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Most influential journals and authors in digital business research: A bibliometric analysis

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MOST INFLUENTIAL JOURNALS AND AUTHORS IN DIGITAL BUSINESS RESEARCH: A BIBLIOMETRIC ANALYSIS

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Abstract

In the last few decades many firms have been making large investments in e-commerce applications, digital technologies or the use of the Internet in several business activities and processes, giving rise to the notions of digital business and digital economy. Consequently, the number of academic articles on digital business has grown exponentially. The aim of this study is to present the evolution of academic research in digital business between 1990 and 2015. The main contribution is to provide an overview of the current academic state of the art in digital business research. The analysis focuses on identifying the most productive and influential journals in digital business research, as well as the leading authors in the field. The results show a strong increase in digital business research during the last fifteen years due to the development of a good number of specialized journals of information systems. We suggest that the field of business research should expand beyond its traditional boundaries and embrace a more multidisciplinary perspective.

Keywords

Digital Business, Information Systems and Technologies, Bibliometrics, Web of Science.

1. Introduction

The digital economy is an economic system based on digital technologies that can promote the economic development of a region (Nathan and Rosso, 2015). Digital business encompass an interlocking set of sectors (industries and firms), outputs (products and services), and a set of production inputs used at varying intensities by firms and workers across all sectors (OECD, 2011, 2013). According to Zhu and Kraemer (2005), the rise of digital businesses has allowed an active research area in the information systems discipline.

The digital economy now permeates countless aspects of the world economy, impacting sectors as varied as banking, retail, energy, transportation, education, publishing, media or health. Information and Communication Technologies are transforming the ways social interactions and personal relationships are conducted, with fixed, mobile and broadcast networks converging, and devices and objects increasingly connected to form the Internet of things (OECD, 2015).

From an academic point of view, the increase in the number of articles, especially those published in high quality journals (for instance, those present in the Web of Science, WoS), unveils efforts from authors and journals to significantly promote the development of new knowledge and new applications in digital business research. Bibliometric studies are very common in several disciplines such as economics (Bonilla *et al.*, 2015), innovation (Fagerberg 2009, 2012; Merigó *et al.*, 2016), and management (Podsakoff et al. 2008), among others. In particular, the aim of this paper is to develop a journal and author analysis identifying the most productive and influential ones in digital business research considering several bibliometric indicators. We believe that, as never before, this research area presents a multidisciplinary nature that is characterized by uniting scientific research from diverse knowledge areas, both those with a focus on information systems, and those with a focus on business, marketing and other disciplines.

The results indicate that the most influential professors over the last 26 years, according to their *h*-index, are Izak Benbasat, Paul Pavlou, Robert Kauffman, Nicholas Yannelis, Kevin Zhu, Varun Grover, David, Gefen, Kenneth Kraemer, Detmar Straub, Andrew Whinston, Ritu Agarwal, Nitish Singh, Alok Gupta and Chao-Ton Su. This group of authors does not necessarily include those who publish the most on digital business research, but instead those who have greater influence on this matter. A relevant result is the fact that the greatest number of publications is obtained by the appearance of specialized journals in digital business research. In contrast with other fields of business research, publications by authors from the USA do not dominate these journals; in fact authors from five continents are given the opportunity to publish their experiences, cases and realities.

The rest of the article is organized as follows. The Conceptual framework section presents some applications and studies in digital business research. The Methods section presents the bibliometric methods used in the analysis. The Results section presents the results of the journal and author analysis. Finally, the Conclusions section summarizes the main findings of the study.

2. Overview of digital business research

Although there is not a unique definition, digital business is associated with using the Internet to deploy or support business activities along the value chain. For instance, on the one hand, using the Internet to affect operational activities as logistics, production/manufacturing, marketing and sales, or, on the other hand, using the Internet to affect procurement, infrastructure management, human resources and finance (Lerner, Brynjolfsson & Kahin 2000). In this sense, the study of digital businesses

shows a wide number of applications. For example, Childers *et al.* (2001) explain that the interactive nature of the Internet and Web offer many opportunities to increase the efficiency of online shopping behavior by improving the availability of product information, enabling direct multi-attribute comparisons, and reducing buyer search costs. Also, Amit and Zott (2001) study businesses conducted over the Internet, with their dynamic, rapidly growing, and highly competitive characteristics, that promise new avenues for the creation of wealth.

Digital technologies have spread rapidly in much of the world. Digital dividends—that is, the broader development benefits from using these technologies—have lagged behind. In many instances, digital technologies have boosted growth, expanded opportunities, and improved service delivery. Yet their aggregate impact has fallen short and is unevenly distributed (World Bank, 2016). According to Schwab (2016), explaining the impact on business and economies:

Entrepreneurship and agility will become much more important and, generally, small and medium enterprises are more agile than bigger ones. In the future, it will not be the big fish that eats the small fish, it will be the fast fish that eats the slow fish. Think of Google, which has created Alphabet as a platform for several smaller and more focused businesses. In banking, the "fintech" or financial technology revolution will cause rapid disintermediation. In the end, the business models of each and every industry will be restructured.

In recent years, business infrastructure has become more "digital" increasing the interconnections among agents and processes (Bharadwaj, et al., 2013). Although managers initially limited themselves just to apply technology to parts of the current enterprise model, now it is clear that the use of such technology is creating a mindset change giving rise to new digital business models (Wall, Jagdev and Browne, 2007). The literature has also stressed that digital technologies have enabled "open innovation" strategies in firms, through recent developments such as open software, open access, technology platforms, and online communities (Corrocher, 2011; Dodgson et al., 2006; West et al, 2008; Yoo et al., 2012). Looking into the future, technologies are expected to continue reshaping business and, more broadly, social trends through new developments in prominent fields such as the internet of things, big data analytics or artificial intelligence (OECD, 2016).

Research on the economics of digitization studies on how markets change when digitization leads to reproduction at zero cost and an abundance of digital data.

Digital technology has led to a rapid decline in the cost of storage, computation, and transmission of data. As a consequence, economic activity is increasingly digital. The transformative nature of digital technology has implications for understanding economic activity, for consumer behavior, for competitive strategy, for new firm formation, and for determining policy. (Goldfarb *et al.*, 2015).

More than a decade ago, digital business research was mostly linked to e-commerce studies, specially discussing issues related with trust and security of transaction, costumer experience and loyalty. But other concerns quickly appeared as it was becoming more evident that Information Technologies were changing firms beyond

their relations with costumers. This finding opened new research agendas capturing the multidimensionality of the relation between business and digital transformation. This is the case of studies in the field of operations research and information systems, and the development of concepts such as digital agenda and digital business strategy.

Although these developments were clearly related to the areas of business and management, the impact of digital business on every aspect of modern society suggests that the boundaries of such research agenda go far beyond the scope of these two areas. Our bibliometric analysis suggests that there are other interrelated fields using alternative approaches to the same topic. Studying the research areas of the 50 most influential journals in digital business, we found a wide variety ranging from Engineering to Psychology or Ethics. Management and Business are the main areas of this group of journals, followed by Information science and library science, Computer science and information systems, Economics, Operations research and management science, and Planning and development. Among the remaining areas we found disciplines such as Environmental studies, Communication, Geography, Sociology and Urban studies. These facts are consistent with the idea that digital transformation is changing every aspect of human society.

3. Methods

Bibliometrics is a research method to quantitatively study bibliographic material (Broadus, 1987) providing a general overview of a research field according to a wide range of indicators. There are different ways of ranking material in a bibliometric analysis. The most common approaches use the total number of articles or the total number of citations. Another useful indicator is the *h*-index (Hirsch, 2005; Merigó *et al.*, 2016), that combines articles with cites indicating the number of X studies that have received X or more citations. The general assumption is that the number of articles shows the 'productivity' while the total cites reflect the 'influence' of a set of articles.

WoS is one of the most popular databases for classifying scientific research worldwide. The assumption is that it only includes those journals that are evaluated with the highest quality. Currently, WoS includes more than 15.000 journals and 50.000.000 articles that encompass all the known sciences. The material is classified by research categories and research areas. Today, there are about 250 categories that are grouped into 150 areas (Merigó *et al.*, 2016).

In order to search for articles that have focused on digital business research, the study uses the keywords "digital economy", "digital business", "digital technolog*", "digital agenda", "information econom*", "knowledge econom*", "digital organization", "digital firm", "e-commerce", "e-business", "digitization" and "internet of things" in the title, abstract and keywords of any work available in WoS between 1990 and 2015. This, in order to capture as many possible combinations of terms related to digital business. The selection of these keywords followed from an internal discussion of the research team and consultations with a set of experts in digital business from the corporate and public policy worlds. As an additional filter, with the idea to deep our analysis only from a managerial perspective, the following research areas are considered: Management,

Business, Public Administration, Economics, Political Science, Social Issues, Planning and Development, Business Finance, Sociology, Social Sciences Interdisciplinary.

Our search, conducted in April 2016, found 3.005 publications, considering articles, reviews, notes and letters. Since 1999, possibly from the dot-com bubble burst, there has been a steady growth in the number of scientific publications in digital business. This growth trend has not been constant over time, but it is clear that interest for digital business by the scientific world continues growing. Therefore, only in one year, 2015, we observe that five times more articles were published than those published in all the 1990s decade.

The main characteristics of the articles population in terms of their level of 'influence' in the academic world (number of citations), in relation to articles that several journals focused on digital business publish, and with respect to who the main authors in this discipline are analysed in the following section.

4. Results

This section presents the results of the paper. First, the article analyzes the most influential journals in digital business research according to WoS. Second, the study analyzes publications and citations in some specialized journals in Digital Businesses.

4.1. Leading journals in digital business research

There are many journals in the scientific community that publish material related to digital business research. Table 1 presents a list with the forty journals with the highest h-index in digital business research.

R	Journal	TPDB	TCDB	HDB	TC/TP	%P	TPG
1	Information & Management	98	3228	32	32,9	6,6%	1493
2	Journal of Management Information Systems	86	4299	29	50,0	11,7%	734
3	International Journal of Electronic Commerce	124	3606	28	29,1	30,5%	407
4	Information Systems Research	56	3339	27	59,6	7,3%	766
5	MIS Quarterly	52	2293	24	44,1	5,4%	966
6	Management Science	33	3047	22	92,3	0,9%	3498
7	Industrial Marketing Management	49	1009	20	20,6	2,3%	2124
8	Electronic Commerce Research and Applications	129	1251	19	9,7	26,2%	492
9	Harvard Business Review	32	2115	17	66,1	0,4%	7465
10	Technovation	36	790	17	21,9	2,1%	1687
11	European Journal of Operational Research	59	951	16	16,1	0,5%	12860
12	Internet Research Electronic Networking Applications and Policy	45	670	16	14,9	9,4%	477
13	Journal of Business Research	42	847	15	20,2	1,1%	3737
14	International Journal of Operations Production Management	32	624	15	19,5	2,0%	1591
15	Decision Sciences	26	534	15	20,5	2,5%	1055
16	Research Policy	26	771	14	29,7	1,0%	2515
17	Journal of Operations Management	25	660	14	26,4	3,5%	715
18	Internet Research	52	513	14	9,9	13,6%	383
19	Tourism Management	22	439	12	20,0	0,8%	2850
20	Journal of Business Ethics	26	384	12	14,8	0,5%	5775
21	Marketing Science	18	384	12	21,3	1,5%	1181
22	Journal of Strategic Information Systems	24	715	11	29,8	5,2%	463
23	IEEE Transactions On Engineering Management	28	506	11	18,1	2,1%	1327
24	Psychology Marketing	23	440	11	19,1	1,9%	1243
25	European Planning Studies	28	410	11	14,6	1,8%	1558
26	Supply Chain Management-An International Journal	23	373	11	16,2	3,8%	610
27	Journal of Electronic Commerce Research	59	337	11	5,7	32,8%	180
28	Economic Theory	30	276	11	9,2	1,6%	1865
29	International Marketing Review	19	261	11	13,7	2,9%	657
30	Omega-International Journal of Management Science	16	1294	10	80,9	0,9%	1763
31	Electronic Commerce Research	47	265	10	5,6	27,0%	174
32	Information Technology & Management	27	198	10	7,3	12,7%	212
33	Journal of Retailing	17	1240	9	72,9	2,2%	762
34	Technological Forecasting and Social Change	39	330	9	8,5	1,5%	2651
35	International Journal of Technology Management	43	258	9	6,0	2,2%	1970
36	Journal of Information Technology	27	226	8	8,4	4,0%	674
37	Service Industries Journal	31	196	8	6,3	1,7%	1783
38	Management Decision	18	159	8	8,8	1,9%	965
39	Total Quality Management Business Excellence	17	169	7	9,9	1,5%	1116
40	Inzinerine Ekonomika Engineering Economics	17	124	7	7,3	3,4%	500

Table 1: Most influential journals in digital business

TPDB: Total Publications in Digital Business; TCDB: Total Citations in Digital Business; HDB: *h*-index in Digital Business; TC/TP: Total citations/ Total publications ratio; TPG: Total Publications in any discipline; %P: Total Publications in Digital Business/ Total Publications in any discipline.

According to Table 1, the most influential scientific journals in digital business research are *Information Management, Information Systems Research and MIS Quarterly, Journal of Management Information Systems, International Journal of Electronic Commerce*. All of them have the highest h-index in the discipline, not necessarily because they have published the most on digital business, but because they have more citations in relation to what has been published.

In Table 1 two journals draw attention. On the one hand, *Electronic Commerce Research and Applications* presents the greatest number of publications in digital business, although it does not have as many citations as the first five of the ranking. On the other hand, *Harvard Business Review* has fewer publications within the first ten journals of ranking, but it presents one of greatest number of citations. This implies that the most productive journals are not necessarily the most influential in the discipline.

When analyzing the number of publications in digital business for each journal based on the total of number of publications of the journal in any area (% P in Table 1) we see that only four journals are considered specialized journals in the discipline. The following four journals stand out because at least one quarter of their publications are in digital business: *International Journal of Electronic Commerce, Electronic Commerce Research and Applications, Journal of Electronic Commerce Research,* and *Electronic Commerce Research*.

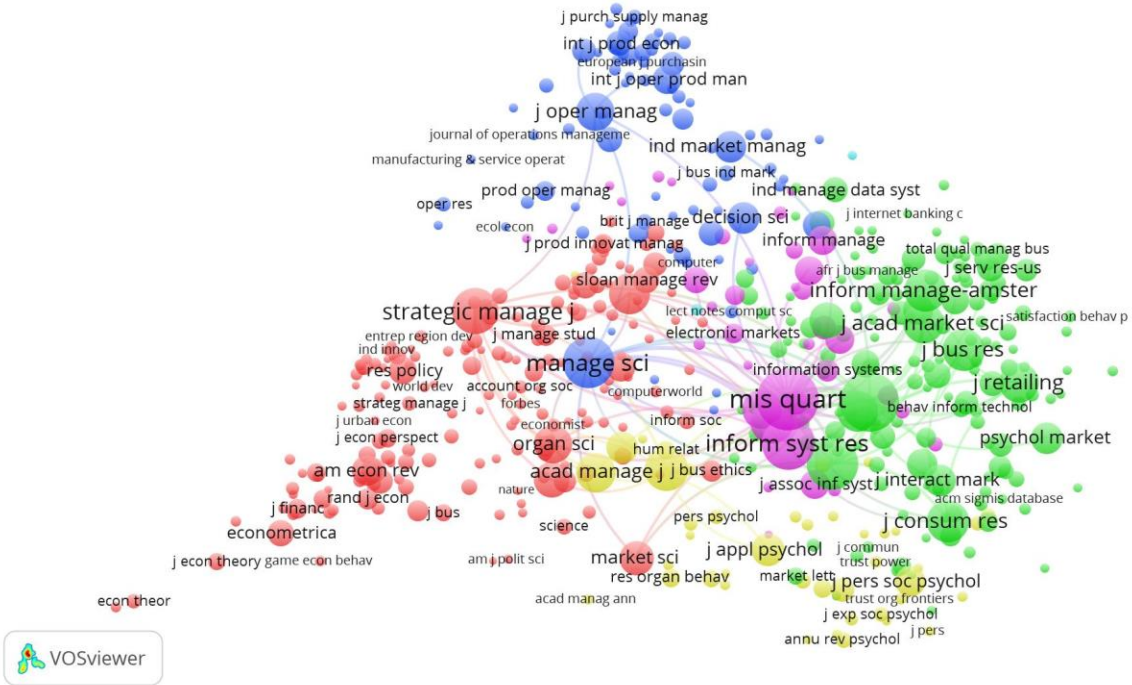

Figure 1: Co-citation journals in digital business research

Figure 1 presents co-citation analysis in the most published journals in digital business research for the period 1990-2015. It is worth noting that co-citation is defined as the

frequency with which two documents are cited together by other documents. As we can see in Figure 1, *Management Science, MIS Quarterly, and Information Systems Research* are the main networks that show which journals are being cited by other journals. These are influential journals in each of the research networks involved. The colours of the figure clearly identify at least three groups of journals which cite each other; hence, they could be working on similar topics in digital business research.

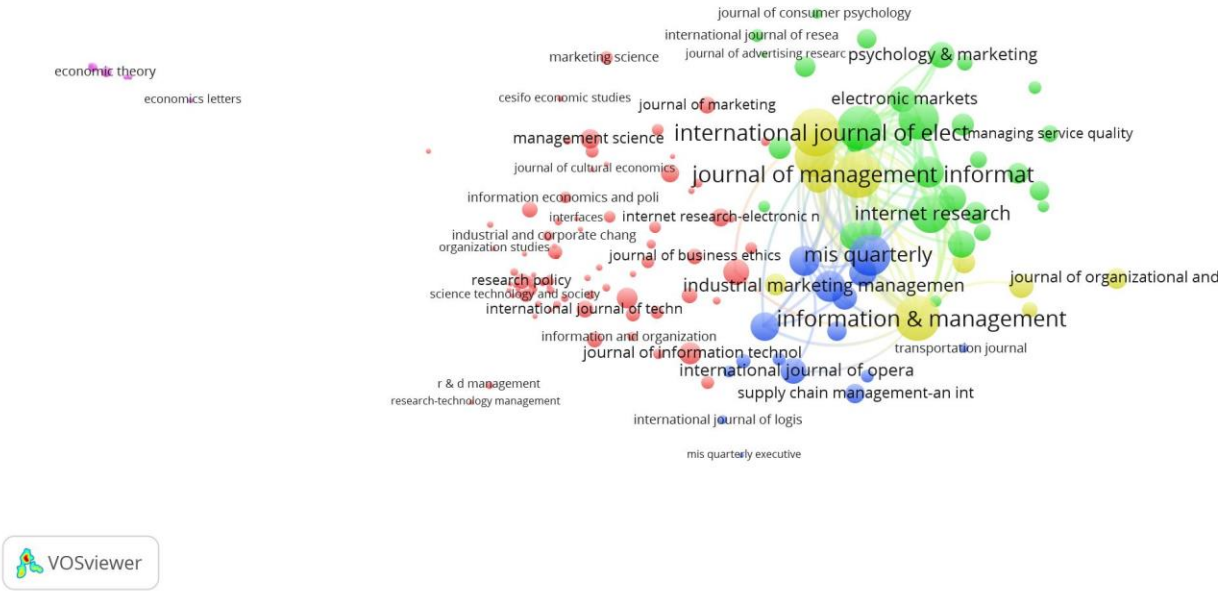

Figure 2: Bibliographic Coupling journals in digital business research

Figure 2 presents a bibliographic coupling analysis of the journals for the period 1990-2015. As we can see *Information Management, MIS Quarterly, International Journal of Electronic Commerce* and *Journal of Management Information* are the main networks that show what academics worldwide are studying regarding Digital Business. It is interesting to note that the connections show those journals that tend to cite the same bibliographic material, i.e., that analyse material in common.

4.2. Leading authors in digital business research

In this section we analyse the authors who have the most influence in digital business research for the period 1990-2015. Given the information presented, we will also be able to know which countries lead scientific research in digital business.

R	Author	Full Name	Country	TPDB	TCDB	HDB	TC/TP	%P	TPG
1	Benbasat I	Izak Benbasat	Canada	20	697	14	34,85	37,74%	53
2	Pavlou PA	Paul A. Pavlou	USA	11	1893	11	172,09	29,73%	37
3	Kauffman RJ	Robert J. Kauffman	Singapore	16	383	9	23,94	45,71%	35
4	Yannelis NC	Nicholas C. Yannelis	USA	19	227	9	11,95	43,18%	44
5	Zhu K	Kevin Zhu	USA	8	1359	8	169,88	16,67%	48
6	Grover V	Varun Grover	USA	10	369	7	36,90	18,18%	55
7	Gefen D	David Gefen	USA	7	1579	6	225,57	35,00%	20
8	Kraemer KL	Kenneth L. Kraemer	USA	6	1039	6	173,17	26,09%	23
9	Straub DW	Detmar W. Straub	USA	6	731	6	121,83	25,00%	24
10	Whinston AB	Andrew B. Whinston	USA	9	384	6	42,67	16,67%	54
11	Agarwal R	Ritu Agarwal	USA	6	175	6	29,17	8,22%	73
12	Singh N	Nitish Singh	USA	8	148	6	18,50	23,53%	34
13	Gupta A	Alok Gupta	USA	7	130	6	18,57	5,69%	123
14	Su CT	Chao-Ton Su	Taiwan	6	125	6	20,83	13,04%	46
15	Ramsey E	Elaine Ramsey	UK	8	112	6	14,00	88,89%	9
16	Huang L	Leo Huang	Taiwan	6	106	6	17,67	60,00%	10
17	Moe WW	Wendy W Moe	USA	5	424	5	84,80	62,50%	8
18	Cheng TCE	T.C. Edwin Cheng	China	5	245	5	49,00	8,20%	61
19	Chang HH	Hsueh-Hsien Chang	Taiwan	6	177	5	29,50	75,00%	8
20	Cagliano R	Raffaella Cagliano	Italy	5	177	5	35,40	71,43%	7
21	Caniato F	Federico Caniato	Italy	5	177	5	35,40	20,83%	24
22	Lin HF	Hsiu-Fen Lin	Taiwan	8	161	5	20,13	10,13%	79
23	Kotha S	Suresh Kotha	USA	5	159	5	31,80	50,00%	10
24	Ordanini A	Andrea Ordanini	Italy	6	150	5	25,00	27,27%	22
25	Krishnan R	Ramayya Krishnan	USA	6	141	5	23,50	22,22%	27
26	Mc Cole P	Patrick Mc Cole	UK	6	100	5	16,67	85,71%	7
27	Chen YH	Yueh H. Chen	Taiwan	6	95	5	15,83	28,57%	21
28	Sambamurthy V	Vallabh Sambamurthy	USA	7	351	4	50,14	46,67%	15
29	Miyazaki AD	Anthony D Miyasaki	USA	5	300	4	60,00	45,45%	11
30	Garicano L	Luis Garicano	USA	5	242	4	48,40	27,78%	18
31	Gupta S	Sumeet Gupta	India	5	129	4	25,80	6,17%	81
32	Lowry PB	Paul Benjamin Lowry	China	8	123	4	15,38	17,78%	45
33	Kim D	Daekwan Kim	USA	5	116	4	23,20	35,71%	14
34	Sunder S	Shyam Sunder	USA	6	97	4	16,17	14,29%	42
35	Krasa S	Stefan Krasa	USA	5	91	4	18,20	50,00%	10
36	Melnikas B	Borisas Melnikas	Lithuania	8	82	4	10,25	66,67%	12
37	Lee S	Sangjae Lee	South Korea	6	80	4	13,33	14,29%	42
38	Archer N	Norm Archer	Canada	5	65	4	13,00	27,78%	18
39	Reuer JJ	Jeffrey J. Reuer	USA	7	64	4	9,14	20,00%	35
40	Lee J	Jessica Lee	Australia	7	51	4	7,29	25,93%	27

Table 2: Leading authors in digital business research

TPDB: Total Publications in Digital Business; TCDB: Total Citations in Digital Business; HDB: *h*-index in Digital Business; TC/TP: Total citations/ Total publications ratio; TPG: Total Publications in any discipline; %P: Total Publications in Digital Business/ Total Publications in any discipline.

According to Table 2, the majority of the most influential authors in digital business research (listed by HDB: h-index in Digital Business) come from the USA, representing

80% within the first 10 authors in the ranking, and more than 50% of the total authors in our ranking. Interestingly, in this discipline authors from Asia (Singapore, Taiwan, China and South Korea) are also relevant, representing at least one quarter of the authors in the ranking. Authors from Europe participate less, especially those from universities in Italy and the UK.

The results indicate that the most influential researchers over the last 26 years, according to their *h*-index, are Izak Benbasat, Paul Pavlou, Robert Kauffman, Nicholas Yannelis, Kevin Zhu, Varun Grover, David Gefen, Kenneth Kraemer, Detmar Straub, Andrew Whinston, Ritu Agarwal, Nitish Singh, Alok Gupta, Chao-Ton Su, Elaine Ramsey and Leo Huang. In this select group, there are authors who are particularly relevant and have specialized in digital business, in fact the following scholars do not necessarily write in other thematic areas: Robert Kauffman, Nicholas Yannelis, David Gefen and Elaine Ramsey.

5. Conclusions

Digital business research is becoming a discipline of great interest worldwide. The topics being studied are varied, including e-commerce applications, digital technologies, Internet supply and demand, economic frictions and new markets, or government policy to promote a digital economy.

This study presents a general overview of the leading journals and authors in digital business research between 1990 and 2015. First, the analysis focuses on studying the increase in the number of scientific publications in the Web of Science (WoS) on digital business. Subsequently the most influential journals in the discipline are analysed. The analysis of journals highlights the existence of general journals (i.e., not specialized in a narrow topic) that were the first to begin publishing scientific articles on digital business, particularly in the decade of the 1990s. After 2000, a series of journals specialized in digital business appeared, covering academic topics within the field of information systems and technologies, which began to publish a large number of scientific items on the discipline, and consequently led to their immense growth regarding the number of publications and citations.

It is interesting the way in which information systems and technologies are influencing people's lives and studied within and across different areas of knowledge. First, studies from the specialized journals specialized in MIS try to present new technologies or new systems that support decision making or creation of new knowledge. Second, studies in marketing reveal how information is delivered today to people through different channels and media. Third, the area of operations, analyze how different information systems can help to optimize working times and use of resources in companies. Fourth, innovation research attempts to demonstrate the effect of new processes, products or services, improving the quality of life of people. Even though we have been able to classify the most influential research in the just mentioned disciplines, our journals and authors' rankings also reveal that other disciplines are also investigating Digital Business to generate new knowledge that strengthens the research area. Among these other areas are: ethics, business, supply chain, tourism, etc.

Along with the study of the most influential journals, this work also analyses the most influential authors in the discipline. Interestingly, although U.S. authors appear in the first places of our ranking, they do not appear to be the more productive authors in the discipline. It is also novel that a number of non-American authors begin to have a strong position in digital business research because they are publishing a large number of articles in high quality scientific journals, as well as receiving more attention from their academic peers, which can be observed by the greater number of citations that their works receive.

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