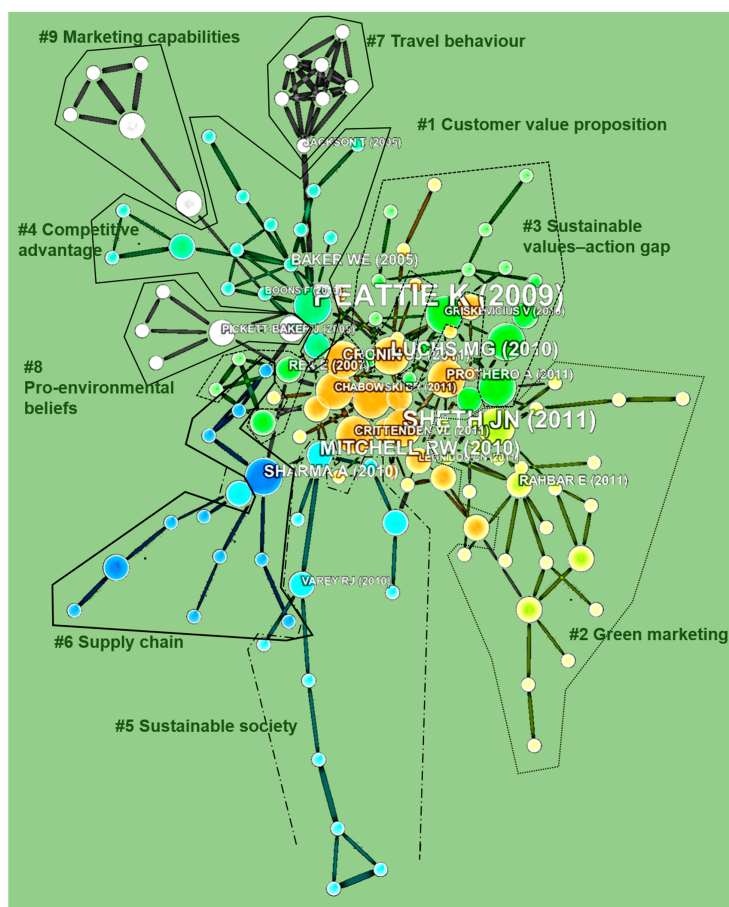


Figure 1. Marketing and sustainability intellectual turning points (2009–2018). (the color of the circle shows the membership cluster).

The connection between sustainability as a value proposition and sustainable values–action gap is inferred from the joint use as intellectual source, by cluster #3 researchers, of the works: “The sustainability liability: potential negative effects of ethicality on product preference” [30] (#1); and “Sustainable consumption: Opportunities for consumer research and public policy” [67] (#1), with the work “Going green to be seen: Status, reputation, and conspicuous conservation” [14] (#3).

Research about sustainability as a value proposition and competitive advantage are mainly connected by the “Green marketing strategies: an examination of stakeholders and the opportunities they present” [26] (#1) with the “Business models for sustainable innovation: state-of-the-art and steps towards a research agenda” [45] (#4) and “Building understanding of the domain of consumer vulnerability” [68] (#4).

Sustainability as value proposition and the difficulties by society in addressing environmental issues connect in the works of Sheth, Sethia, & Srinivas [35] (#1) about the mindful consumption and the work “Sustainable market orientation: a new approach to managing marketing strategy” [47] (#5).

The supply chain research is the last big connecting link to cluster #1. It arises as a consequence of the joint use, as an intellectual source, of the works “Market-oriented sustainability: a conceptual framework and propositions” [9] (#1) and “Sustainability and business-to-business marketing: A framework and implications” [52] (#6).

Research about sustainability strategies as a competitive advantage is the second most centric area in the field of marketing and sustainability. This area is closely connected to the other five research fields (#1, #5, #7, #8 and #9). In addition to the connection that presents sustainability as a value proposition (#1), it is also strongly connected to clusters #5, #7 and #8 by means of the work “Social marketing: A pathway to consumption reduction?” [69] (#4). This work has been widely used as a research source together with: the work of Mitchell, Wooliscroft, and Highman [47] about sustainable market orientation (#5); the report about “Motivating Sustainable Consumption a review of evidence on consumer behavior and behavioral change” [70] (#7); and the work “Pro-environmental products: marketing influence on consumer purchase decision “ [61] (#8).

The effect of the marketing capabilities for sustainability (#9) is mainly connected to research about sustainability strategies as competitive advantage (#4). In this case, one of the strongest connections are produced between the work of Bon and Lüdeke-Freund [45] with “Is Market Orientation a Source of Sustainable Competitive Advantage or Simply the Cost of Competing?” [71] (#9).

Finally, there are also strong connections between the research about the sustainable values-action gap (#3) with the green value chain studies (#6) and the pro-environmental beliefs (#8). It arises between the work “Beyond ecolabels: what green marketing can learn from conventional marketing” [13] (#3) with the work of Sharma et al. [52] about sustainability and business-to-business marketing, and the work of Pickett-Baker and Ozaki [61], about pro-environmental products, respectively.

3.3. Most Active Areas of Research in Marketing and Sustainability

Previously, it has been shown which are the main marketing and sustainability research areas during the 2009–2018 period. It has been also shown the works through which these research areas are connected. At this point, it must be asked which works have gained an extraordinary level of attention from the scientific community during this period? Which research works have been extraordinarily cited?

The burst rate is an indicator that allows to measure the influence of a work in the community during a specific period of time [72]. This indicator shows two features: the intensity and the explosion duration. Table 2 recognizes the top 20 works containing the biggest citation bursts in the area of marketing and sustainability during 2019–2018.

Table 2. Burst papers in the marketing and sustainability field.

Cluster	References	Year	Strength	Begin	End	2009–2018
9	VORHIES DW, 2005, J MARKETING, V69, P80	2005	6,3659	2009	2013	
4	ANJA S, 2005, J MACROMARKETING, V25, P76	2005	3,2098	2009	2011	
-	ALLEN P, 2003, J RURAL STUD, V19, P61	2003	2,7894	2010	2011	
5	VARGO SL, 2004, J MARKETING, V68, P1	2004	8,3622	2010	2012	
3	PEATTIE K, 2009, J BUS RES, V62, P260	2009	5,2628	2011	2014	
3	BAKER WE, 2005, J ACAD MARKET SCI, V33, P461	2005	2,9425	2011	2013	
4	VAREY RJ, 2010, J MACROMARKETING, V30, P112	2010	3,3958	2011	2014	
5	SHARMA A, 2010, IND MARKET MANAG, V39, P330	2010	5,5309	2012	2014	
2	ALBINO V, 2009, BUS STRATEG ENVIRON, V18, P83	2009	2,9119	2012	2013	
2	REX E, 2007, J CLEAN PROD, V15, P567	2007	3,4697	2013	2015	
0	CHABOWSKI BR, 2011, J ACAD MARKET SCI, V39, P55	2011	2,5867	2013	2014	
4	CHAMORRO A, 2009, BUS STRATEG ENVIRON, V18, P223	2009	2,9461	2014	2016	
8	PICKETT-BAKER J, 2008, J CONSUM MARK, V25, P281	2008	5,0524	2014	2016	
0	CONNELLY BL, 2011, J ACAD MARKET SCI, V39, P86	2011	3,6637	2014	2015	
1	HULT GTM, 2011, J ACAD MARKET SCI, V39, P1	2011	4,9300	2015	2016	
0	LEONIDOU CN, 2011, EUR J MARKETING, V45, P68	2011	4,3361	2016	2018	
0	STEG L, 2009, J ENVIRON PSYCHOL, V29, P309	2009	4,7034	2016	2018	
0	PEATTIE K, 2010, ANNU REV ENV RESOUR, V35, P195	2010	3,9697	2016	2018	
9	KUMAR V, 2011, J MARKETING, V75, P16	2011	4,7034	2016	2018	
1	RAHBAR E, 2011, BUSINESS STRATEGY SERIES, V12, P73	2011	3,9697	2016	2018	

Note: track line represent the burst length during the period of study.

The top ranked item by bursts is “Evolving to a New Dominant Logic for Marketing” [73]. In this work, the paradigm shift is promoted towards a marketing focused on the service by implementing skills and abilities resulting in a higher profit for consumers. The second article that emerged during burst detection analysis is “Benchmarking Marketing Capabilities for Sustainable Competitive Advantage” [74]. In this work, benchmarking potential is examined as a learning mechanism to develop marketing capabilities that allow sustainable competitive advantage to be gained. The third most important work by bursts is authored by Sharma et al. [52]. The authors recognize three strategies in which the role of marketing in environmental sustainability is essential to obtain competitive advantages. The forth is the work by Peattie and Peattie [69] about the potential of the social marketing perspective to contribute to consumption reduction. Finally, the fifth strongest work by citation bursts in this area is authored by Pickett-Baker and Ozaki [61]. This paper shows a correlation between consumer confidence in the performance of green products and their pro-environmental beliefs in general. It also shows that it is difficult for consumers to recognize greener products easily.

In terms of the literature source, these papers were published primarily by the *Journal of the Academy of Marketing Science* (4 papers), the *Journal of Marketing* (3 papers), the *Journal of Business Strategy and the Environment* (2 papers), and the *Journal of Macromarketing* (2 papers). Further on, the mean time a burst paper takes to burst since it is published until it starts its highest interest period, is 4.45 years. While the mean time of maximum activity of burst papers in this area is 1.95 years.

3.4. Emerging Trends of the Marketing and Sustainability Domain

Marketing research and sustainability trends follow five main lines. Three of them are related to the value proposition of sustainability (#1) for the clients. Another one is related to the effect of capabilities of marketing (#9); and the last one is related to the use of green marketing (#2). The research fronts of a domain can be detected through analyzing recent literature with high burst rates [22]. In this case, at the end of Table 2 can be seen the research forming the emerging trends in the field of marketing and sustainability. These are researches that have recently (2018) raised great interest among researchers from this field.

The most interesting research line in the field of marketing and sustainability is about the study of the cognitive, motivational and structural factors and processes that threaten sustainability, with the goal of better understanding and promoting the pro-environmental behavior [29]. In this way, Leonidou and Leonidou [5] and Peattie [33] point out the need to better know the process through which the clients appreciate and feel self-satisfied with green products.

Another emerging trend in this field consists in examining the effects of market orientation [71] on sustainability results [75,76].

Finally, research of the effect of green marketing tools (e.g., eco-brand) on consumers' purchase behavior [66] is also a trend.

4. Discussion, Conclusions and Limitations

There is a shortage in digital marketing and sustainability works. However, digital marketing is essential to save the gap between markets and companies [1]. The combination of these factors suggests the need to create a research agenda for this field.

Bibliometrics allows us to improve the comprehension of a research field. In this work it has been identified as the current main research areas in marketing and sustainability, the cornerstones around which the main disclosure paths meet, the works that have extraordinarily attracted the attention of the scientific community and the emerging trends. The analysis of these results has allowed us to create an agenda that shows the main challenges for the field of digital marketing and sustainability.

This research answers "what can digital marketing do for sustainability?", showing the main research challenges in this field. Six big challenges have been found for researchers in digital marketing and sustainability: (1) customer orientation and value proposition; (2) digital consumer behavior; (3) digital green marketing; (4) competitive advantage; (5) supply chain; and (6) capabilities. These challenges are inferred from the result of a previous analysis of the current situation of the field of marketing and sustainability.

Challenge 1: customer orientation and value proposition. One of the main topics for the development of sustainability consists in knowing better what do customers value from products and sustainable companies [9,67]. Technological advances, particularly the internet [77], have benefited the appearance of a large amount of metrics that can be oriented to gain a better knowledge of the customers. Metrics allow us to define indicators that are able to determine the assessment of sustainability from customers and other stakeholders. What is more, there is great interest in knowing better the individual features, values, rules and habits of the consumers who are aware of their health, community and nature [35]. Researchers can establish models that explain the metric related to this kind of behavior. Are there digital unique metrics acting as a global metric capable of representing the characteristics of the socially-concerned consumers? Which consumer's characteristics benefit the sustainability legitimacy on society [78]? They can also try to determine the existence of moderating effects between the use of a digital pro-sustainability communications and the consumer's perceived value. Furthermore, academics can demonstrate digital strategies that enhance the consumer experience [79] and promote sustainability. For example, it has been suggested that strategies based on mobile augmented reality (AR) apps may improve the level of satisfaction, quality and experience of consumers while representing a way to achieve sustainability [80].

Challenge 2: digital consumer behavior. Sustainability is a trigger for consumer commitment and therefore an aspect to be taken into account by digital marketing [16]. Related to the existing gap between socially-concerned consumers who buy green products, against those one who do not buy them [7,42] it asks: which digital marketing actions benefit this purchase behavior? What is the connection between consumers environmental values and the digital purchase behavior? instead, which values explain better the digital purchase behaviors of the green products? Which digital purchase behavior benefits green products purchase? Are companies encouraging online customer education? [81]

Challenge 3: digital green marketing. Another subject of interest is related to the green marketing management in digital environments [38,39]. For example, how do green marketing tools influence digital environments about the consumers' purchase intention? This can be particularly relevant in the most contaminated sectors and those with a higher number of consumers, such as the passenger transport [54,56]. Are companies promoting green activism in their social networks? [81] Does digital marketing develop social culture campaigns on social networks? What effect has the use of eco-labels

in digital environments on the purchase behavior, the satisfaction or the consumers' fidelity? Is it suitable to dedicate digital spaces to the eco-labels in order to benefit the green products purchase?

Challenge 4: competitive advantage. Sustainability has turned into a competitive advantage for the companies [43]. Sustainability generates trust towards the company [16]. Does digital marketing apply sustainability to establish strong relationships with its stakeholders? [81] Researchers can determine which digital marketing strategies are the most effective to make sustainability a competitive advantage. In this way, there is also a need to investigate: Which digital marketing strategies benefit the appearance of sustainable business models? Furthermore, what transformation may offer digital marketing the chance to create a more sustainable society?

Challenge 5: supply chain. Supply chain management is basic for sustainability goals' fulfilment [15]. At this point, researchers can answer to: What is the role played by digital marketing over the supply chain to obtain sustainability goals? For example, how can digital marketing influence on reducing the consumption in the supply chain? How can smart technology and media improve the sustainability of industry or households? [82]. Along these lines, emerging applications such as AR are being useful in the tourism sector, enhancing the visitor experience and at the same time preserving historical architecture or art [83].

Challenge 6: capabilities. Finally, as the capabilities of marketing can benefit sustainable attitudes inside organizations [63,64], it may be asked to what extent digital marketing capabilities benefit this kind of attitude. Which digital capabilities and skills are more beneficial for sustainability and should be taught [84]? How does digital innovation influence environmental commitment?

This research shows several limitations. On the one hand, the work faces the limitations of bibliometric methods based on citations [22]: (i) citations take time to accumulate, therefore there is a bias towards older articles, due to the existing time gap between the moment when the paper is published to when it is cited; (ii) citation-based metrics could be biased due to author self-citation; (iii) the scope of the data is limited by the source of the retrieval (Web of Science) and the composite query used (marketing and sustainability). On the other hand, the development of a research agenda is subjective to the researcher's criteria. In order to reduce this subjectivity, the authors have based this work on previous quantitative results. Another limitation that has marked this research has been the shortage in digital marketing and sustainability works in the main scientific data bases.

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