Estudios Gerenciales vol. 39, N.° 167, 2023, 142-158

EG Estudios Gerenciales
Journal of Management and Economics for Iberoamerica

Research article

Digitalization of the Consultancy Sector: Internal and external drivers and Facilitators

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Abstract
Literature has conventionally addressed the concept of Digitalization by focusing on the manufacturing industry, harmonizing and pairing its features with the service industry. This leads us to ask ourselves whether there is a single concept of digitalization or the digital transformation of the firm can vary depending on sales orientation. To answer our problem statement and research questions, we used a systematic literature review (SLR) and bibliometric analysis (BA) of digitalization to identify the most relevant articles on the subject. After analyzing a set of 1316 articles extracted from Scopus, EBSCO, PROQUEST, and the Web of Science databases, we found that the process of digitalization of a company should be studied differently depending on its underlying sector or activity. We also found that digital transformation in the consulting business has been facilitated and boosted by internal and external drivers that resulted in a change in the service digitalization paradigm in this sector, going from cost-saving strategies to value-added chains.

Keywords: business service digitalization; systematic literature review; consultancy services.

Digitalización del Sector de la Consultoría: impulsores y facilitadores internos y externos

Resumen
La literatura ha abordado convencionalmente el concepto de Digitalización centrándose en la industria manufacturera y equiparando sus características con la industria de servicios. Esto nos lleva a plantearnos la cuestión de si existe un único concepto de digitalización o si la transformación digital de la empresa puede variar en función de la orientación comercial. Para responder al planteamiento del problema de investigación, utilizamos una revisión sistemática de la literatura (SLR) y un análisis bibliométrico (BA) de la digitalización para identificar los artículos más relevantes sobre el tema. Después de analizar un conjunto de 1316 artículos, extraídos de las bases de datos Scopus, EBSCO, PROQUEST y Web of Science, encontramos que el proceso de digitalización de la empresa debe estudiarse de manera diferente según el sector o actividad subyacente. También encontramos que la transformación digital en la consultoría se ha visto facilitada e impulsada por factores internos y externos que han motivado un cambio de paradigma de digitalización de servicios en este sector, caracterizado por pasar de estrategias de ahorro de costos a cadenas de valor agregado.

Palabras clave: digitalización; revisión sistemática de literatura; servicios de consultoría.

Digitalização do setor de consultoria: impulsionadores e facilitadores internos e externos

Resumo
A literatura tem abordado convencionalmente o conceito de digitalização focando na indústria manufatureira e equiparando suas características com a indústria de serviços. Isso leva a perguntar se existe um conceito único de digitalização ou se a transformação digital da empresa pode variar dependendo da orientação comercial. Para responder à abordagem do problema de pesquisa, utilizou-se uma revisão sistemática da literatura (SLR) e uma análise bibliométrica (BA) de digitalização para identificar os artigos mais relevantes sobre o assunto. Após a análise de um conjunto de 1.316 artigos, extraídos das bases de dados Scopus, EBSCO, PROQUEST e Web of Science, constatou-se que o processo de digitalização da empresa deve ser estudado de forma diferenciada dependendo do setor ou atividade subjacente dela. Constatou-se também que a transformação digital no setor empresarial de consultoria tem sido facilitada e impulsionada por fatores internos e externos que levaram a uma mudança de paradigma na digitalização de serviços neste setor, caracterizada por passar de estratégias de redução de custos para cadeias de agregação valor.

Palavras-chave: digitalização; revisão sistemática da literatura; serviços de consultoria.

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JEL classification: JEL; M15.

How to cite: Brazo, P., Velicia-Martín, F. & Palos-Sanchez, P. R. (2023). Digitalization of the Consultancy Sector: internal and external drivers and facilitators. *Estudios Gerenciales, 39*(167), 142-159. https://doi.org/10.18046/j.estger.2023.166.5498

DOI: https://doi.org/10.18046/j.estger.2023.166.5498

Received: 28-04-2022
Accepted: 16-08-2022
Available online: 30-06-2023

1. Introduction

The growing importance of the service sector in the global economy does not allow us to follow the manufacturing sector's innovative path as a good pattern of digitalization (Drejer, 2004; Miles, 2009). Digitalization was at first closely related to manufacturing, nowadays we do not consider it a closed concept. There is a challenging transition of digitalization towards new paradigms depending on the economic activity of the firm and its sales orientation (Kohtamäki et al., 2021). Therefore, we need to reconceptualize digitalization —or digital transformation— to embrace the special circumstances of each economic activity. The literature has already pointed out the difference between digitalization processes in both sectors, and has identified some determinants, features, and patterns that make it different from manufacturing (Evangelista, 2000; Guerrieri & Meliciani, 2005; Miozzo & Soete, 2001); undeniably, the literature on innovation and digitalization in the service industry is moving away from it and is developing as a new field of investigation. Hence, it is necessary to develop a new conceptual approach to the existing framework.

The results of this study contribute to the knowledge and provide valuable insight into digitalization research. First, the bibliometric methodology has gained importance in recent years (Donthu et al., 2021), Systematic Literature Review (SLR) combined with bibliometric analysis (BA) has been used little in this area, and running a cluster analysis using the VOSviewer software (Ponsignon et al., 2019) has also been relevant. Second, the concept of digitization has been reexamined and revisited. To date, most studies on digitalization have approached it from a single perspective. This study contributes to the knowledge of digitalization in a double perspective depending on the business orientation (good sales and service provision). According to Avison & Malaurent (2014, p. 327): "New arguments, facts, patterns or relationships" could be considered sufficient contributions to the field of knowledge without theory-building beyond this. We focus on the consultancy industry as a driver and facilitator of digital transformation, but also as a digitalization carrier in its sector. Consulting companies (CC) usually help others to develop their digital transformation but also try to innovate, create new opportunities, and maintain a competitive advantage in a highly competitive sector. This paper explores the theoretical basis that led these companies to boost digital transformation internally and externally: an internal source, characterized by economic and organizational factors; and an external source, aimed at clients and institutional points of view.

2. Conceptual background

ed by economic and organizational factors; and an external source, aimed at clients and institutional points of view.

2.1 Theoretical Approach

The digitalization of companies has traditionally been approached using the Resource-Based Theory (RBT) to explain how companies try to maintain and improve their competitive advantage (Barney, 1991; Wernerfelt, 1984). Companies investing in digital equipment have a competitive advantage by increasing their value, improving performance, and boosting productivity (Bharadwaj et al., 2013). However, digital transformation and digitalization are not always related to machine-based investments (Balsmeier & Woerter, 2019). There is an intangible set of resources that affect the way these assets are used and managed; therefore, the same level of digital investment produces different results (Mikalef & Pateli, 2017). Following this idea, we introduced a new theoretical approach based on the Dynamic Capabilities Theory (Teece & Pisano, 1994), as an extension of the RBT, to address the question of different performance for similar technological investments. This approach proposed a substantial variation between businesses in terms of the returns on technological investments (Aral & Weill, 2007). This point supports the idea that investment in digital and technological transformation is necessary —but not a sufficient cause by itself— to generate and maintain a competitive advantage, and that there are many other crucial conditions such as using intangibles to create and maintain a successful strategic opportunity. These points can be used as a basis for the evolution of the traditional theoretical model.

2.2 Problem Statement

As Castellacci (2008, p. 982) says: "Despite recent advances in the study of service innovation, this literature still seems fragmented and not clearly related to the paradigm–regime–trajectory model earlier developed to study innovation in manufacturing industries." The consulting sector has also been undervalued as a driver of digital transformation, not only for other agents in the economy but for themselves. As pointed out by Lemus-Aguilar et al. (2015, p. 1): "Innovation inside consulting firms has missed specific attention in academic research. Consulting firms are usually considered part of Knowledge-Intensive Business Services (KIBS), Professional Service Firms (PSF), or Project-Based Firms (PbF). However, consultancies possess characteristics that might affect generalizations made in studies targeting all categories stated above." Therefore, the need to conduct more research on this topic seems clear.

2.3 Topic Justification

Digitalization and digital transformation are extensively studied; however, as shown in Figure 1, until 2014-2015 researchers have not had focused their attention on conducting Systematic Literature Reviews

(SLR) on digitalization. Initially, we did exploratory research using the Scopus database for the 2001-2020 period and applied a Boolean search string (results shown in Figure 1), which yielded a total of 1522 articles, out of which 1239 were published in the 2015-2020 period (Annual Growth Rate: 24.48%). It illustrates the growing importance of this methodology in the research topic.

As shown in Figure 1, the impact of digitalization has gained importance in recent years according to different indexes. However, there is still a lack of conceptualization when defining digitalization. Most of the current research uses a single definition for all types of businesses. We consider it an unanswered question. To address this gap in the literature, we will present our research questions in the following section.

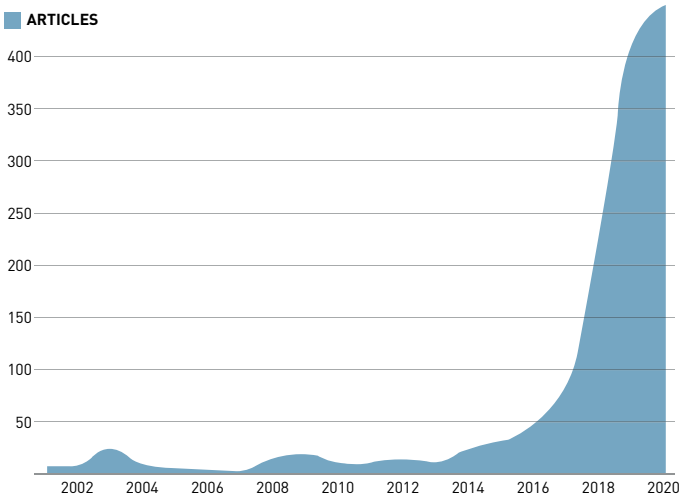

Figure 1. SLR on Digital Transformation - Annual Scientific Production. Source: own elaboration, data retrieved from Scopus.

3. Research Questions

This research presents a new point of digital transformation according to business orientation. In doing so, a series of research questions will be analyzed. Their construction is one of the most important phases of an investigation; most research studies suggest that gap-spotting is a reliable way to find the most relevant (Sandberg & Alvesson, 2011). Such points surpass the overarching concepts in the literature; therefore, they challenge existing digitalization theories (Locke & Golden-Biddle, 1997). This article emphasizes the current connections in the literature on digitalization, where digitalization processes have not been studied based on the activity of the company exclusively but have always been approached in a global way (Alvesson & Sandberg, 2011).

When conducting an SLR, researchers have different methodologies from different authors. Depending on the author, the search protocol, the field of research, etc., there are different circumstances that lead to the use of one or another. Thus, we find that not all SLRs use the same reference author systematically and that most of the time the researcher uses a regular process but with a different reference. Our purpose is to determine which is the most predominant reference author on digitization. So, our first research question is:

1) What is the most widely used systematic literature review protocol in the field of digitization? (RQ1).

As far as business digitalization is concerned, the digital transformation has been focused on the manufacturing industry, which is oriented toward the production of goods. With the servitization of business, digitalization has gained weight in the service industry. Rarely has it been studied from different conceptual angles. We will deal with a new outlook that suggests that it could be considered differently depending on the business orientation of the company (product/services). Thus, we decided to conduct a new literature review aiming to answer our second research question:

2) Has digital transformation been studied with the same prominence for companies with different activities? (RQ2)

Finally, a last research question will be addressed. Consultancy Sector Digitalization has been facilitated and boosted by internal and external industry drivers that have changed the digitalization paradigm, so we will analyze the factors that have promoted their own digitalization process and third-party digital transformation.

3) How has digital transformation affected, and is currently affecting, the consulting sector (accounting, taxation, labour)? (RQ3).

4. Research Methodology

This research encompasses a systematic literature review (SLR) and a bibliometric analysis (BA) to investigate digitalization orientation. Since knowledge production on digitalization remains fragmented, the SLR results are more relevant than ever (Snyder, 2019). Bibliometrics has also been widely used in recent years (Donthu et al., 2021), sometimes in combination with SLR techniques, but scarcely have both (SLR+BA) been combined for this topic. Using SLR allows us to select the most relevant articles on digitalization, while BA helps us find the most widely used and extended methodology (RQ1). This combined method has been proven suitable and useful for this purpose (Ben-Daya et al., 2019; Linnenluecke et al., 2020; Pulsiri & Vatananan-Thesenvitz, 2018).

A large amount of research on digitalization has been published in recent years, much of it is SLRs. However, few articles in the literature provide a comprehensive analysis of cutting-edge research to show a review of digitalization methodologies.

Most systematic reviews in the existing literature begin with an introduction to an individual case of

digitalization, and then apply a methodology without analyzing whether the method or process is appropriate. The use of a methodological line of research when performing an SLR on digitalization offers different alternatives in terms of authors. Most articles follow the methodology proposed by an author regardless of the field in which it was used. Thus, we consider it important to review the most used methods in the field of digital transformation (RQ1). To do this, we will perform an analysis of the literature, and later we will apply cluster analysis to find out who are the most important authors.

5. Results and Discussion

5.1 First Research Question

The first research question in this study requires an analysis of the different existing methodologies to discover which have been used the most and have been more widely accepted by researchers, as well as to decide and justify which of them will be used to analyze our hypotheses and research questions.

This approach could be called systematic literature review screening (SLRS) and was done using the Dimensions database. It is new and used for scientific research and has revolutionized the analysis of metadata beyond bibliometrics (Hook et al., 2018). It is considered a democratization of scholarly data and an alternative to WoS and Scopus (Orduña-Malea & Delgado-López-Cózar, 2018; Thelwall, 2018). A Boolean search string was used: 'systematic literature review" AND Digitalization OR digitalisation OR 'digital transformation'.

All types of publications were included initially and there was no time limit. The classification was made by the Dimensions database. The results were then stratified by activities or sectors to organize the results into a hierarchy (Butler, 2010; Rousseau & Leuven, 2018). Dimensions database classifies and assigns a code to the field of research, thus allowing for a more precise examination and filtering of the results. In this case, we selected the codes '15 Commerce, Management, Tourism and Services' and '08 Information and Computing Sciences and 42 matches were found. All publications were analyzed and nine of them were discarded because they were either not directly related to the research topic, not in English, or were not accessible. We obtained a final sample of 33 references. Subsequently, the VOSviewer Software was used to analyze the data obtained. This tool uses a clustering technique with scientometric research and has also been used to study digitalization (Strozzi et al., 2017; van Eck & Waltman, 2010; Waltman et al., 2010; W. Zhang & Banerji, 2017). The resulting documents from the previous search were then grouped by author and analyzed. A map of all the data extracted from Dimension was then created. The purpose was not only to analyze all the references obtained but also to analyze the bibliography used by those authors. The software examined the link and strength between all documents by a bibliographic analysis between publications. The items were then clustered so as not to overlap and references were not allowed to belong to different groups.

The results were clustered into three main groups, and Tranfield's (2003) was the most significant. The results in Figure 2 shows that this SLR methodology is used or referenced the most in SLR in digitalization. This is an extraordinary outcome since this is not found as a direct reference from our initial sample of 33 articles, but it is the most used by all referred authors.

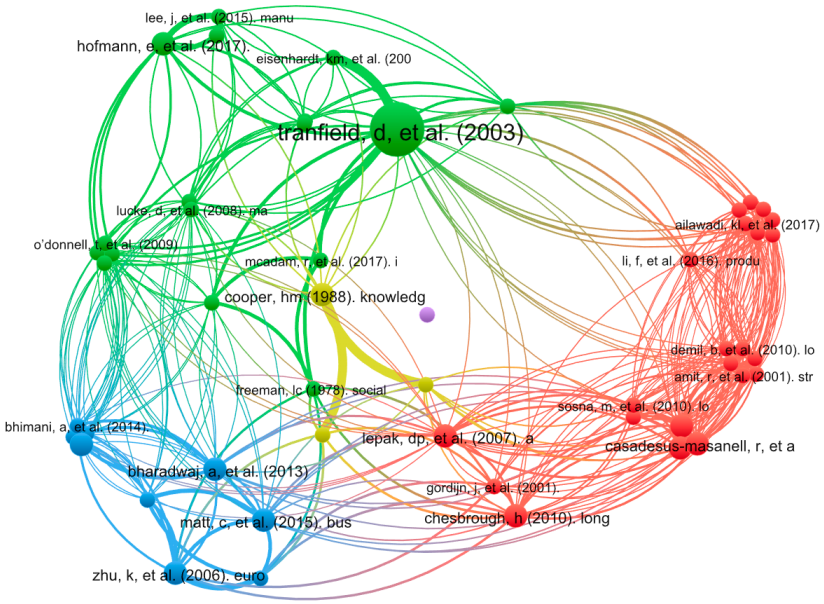

Figure 2. Clustering SLR Methodologies by Author.
Source: own elaboration.

Tranfield's First Cluster (2003) is referenced the most by all researchers when doing SLR in the field of digitalization. This stresses the need to do a preliminary study when starting an SLR. It requires an initial expert panel that includes theory and practitioners to assess the relevance and size of the literature and to delimit the subject area or topic. Almost all SLR methodologies connected in the cluster follow this path. Authors such as Cooper et al. (1988) and Hoffmann et al. (2019) also stand out in this cluster, although not as predominantly as Tranfield. Levi's second cluster (Bharadwaj et al., 2013) stands out for its importance and impact in the field of digital transformation. It is a methodological view directly related to the field of information systems and has also been widely used in the field of digitalization by analogy. In his presentation, Levy highlights the importance of identifying the target audience to select the best framework. Third cluster connections with first and second clusters give us weak relations with the former and the latter and have not been as relevant as those.

To find the consistency of the results with this tool, all the references were analyzed individually. Each document extracted from the Dimensions database was evaluated and classified considering the subject, year of publication, type of publication, period, time horizon studied, databases used, articles analyzed, references and author, and methodology used to perform the systematic literature review. To find the consistency of the results with this tool, all the references were analyzed individually. Each document extracted from the Dimensions database was evaluated and classified considering the subject, year of publication, type of publication, period, time horizon studied, databases used, articles analyzed, references and author, and methodology used to perform the systematic literature review.

In Table 1, we show a list of SLRs on digitization. The first column shows the different researchers classified chronologically based on the date of publication of the article ("pub. year"). The fifth column shows the subject of the article used to carry out the SLR. Within these thematic areas, health stands out in terms of mentions. Health and finance (blockchain, bitcoin, investments) have gained importance because of the actual increase in this kind of service. The sixth column shows the time horizon used to analyze and review publications on digitalization, the analyzed period predominantly exceeds 10 years, on average. As can be seen in the 'database' column, Scopus and Web of Sciences are the most used, although publication databases such as IEEE and AISEL —with great transcendence in terms of technology— are notably gaining ground. The introduction of interviews and reports as complementary tools for conducting SLRs is also very interesting. In all the references analyzed, we note the scarce use of mixed-analysis tools that complement the SLR with the BA (as has been done in this article). The literature analyzed (see Table 1) is based on an initial sample of articles that on average exceeds 500 references, reducing this amount to a considerably final sample of two or three tens. This is because the increase in publications in the field of digitization began in 2018, as observed in Figure 1. If we take into account that only part of this increase corresponds to SLR, we can understand that there are still few references compared to other subjects. The last column presents the source used as a methodological reference to carry out the SLR.

After analyzing all the information explaining the methodology employed in the articles, there seems to be a difference between practical and theoretical methodologies. Many articles cite the use of the PRISMA, SMARTER, or SNOWBALLING algorithms to extract the articles to be analyzed. We consider the methodologies proposed by Denyer & Tranfield (2009), Keele (2007), Levy & Ellis, (2006), and Tranfield et al. (2003) to be much more accurate since a theoretical methodology for conducting SLR should include the whole process of investigation and not just a search algorithm.

The use of one methodology or another is a hands-on procedure; the author decides which one to use based on his/her experience. We frequently see that the methodology focuses on how the theoretical approach is developed when conducting the SLR but does not often concentrate on why. It requires establishing a prior data collection in the field of research taking into account the circumstances in which the different authors have used it. In our opinion, determining which author has been more cited to establish which methodology is used the most in this field is a preliminary step to understanding and doing research on SLR. Most of the existing SLRs are practical, meaning methodologically rigorous in terms of following a path to approach the final result (i.e. PRISMA); however, a theoretical methodology should previously be followed before applying the SLR search scheme, and this is not being done. Following the argument of Tranfield et al. (2003) and applying it in an analogous way to this research, a theoretical methodology implies carrying out a previous process where the terms by which the SLR will be carried out are relevant. The use of expert panels before the compilation of the literature through search equations should be a mandatory start. An integrative theoretical statement like this would give higher criteria for methodological validity since the initial searching process is contrasted by a theorist-practitioners panel review.

Thus, regarding the first research question, according to the review and the bibliometric analysis using VOSviewer Software, the most used theoretical methodology approach is that of Tranfield et al., (2003).

Table 1. List of Systematic Literature Reviews (SLR) on Digitalization.

Authors	Pub Year	Pub Type	Field of Research	Research domain	Period	Databases	Screened papers/ Final Sample	SLR Applied Methodology
Knudsen et al.	(2020)	Article	08	Accounting	2007-2017	27 journals	103/33	Rom and Rohde (2007)
Osterrieder et al.	(2020)	Article	08	Smart Factory, Industry 4.0		EB., E., PQ and SD	-/124	Vom Brocke et al. Cooper (1988)
Carvallone & Palumbo	(2020)	Article	15	Health/Technology	1999-2019	S., WoS and P.	1194/40	Littell et al. (2009)
Gheidar et Mehdi (2020)	(2020)	Article	15	Employment	-	Informal Reviews	16	Okoli and Schabram (2012)
Clarke, D,	(2020)	Preprint	15	Investments	2015-2020	GS., ASU, EB	23	Tranfield el Al. (2003) PRISMA
Schinagl & Shahim	(2020)	Article	08	Information Security	1996-2018	Web of Science	146/76	Horne et Al., (2017)
Nosratabadi et al.	(2020)	Preprint	15	Food Industry	1999-2019	WoS, S, SD, E, J-store, and Sage	849/72	PRISMA
Chang & Chen	(2020)	Article	08	Blockchain-Bitcoin	2016-2019	IEEE,ACM DL, GS	-/186	Tranfield el Al. (2003) Kitchenham et al. (2008)
Marques & Ferreira	(2020)	Article	08	Health/Technology	1973-2018	Scopus	749/53	Edwards, W. (1977)(SMARTER)
Wulff et al.	(2019)	Article	08	Health/Technology	2014-2019	Pub, IEEE, Embase, S, SD	2373/55	PRISMA
Mahmood et al.	(2019)	Article	15	Corporate Gob.	2008-2018	SD, SL, IEEE, E, JSTOR, GS, PQ	103/55	Levy and Ellis (2006)
Hausberg et al.	(2019)	Article	15	Digital transform.	2000-2015	Web of Science	-/1815	Levy and Ellis (2006)
Haas, Y.	(2019)	Article	15	Retail business	2014-2019	WoS and E	248/28	Quantitative-Qualitative
Babar & Yu	(2019)	Proceed.	08	Digital transform.	2010-2019	PQ	818/36	Okoli and Schabram (2012)
Ancillai et al.	(2019)	Article	15	Social Selling	2012-2018	S, E, and WoS	109/29	Thorpe et al. (2005) Tranfield et al. (2003) Webster & Watson (2002)
Hoang et al.	(2019)	Article	08	Smart City Projects	2008-2018	Scopus	606/76	Van Eck & Waltman (2010)
Junge, A.		Article	08	Logistics	2015-2018	EB	388/62	Durach et al., (2017)
Sahlin & Angelis	(2019)	Article	15	Performance Management	1987-2017	Scopus	2560/241	Tranfield et al. (2003)

Table 1. List of Systematic Literature Reviews (SLR) on Digitalization.

Mukhopadhyay & Bouwman	(2019)	Article	08	Platform Ecosystems	2010-2017	PQ, EB, SD, JSTOR, Informs, GS and E	76/48	Rowley and Slack, (2004)Webster and Watson, (2002) Zhang et al., (2014)
Monteiro et al.	(2019)	Article	08	Hybrid Project management	2014-2019	WoS	279/7	PRISMA
Helbin & Van Looy	(2019)	Proceed.	08	Organizational ambidexterity	2014-2018	SD, E, SL, IEEE, ACM, S, WoS	892/47	Kitchenham et al. (2008) Webster & Watson (2002)
Milian et al.	(2019)	Article	08	FinTech	1980-2018	WoS and S	211/179	Kitchenham et al. (2008) Levy and Ellis (2006)
Sanchez-Gonzalez et al.	(2019)	Article	08	Maritime transport	2002-2017	INGENIO (Polytechnic University of Madrid)	99	Tranfield el Al. (2003)
Wichmann & Wißotzki	(2019)	Chapter	08	Health/Technology	2005-2017	AISeL, IEEE, S, and SL	-/405	Kitchenham et al. (2008)
Wiedenmann & Größler	(2019)	Article	15	Supply chains	2006-2018	EB, E, SD, TF and Ec	77/35	Tranfield el Al. (2003)
Kollwitz & Dinter	(2019)	Chapter	15	Hackathons	Mid 2000	AIS Electronic Library (AISeL), IEEE Xplore Digital Library (IEEE) and WoS	234/189	Vom Brocke (2009) Webster & Watson (2002) Cooper (1988)
Nazir et al.	(2019)	Article	08	Big Data	2008-2018	IEEE, Pub, SD, S, TF, W	568/190	Kitchenham et al. (2008)
Gebayew et al.	(2018)	Proceed.	15	Research Methodology	2014-2018	SD, SL, IEEE, ACM, ISIS	1564/30	Okoli and Schabram (Okoli & Schabram, 2012) Kitchenham et al. (Kitchenham et al., 2008)
Lammers et al.	(2018)	Proceed.	15	Australia Business digital transformation	2010-2017	Government and CSIRO reports	-/58	Levy and Ellis (2006)Webster & Watson (2002)
Liu, F.	(2018)	Article	15	Creative Industries	2010-2016	WoS	1239/50	Tranfield et al. (2003) Petticrew and Roberts (2006)
Wilson & Wnuk	(2018)	Chapter	08	Digital business strategy	-	GS	2948/477	Wholin (2014)) Snowballing
Marquardt, K.	(2017)	Article	08	Smart services	2013-2018	GS, S, E, El and SL	180/65	Not referred
Schäffer & Leyh	(2017)	Chapter	08	Master data management	2015-2016	GS, IEEE, SL and AIS and Interviews	155/44	Vom Brocke (2009)

Notes: 08= Information and Computing Sciences, 15= Business and Management Initial Sample=42; Final Sample=33; Excluded references: 9 (6 Not related,1 Not English, 2 Not accessible). GS=Google Scholar, WoS=Web of Science, S=Scopus, SL=Springer Link, SD=Science Direct, E=Emeral, EB=EBSCO, PQ=ProQuest, P=Pubmed, ASU=Academic Search Ultimate, TF=Taylor & Francis, W=Wyley. E=Elsevier, Ec=EconBiz.

5.2 Second Research Question

Digitalization is a process of change and development of new mechanisms, procedures, and technological infrastructure in an organization to increase the efficiency of organizational processes. A lot of the existing literature about the digitalization of a company has studied the concept from one single point of view, without paying attention to and regardless of the economic environment in which the company operates. Digitalization in the service industries is usually undertaken from a Servitization perspective, which is a process of vertical integration (Kox & Rubalcaba, 2007). Digitalization makes a complete change in the organizational structure of the company, resulting in a rationalization of the entire business. Therefore, we could consider it a multilevel concept (Smith, 2003, 2012), i.e., that digitalization transcends the mere "digitation" of organizational processes. It must be reconsidered as a multitiered process with an ecological vision of digital transformation that leads to a comprehensive change at all company levels: social, relational, productive, distributive, ecological, and more.

There used to be an overlap of product and service digitalization without differentiation. However, the emergence of a new kind of company, exclusively service-oriented, with comprehensive use of digitalization, and completely dedicated to the service sector, is changing the way digitalization is seen.

These circumstances create a new comprehensive paradigm for the kind of companies that don't make any changes and don't transform their processes because they start as digital natives. To answer the hypothesis (RQ2), a systematic literature review must be performed to see if there is a paradigm shift in digitalization. This would mean a different digitalization process from the past for both product-manufacturing and service businesses. To perform an exhaustive in-depth analysis of the keywords used for the research subject, different databases were chosen —Proquest, EBSCO, Web of Science, and Scopus (Cooper, 1988; Levy & Ellis, 2006)— and the search string was applied. These databases are well-oriented and are the most used in the field of digitalization, according to RQ1. A common search equa-tion was constructed with some exclusion criteria for every search round without time restrictions, as shown in Table 2.

As a result of the first search, an initial sample of 1316 articles were obtained, which were structured by databases as seen in Table 2. A set of restrictions was applied to the main sample of articles. These were the most used in the literature on the subject (Littell et al., 2009; Waltman et al., 2010; Webster & Watson, 2002; Wohlin, 2014).

First, only articles written in English that had been peer-reviewed were selected. Second, the sample was filtered by articles about "manufacturing industries" and then those about service and commerce companies. A final sample of 89 articles was obtained for manufacturing industries and 60 articles for service and commerce companies. In the final stage, all abstracts were read to discard articles not related to the research topic. A total of 33 articles related to the topic of industrial digitalization and 30 articles focused on the subject of service digitalization were found. As summarized in Table 3 —which shows all references by year and source— this topic has become increasingly important over the past few years.

Research on digitalization can be separated into two different areas: the industry sector and the services sector (see Figure 3). Digitalization is generally applied indistinctly. Although there has been a clear vertical integration of services in the manufacturing industry, usually called servitization (Gebauer et al., 2020), the process of digitalization or technological transformation of a company is not the same for every sector and should be identified when researching digitalization. This means that servitization does not always result in digital transformation.

The orientation of a company towards products or services should be considered when studying any aspect related to digitalization.

Table 2. Selected papers by database and exclusion criteria.

	First search round	**Second search round**	**Third search round**	**Fourth search round**
	TITLE: (("Digitalization" OR "Digitalisation" OR "Digital transformation")) Refined by: DOCUMENT TYPES: (ARTICLE) AND LANGUAGES: (ENGLISH)	**TITLE: (("Digitalization" OR "Digitalisation" OR "Digital transformation"))** Refined by: DOCUMENT TYPES: (ARTICLE) AND LANGUAGES: (ENGLISH) AND FULL TEXT AND PEER REVIEWED	**Industry /Service & Commerce** (Including all obtained references)	**Industry /Service & Commerce** After erasing duplicates and discarding non-relevant articles)
SCOPUS	328	280	37 / 23	15/14
WoS	246	117	18 / 14	9/6
ProQuest (Abi-Inform)	373	157	15 / 9	5/5
EBSCO	369	219	19 / 14	4/5
	1.316	773	89 / 60	33/30

Search string: Digitalization OR digitalisation OR "digital transformation") AND (Industry) (Digitalizaction OR digitalisation OR "digital transformation") AND (Service* OR Commer*)
Source: own elaboration.

Table 3. Number of selected papers by database and exclusion criteria.

	INDUSTRY ORIENTED				SERVICES ORIENTED				∑ INDUSTRY	∑ SERVICES
	EBSCO	PROQUEST	SCOPUS	WoS	EBSCO	PROQUEST	SCOPUS	WoS		
2020		1	7	4	1			2	12	3
2019	6	8	18	8	5	4	16	6	40	31
2018	6	4	7	2	2		4		19	6
2017	3	2	2		3	3	3	4	7	13
2016			3	1	1	1		1	4	3
2015	1				2	1			1	3
2014									0	0
2013	1			2				1	3	1
2012	1								1	0
2011	1			1					1	0
TOTAL		89				60				

Source: own elaboration.

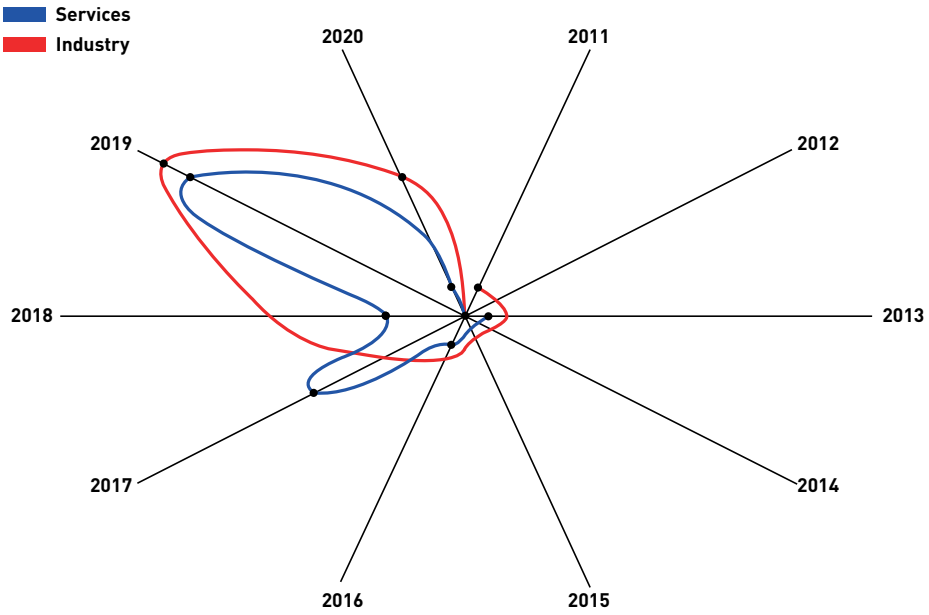

Figure 3. Temporal path of digitalization orientation.
Source: own elaboration.

Table 4. Changes in digitalization orientation.

From product view	Toservice view
Goods Orientation	Service Orientation
Cost Reduction	Value and Revenue Expansion
Owned Property	Shared Property
Low Risk and long investment return	High risk, high yield, short investment return
Standardization	Customization

Source: own elaboration.

1. From Goods to Service Orientation: The progressive reduction in profit margins in certain mature sectors led to the use of servitization as vertical integration of some services within the manufacturing industry. The rapid expansion in the use of this servitization by competitors, as well as the continuous search and maintenance of competitive advantage, have forced sectors to initiate new digitally intensive activities oriented solely to services. Also, they are seen as new opportunities to differentiate themselves. Thus, the transition from the digitalization of products linked to servitization towards the digitalization of the industry oriented only to services (financial, marketing, audiovisual, online storage, etc.) has been boosted as an incentive to search for new competitive advantages (Vandermerwe & Rada, 1988).
2. From Cost Reduction to Value and Revenue Expansion: Digitization and digitalization in manufacturing companies have their origins in cost savings to increase revenues and productivity. Servitization introduced a novelty in terms of the creation of complementary services to manufactured products; simply intending to create economies of scale and services. However, the continuous expansion of the industry towards the capture of value has made it so that more and more manufacturing companies have become exclusively service companies (J. Björkdahl, 2020; Joakim

Björkdahl & Holmén, 2019). This leads us to think about and explain one of the paradigms introduced in this article: digitalization is a concept defined and characterized by every activity depending on its orientation.

3. From Owned Property to Shared Property: The digital transformation in the service industry has made it possible that much of the operations support, initially held by the company, to be shared with third parties. With the digitalization of back-end operations through shared digital services instead of through owned or internal property, companies can expand efficiently, achieve significant time savings, and avoid restructuring costs (Bergeron, 2002; Forst, 2001; Lichtenthaler, 2017; Sako, 2010).
4. From Low Risk and Long Investment Return to High risk, High yield, and Short Investment Return: Manufacturing companies transformed into service companies because of falling profit margins in their mature sectors have seen their margins grow and return on investment improved. However, this also implies an increase in investment risk.
5. From Standardization to Customization: Standardization in the manufacturing industry has usually been linked to scalability and cost reduction, and digitalization has played a fundamental role in this process (Nooteboom, 1992). The Internet of Things, Internet of Service, and data mining have enabled new forms of customization and personalization. Digitalization has made it possible to go from mass customization to personalization, which means that a better coverage of customer needs is achieved through certain services. Customization and personalization of services have made it possible to increase the scale, scope, and value of businesses, increasing quality, cost-saving, variety, and efficacy through on-demand production services (Hu, 2013).

The reviewed literature revealed that until now, many researchers have investigated different types of servitization as an extension to manufacturing (Martinez et al., 2017). However, it is currently considered a change in the company's competitive strategy (Cusumano et al., 2015; Kox & Rubalcaba, 2007; Rubalcaba, 1999). Although digitalization processes for service companies were initially complementary to the offered product (Frank et al., 2019), nowadays digital transformation processes must be considered different in product-oriented and service-oriented industries since they deal with different industrial environments in a Schumpeterian way (Visnjic et al., 2016). Table 4 shows how digitalization strategies have different objectives in business models.

5.3 Third Research Question

The business consulting sector has undoubtedly undergone a great digital transformation in the entire economy (Krüger & Teuteberg, 2018). Many of those who are currently partners of large consulting firms can recall how, not even two decades ago, there were large offices with staff intensively recording company accounts. Many forms had to be filled out by hand and then sent to the Tax Office by mail, and entire floors of a building were used to store documents. The business model of the sector in those times was exclusively face-to-face interaction (Nissen et al., 2018) with very high labour costs, and equally high fees charges for the services provided. The digital transformation of the consulting sector has three main causes: a rationalization of costs, legal imposition, and a search for new scale economies. So, to answer RQ3, a systematic literature review was carried out for digitalization in the consulting sector. The search used a Boolean equation and the results were filtered with the criteria shown in Table 5.

Although the digitalization and digital transformation of companies in all sectors have been extensively researched —as shown in Table 5— there is a lack of articles on accounting, tax, and labour advice in the digitalization of the consulting sector. The final sample of selected articles, once thoroughly studied, consisted of 13 articles from the 24 results after the previous filter stages. This is surprising, as the literature states that Industry 4.0 applies to the consulting sector. The digital transformation of the consultancy sector can provide more accurate, high-quality, real-time accounting, and more effective reporting for decision-making (Burritt & Christ, 2016). The administrative procedures within the organization have undergone a transformation that has resulted in the optimization of all back-office processes, leading to a reduction in management expenses. These improvements have been very important for companies that provide accounting, tax, and labour advice services. The great competition in the sector has led consulting companies to implement computer systems that allow them to control all areas of the client's company in an integrated manner with a significant reduction in personnel costs. The role of digital transformation has not only been accompanied by this reduction but has also been used to increase revenue (Werth & Greff, 2018). Consultancy companies have not only been the drivers and facilitators of digital transformation in many companies but have also adapted their business models to their clients (Jeronimo et al., 2019). Digital transformation and increased investment in the consultancy sector have been motivated by both internal and external factors (see Table 6).

The increase in the digitalization of the consultancy sector has happened for different reasons. On the one hand, a series of external factors have caused companies in the sector to implement modern technology as a solution to the challenges and opportunities that have arisen. On the other hand, it has been due to external factors not related to the sector, or the consulting companies themselves.

Table 5. Selected papers on digitalization in consulting services.

	Initial search	Excluding duplicates	Excluding not related to digitalization in consulting services after revising the abstract
SCOPUS (S)	55	54	10
WoS (W)	27	20	6
ProQuest (P) (Abi-Inform)	43	42	7
EBSCO (E)	8	8	1
		133	**124**

Search string: ((("Digitalization" OR "Digitalisation" OR "Digitation" OR "Digital transformation") NEAR ("Advising" OR "consulting" OR "Accounting")))
Source: own elaboration.

Table 6. Triggering factors for the digitalization boost of the consultancy sector in Spain.

	ECONOMIC	ORGANIZATIONAL
INTERNAL FACTORS	Efficiency (+)	Spatial flexibility (+)
	Scale economies (+)	Data security (+)
	Operational cost (-)	Job overlap (+) reduction (+)
	Structural cost (-)	Compliance(+)
	CLIENT	**INSTITUTIONAL**
EXTERNAL FACTORS	New software requirements (-) (-)	Compulsory tax filing (-) (-)
	Just-in-time consulting (-) (-)	Electronic notifications (-) (-)
	Data mining decision-making (-)	Paperless public office (+)
		E-Government (+)

Source: own elaboration, adapted from Nissen & Seifert (Volker Nissen et al., 2018).

5.3.1 Internal factors: economic and organizational

The research results revealed eight internal factors identified as efficiency, scale economies, operational cost, structural cost (related to economic aspects), spatial flexibility, data security, reduction of job overlap, and compliance (related to organizational matters).

a. Internal factors from an economic perspective –

Efficiency (+): Digital transformation has had a positive effect on the economic efficiency of the consultancy sector. Evaluating the cost-effectiveness of digitalization results in consulting has a positive relation in terms of profits through technology, streamlined workflow, and alternative staffing models (Christensen et al., 2013).

Scale Economies (+): Digitalization plays a positive role as an enabler of economies of scale, scope, and speed. Extending the point of view of Bharadwaj et al. (2013), the consulting industry has increased its size by offering new services through digitalization without increasing infrastructure.

Operational Cost (-): Digital transformation reduces operational costs in consulting activities since these employ a large number of human resources and it helps to reduce them.

Structural Cost (-): Digitalization reduces structural cost by transforming the operating business model, and introducing flexibility and scalability through digital solutions. Since Covid-19 affected all industries, consulting has gained a structural cost advantage due to a reduction in the physical footprint caused by the change in client behaviour.

b. Internal factors in the organizational perspective of the Euro

Spatial Flexibility (+): Digital transformation in the consulting industry has resulted in spatial flexibilization, i.e., an open office environment where, even in a crisis scenario, it has been possible not only to keep the consultancy operation running but to increase employee productivity. Knowledge-intensive work has transformed the workplace into a multi-platform ecosystem where employees are no longer attached to an office but to a digital platform. These circumstances have made it possible for the office space to be used more efficiently, cutting down on overlapping staff hours or lagging work performance, drastically reducing costs in terms of time and money.

Data Security (+): Digital transformation has also made it possible to boost data security since consulting firms have experienced several years' worth of digitalization in a month due to Covid-19, not only for their infrastructures but also for clients.

Reduction of Job Overlap (+): Digital transformation has positively affected a reduction in job overlapping because workers in organizations simplified their duties.

In terms of consulting, information and communication technology (ICTs) development helps workers save time, also making this information more available to clients (Løberg, 2020).

Compliance (+): Consultancy compliance has developed a kind of cyber-government of consulting companies. Compliance has grown with the pandemic. Digitalization has improved it through the standardization of tasks to be achieved (Parviainen et al., 2017).

5.3.2 External factors: clients and institutions

The results also revealed seven external factors that we identified as those related to clients (new software requirements, just-in-time consulting, data mining-based decision-making) and related to institutions (compulsory tax filing, electronic notifications, paperless public office, and e-Government). It is often said that there is no greater motivation than the need and the obligation to do something by force. Agility is frequently cited as one of the requirements for successful digitalization (Kohlen & Holotiuk, 2017).

It is suggested that one of the most important triggers for company digitalization is the need to ensure readiness for digital transformation (Berghaus & Back, 2017). It enables companies to adapt to changes in their environment, helping them to remain competitive and maintain competitive advantages. Changing those practices has frequently increased through the consultancy sector. Developing a new digital strategy comes frequently from external partners that are needed due to the ever-changing and fast movement of digital trends. So, external triggers are key channels to increase the capabilities of the digital firm.

The consulting sector in Spain has experienced an expedited digital transformation as a result of various external factors.

External factors from the client's perspective –

New software requirements (-): Covid-19 has changed the way the consulting industry operates. The consultancy has adapted its offer to meet clients' preferences and demands, providing reliable and high-quality standards at a low cost with the same human resources.

Just-in-time consulting (-): Due to the pandemic, knowledge-intensive services have gained flexibility since it is no longer necessary to go to the client facilities to get advice. Customers need advice more rapidly, and online consulting technologies provide a way for doing this. Company-wide management programs, which offered complete integration with the consultants, were created so that visiting the company would no longer be necessary and it entailed an enormous reduction in costs.

Data mining decision making (-): Data mining and business intelligence (BI) have become key to providing unique professional services to clients (Ibrahim et al., 2014). BI has provided consulting companies with a new strategic field that impacts and enhances their business sustainability.

a. External factors from an organizational perspective –

Compulsory tax filing (-): In the late 1980s and early nineties, the Spanish public administration began to force companies to send certain documents to the administration electronically (Guillén Caramés, 2010).

Electronic Notifications (-): The process has advanced rapidly, so nowadays almost all transactions with the public administration have to be submitted online. The latest case started in 2020, with a new technological revolution in business and administration due to the Covid-19 crisis. The government imposed the obligation to send documents online, forcing many companies in the consultancy sector to adapt their organizational models to the new system.

Paperless Public Office (+): The extensive use of new mechanisms of electronic filing of documents in public administration is allowing massive digitization of documentation, which is leading many companies to undertake a complete digitization process.

E-Government (+). The e-Government has allowed the materialization and articulation of the digital transformation of many companies and organizations. For its implementation (Gilbert & Balestrini, 2004), consulting companies have played a fundamental role as a causal link between e-Government and the companies.

The evolution of the consulting sector in the last 10 years has tended towards a paperless office business model, primarily motivated by endogenous factors such as optimizing the price of services, reducing structural costs, and reducing labour costs as it is an eminently labour-intensive activity. The change in the business model towards virtualization (Overby, 2012; Seifert & Nissen, 2018) has been seen in the literature as a necessity rather than as a self-guided change. It is an adaptation of business models where resilience has had an important role in adapting to changing market needs (Jeronimo et al., 2019). The digitalization of processes in the sector has caused a change as radical as that from the typewriter to the computer. Now, online accounting is done without the need for an accountant, the tax documents presented to the Treasury are self-generated, dashboards, and treasury predictions are simultaneously created while accounting. All these jobs, which were previously labour-intensive, now take advantage of the synergies created in the internal processes of the company with the implementation of integrated ERP programs. Internal factors can be looked at from two different points of view, an economic one motivated by the reduction in costs and the increase in efficiency with scale economies, and also as an organizational advantage enabling communication within and outside the organization.

One of the most important factors for digital transformation is centred on cost savings. Bilgeri highlights and points out potential partnerships (consulting sector)

as facilitators of digital transformation, since they avoid the birth of internal pricing and cost conflicts.

The explanation for the new activity in the sector is the accelerating pace of technological changes driven by the disruption of new businesses. They are achieved by using the new strategic business models that have begun to emerge. Business models, such as that of Legalitas Online Lawyers (in Spain), have revolutionized law consulting by mixing the digitalization of online counselling procedures with the introduction of a very affordable online fee for a consultancy service that has achieved high returns.

5.4 Internal and external validity

The present research work uses a systematic literature review (SLR) methodology combined with a bibliometric cluster analysis (BA) conducted using the VOSviewer software (van Eck & Waltman, 2010). The combination of SLR + BA techniques has its origin in medicine; this work has taken into account the reviews made by Ramey (Ramey & Rao, 2011) and by Pulsiri and Vatananan (Pulsiri & Vatananan-Thesenvitz, 2018). All references found in the bibliography were investigated to be analyzed with a BA analysis. This analysis was completed to provide internal and external validity of the data through an exhaustive review of the final sample of articles. This review confirmed the data from the cluster analysis performed with VOSviewer.

6. Conclusions

There is no doubt that we live in a time of changes in the digitalization of business models. Digital transformation has been seen mostly from a product-oriented perspective. When referring to services, it has been studied mainly as part of the production process with the concept of servitization, which is the vertical integration that creates new scale economies in industries with the creation of new services instead of products. However, with the SLR analysis carried out in this article, we have seen that there's a new revolution in the service industry, with no physical products, and services are the only thing provided to customers. The results for RQ1 showed that there is a preference for Tranfield´s methodology (Tranfield et al., 2003) when studying digitalization with SLR. This methodology was used to analyze literature about product and service industries (RQ2), finding that there is a trend to show a difference between business orientations. In recent years, there has been a shift in the approach taken toward digitalization, and a difference between the product and service sectors is being considered. As a special case in the service industry, consulting services (RQ3) have been studied. The consultancy has increased in the last decade and is growing. There have been both internal and external causes for this advance. The first one is economic; consulting companies needed to adapt to their high labour and structural costs. Digitalization also allowed them to use new scale economies, introducing new lines of income by offering customers electronic consultancy services. An example of this is Legalitas, a Spanish law firm created to provide only digital services using service virtualization. The second cause is external and is due to changes in governmental institutions. Public administration has forced the sector to change and adapt to technological change. Paperless public offices were quickly implemented and have rapidly become the norm.

The following list of research problems summarizes the major concerns derived from our SLR, pointing out a guide for further research in Consultancy Digitalization:

- Since there is a difference between digitization in the manufacturing industry and the service industry, what are the factors that determine these differences?
- Professional service firms (PSF) play a noticeable role in furthering that commitment. From this prominent position, PSF could be highlighted as a core tenet for digital transformation , supporting the belief that they have been promoting and increasing the digitalization of their clients, acting as drivers and facilitators of digitalization. Hence, it would be necessary to investigate what are the internal and external factors that affect the digitization process of the company and try to articulate constructs to measure them.
- Finally, if the presence of consulting companies in small businesses constitutes a catalyst for digital transformation, it would be relevant to know what are the repercussions on the company's performance.

7. Limitations and future lines of research

This study highlights the need for new lines of research in the field of service digitalization, specifically in two areas: first, the consequences that the current health crisis has had on consultancy; second, investigate the variables that best represent and measure the importance of these changes. Another line of research could be to determine the best variables to measure the internal and external factors cited as triggers for this digital expansion. An appropriate tool could be structural equation modelling (SEM) since it is perfectly adapted to measuring variables with indicators that are difficult to quantify.

This research was limited by the scarcity of documents on this research topic. Digitalization in consulting services has just begun to be investigated and currently, there is not much literature that addresses it. Therefore, many of the proposed ideas are novel, while others have been adopted by analogy from other academic areas.

Conflict of interest

The authors declare no conflict of interest.

References

Alvesson, M., & Sandberg, J. (2011). Generating research questions through problematization. *Academy of Management Review, 36*(2), 247–271. https://doi.org/10.5465/amr.2009.0188

Ancillai, C., Terho, H., Cardinali, S., & Pascucci, F. (2019). Advancing social media driven sales research: Establishing conceptual foundations for B-to-B social selling. *Industrial Marketing Management, 82*, 293–308. https://doi.org/10.1016/j.indmarman.2019.01.002

Aral, S., & Weill, P. (2007). IT assets, organizational capabilities, and firm performance: How resource allocations and organizational differences explain performance variation. *Organization Science, 18*(5), 763–780. https://doi.org/10.1287/orsc.1070.0306

Avison, D., & Malaurent, J. (2014). Is Theory King?: Questioning the Theory Fetish in Information Systems. *Journal of Information Technology, 29*(4), 327–336. https://doi.org/10.1057/jit.2014.8

Babar, Z., & Yu, E. (2019). Digital transformation-implications for enterprise modeling and analysis. *Proceedings - IEEE International Enterprise Distributed Object Computing Workshop, EDOCW, 2019-Octob,* 1–8. https://doi.org/10.1109/EDOCW.2019.00015

Balsmeier, B., & Woerter, M. (2019). Is this time different? How digitalization influences job creation and destruction. *Research Policy, 48*(8). https://doi.org/10.1016/j.respol.2019.03.010

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Ben-Daya, M., Hassini, E., & Bahroun, Z. (2019). Internet of things and supply chain management: a literature review. In *International Journal of Production Research*. https://doi.org/10.1080/00207543.2017.1402140

Bergeron, B. (2002). *Essentials of Shared Services*. John Wiley &Sons.

Berghaus, S., & Back, A. (2017). *Disentangling the Fuzzy Front End of Digital Transformation: Activities and Approaches*. http://aisel.aisnet.org/icis2017/PracticeOriented/Presentations/4

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly: Management Information Systems, 37*(2), 471–482. https://doi.org/10.25300/MISQ/2013/37:2.3

Björkdahl, J. (2020). Strategies for Digitalization in Manufacturing Firms. *California Management Review*. https://doi.org/10.1177/0008125620920349

Björkdahl, Joakim, & Holmén, M. (2019). Exploiting the control revolution by means of digitalization: value creation, value capture, and downstream movements. *Industrial & Corporate Change, 28*(3), 423–436. http://10.0.4.69/icc/dty022

Burritt, R., & Christ, K. (2016). Industry 4.0 and environmental accounting: a new revolution? *Asian Journal of Sustainability and Social Responsibility, 1*(1), 23–38. https://doi.org/http://dx.doi.org/10.1186/s41180-016-0007-y

Butler, L. (2010). An alternative to WoS subject categories: redefining journal sets for closer alignment to a national classification scheme. *Eleventh International Conference on Science and Technology Indicators, 62*.

Castellacci, F. (2008). Technological paradigms, regimes and trajectories: Manufacturing and service industries in a new taxonomy of sectoral patterns of innovation. *Research Policy, 37*(6–7), 978–994. https://doi.org/10.1016/j.respol.2008.03.011

Cavallone, M., & Palumbo, R. (2020). Debunking the myth of industry 4.0 in health care: insights from a systematic literature review. *TQM Journal, 32*(4), 849–868. https://doi.org/10.1108/TQM-10-2019-0245

Chang, S. E., & Chen, Y. (2020). When blockchain meets supply chain: A systematic literature review on current development and potential applications. *IEEE Access, 1*. https://doi.org/10.1109/access.2020.2983601

Christensen, C. M., Wang, D., & van Bever, D. (2013). Consulting on the cusp of disruption. *Harvard Business Review, OCT*.

Clarke, D. (2020). Robo-Advisors - Market Impact and Fiduciary Duty of Care to Retail Investors. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3539122

Cooper, H. M. (1988). Organizing knowledge syntheses: A taxonomy of literature reviews. In *Knowledge in Society* (Vol. 1, Issue 1). https://doi.org/10.1007/BF03177550

Cusumano, M. A., Kahl, S. J., & Suarez, F. F. (2015). Services, industry evolution, and the competitive strategies of product firms. *Strategic Management Journal, 36*(4), 559–575. https://doi.org/10.1002/smj.2235

Denyer, D., & Tranfield, D. (2009). Producing a Systematic Review. In *The SAGE Handbook of Organizational Research Methods* (pp. 671–689).

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133,* 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Drejer, I. (2004). Identifying innovation in surveys of services: a Schumpeterian perspective. *Research Policy, 33*, 551–562. https://doi.org/10.1016/j.respol.2003.07.004

Durach, C. F., Kembro, J., & Wieland, A. (2017). A New Paradigm for Systematic Literature Reviews in Supply Chain Management. *Journal of Supply Chain Management, 53*(4), 67–85. https://doi.org/10.1111/jscm.12145

Edwards, W. (1977). How to Use Multiattribute Utility Measurement for Social Decisionmaking. *IEEE Transactions on Systems, Man and Cybernetics, 7*(5), 326–340. https://doi.org/10.1109/TSMC.1977.4309720

Evangelista, R. (2000). Sectoral Patterns Of Technological Change In Services. *Economics of Innovation and New Technology, 9*(3), 183–222. https://doi.org/10.1080/10438590000000008

Forst, L. I. (2001). Management: Shared Services Grows Up. In *Journal of Business Strategy* (Vol. 22, Issue 4, pp. 13–15). https://doi.org/10.1108/eb040179

Frank, A. G., Mendes, G. H. S., Ayala, N. F., & Ghezzi, A. (2019). Servitization and Industry 4.0 convergence in the digital transformation of product firms: A business model innovation perspective. *Technological Forecasting and Social Change, 141*, 341–351. https://doi.org/10.1016/j.techfore.2019.01.014

Gebauer, H., Fleisch, E., Lamprecht, C., & Wortmann, F. (2020). Growth paths for overcoming the digitalization paradox. *Business Horizons, 63*(3), 313–323. https://doi.org/10.1016/j.bushor.2020.01.005

Gebayew, C., Hardini, I. R., Panjaitan, G. H. A., Kurniawan, N. B., & Suhardi. (2018). A Systematic Literature Review on Digital Transformation. *2018 International Conference on Information Technology Systems and Innovation, ICITSI 2018 - Proceedings*, 260–265. https://doi.org/10.1109/ICITSI.2018.8695912

Gheidar, Y., & ShamiZanjani, M. (2020). Conceptualizing the digital employee experience. *Strategic HR Review, ahead-of-p[ahead-of-print)*. https://doi.org/10.1108/shr-01-2020-0004

Gilbert, D., & Balestrini, P. P. (2004). Barriers and benefits in the adoption of e-government. *Article in International Journal of Public Sector Management*. https://doi.org/10.1108/09513550410539794

Guerrieri, P., & Meliciani, V. (2005). Technology and international competitiveness: The interdependence between manufacturing and producer services. *Structural Change and Economic Dynamics, 16*(4), 489–502. https://doi.org/10.1016/j.strueco.2005.02.002

Guillén Caramés, J. (2010). *La administración electrónica: ¿Mito o realidad para los ciuidadanos del siglo XXI?* (Centro PwC & IE del Sector Público (ed.)).

Haas, Y. (2019). Developing a generic retail business model – a qualitative comparative study. *International Journal of Retail and Distribution Management, 47*(10), 1029–1056. https://doi.org/10.1108/IJRDM-10-2018-0234

Hausberg, J. P., Liere-Netheler, K., Packmohr, S., Pakura, S., & Vogelsang, K. (2019). Research streams on digital transformation from a holistic business perspective: a systematic literature review and citation network analysis. *Journal of Business Economics, 89*(8–9), 931–963. https://doi.org/10.1007/s11573-019-00956-z

Helbin, T., & Van Looy, A. (2019). Business Process Ambidexterity and its impact on Business-IT alignment. A Systematic Literature Review. *2019 13th International Conference on Research Challenges in Information Science (RCIS), 2019-May,* 1–12. https://doi.org/10.1109/RCIS.2019.8877073

Hoang, G. T. T., Dupont, L., & Camargo, M. (2019). Application of decision-making methods in smart city projects: A systematic literature review. *Smart Cities, 2*(3), 433–452. https://doi.org/10.3390/smartcities2030027

Hoffmann, D., & Ahlemann, F. (2019). *Harnessing Digital Enterprise Transformation Capabilities for Fundamental Strategic Changes: Research on Digital Innovation and Project Portfolio .... d-nb.info*. https://d-nb.info/1202011012/34

Hook, D. W., Porter, S. J., & Herzog, C. (2018). Dimensions: Building Context for Search and Evaluation. *Frontiers in Research Metrics and Analytics, 3*. https://doi.org/10.3389/frma.2018.00023

Horne, C. A., Maynard, S. B., & Ahmad, A. (2017). Organisational information security strategy: Review, discussion and future research. *Australasian Journal of Information Systems, 21*. https://doi.org/10.3127/ajis.v21i0.1427

Hu, S. J. (2013). Evolving paradigms of manufacturing: From mass production to mass customization and personalization. *Procedia CIRP, 7*, 3–8. https://doi.org/10.1016/j.procir.2013.05.002

Ibrahim, J., Bhatti, Z., & Waqas, A. (2014). Business Intelligence as a Knowledge Management Tool in Providing Financial Consultancy Services. *American Journal of Information Systems, 2*(2), 26–32. https://doi.org/10.12691/ajis-2-2-1

Jeronimo, C., Pereira, L., & Sousa, H. (2019). Management Consulting Business Models: Operations through and for Digital Transformation. *Proceedings - IEEE International Conference on Engineering, Technology and Innovation, ICE/ITMC 2019*. https://doi.org/10.1109/ICE.2019.8792592

Keele, S. (2007). Guidelines for performing systematic literature reviews in software engineering. In *Technical report, Ver. 2.3 EBSE Technical Report. EBSE*.

Kitchenham, B., Pearl Brereton, O., Budgen, D., Turner, M., Bailey, J., & Linkman, S. (2008). Systematic literature reviews in software engineering – A systematic literature review. *Elsevier*. https://doi.org/10.1016/j.infsof.2008.09.009

Knudsen, D. R. (2020). Elusive boundaries, power relations, and knowledge production: A systematic review of the literature on digitalization in accounting. *International Journal of Accounting Information Systems, 36*, 100441. https://doi.org/10.1016/j.accinf.2019.100441

Kohlen, J., & Holotiuk, F. (2017). Consulting firms under the influence of digitalization: The need for greater organizational agility. *SIGMIS-CPR 2017 - Proceedings of the 2017 ACM SIGMIS Conference on Computers and People Research*, 175–176. https://doi.org/10.1145/3084381.3084421

Kohtamäki, M., Rabetino, R., Einola, S., Parida, V., & Patel, P. (2021). Unfolding the digital servitization path from products to product-service-software systems: Practicing change through intentional narratives. *Journal of Business Research, 137*, 379–392. https://doi.org/10.1016/J.JBUSRES.2021.08.027

Kollwitz, C., & Dinter, B. (2019). What the Hack? – Towards a Taxonomy of Hackathons. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 11675 LNCS, 354–369*. https://doi.org/10.1007/978-3-030-26619-6_23

Kox, H., & Rubalcaba, L. (2007). The contribution of business services to European economic growth. *Business Services in European Economic Growth, 2003*, 74–94. https://doi.org/10.1057/9780230228795

Krüger, N., & Teuteberg, F. (2018). *Consulting business models in the digital era. MKWI 2018 - Multikonferenz Wirtschaftsinformatik, 2018-March*, 1273–1284.

Lammers, T., Tomidei, L., & Regattieri, A. (2018, October 4). What causes companies to transform digitally? An overview of drivers for Australian key industries. *PICMET 2018 - Portland International Conference on Management of Engineering and Technology: Managing Technological Entrepreneurship: The Engine for Economic Growth, Proceedings*. https://doi.org/10.23919/PICMET.2018.8481810

Lemus Aguilar, I., Hidalgo, A., Cagliano, R., Isaac, L. A., Hidalgo, A., & Cagliano, R. (2015). Innovation in consulting firms: What are the foundations? *IAMOT 2015 - 24th International Association for Management of Technology Conference: Technology, Innovation and Management for Sustainable Growth, Proceedings, June*, 951–966.

Levy, Y., & Ellis, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research. *Informing Science, 9*, 181–211. https://doi.org/10.28945/479

Lichtenthaler, U. (2017). Shared value innovation: Linking competitiveness and societal goals in the context of digital transformation. *International Journal of Innovation and Technology Management, 14*(4). https://doi.org/10.1142/S0219877017500183

Linnenluecke, M. K., Marrone, M., & Singh, A. K. (2020). Conducting systematic literature reviews and bibliometric analyses. In *Australian Journal of Management*. https://doi.org/10.1177/0312896219877678

Littell, J. H., Corcoran, J., & Pillai, V. (2009). Systematic Reviews and Meta-Analysis. In Oxford University Press (Ed.), *Systematic Reviews and Meta-Analysis*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195326543.001.0001

Liu, C. H. S. (2018). Examining social capital, organizational learning and knowledge transfer in cultural and creative industries of practice. *Tourism Management, 64*, 258–270. https://doi.org/10.1016/j.tourman.2017.09.001

Løberg, I. B. (2020). Efficiency through digitalization? How electronic communication between frontline workers and clients can spur a demand for services. *Government Information Quarterly, 38*(2), 101551. https://doi.org/10.1016/j.giq.2020.101551

Locke, K., & Golden-Biddle, K. (1997). Constructing Opportunities for Contribution: Structuring Intertextual Coherence and "Problematizing" in Organizational Studies. *Academy of Management Journal, 40*(5), 1023–1062. https://doi.org/10.5465/256926

Mahmood, F., Khan, A. Z., & Khan, M. B. (2019). Digital organizational transformation issues, challenges and impact: A systematic literature review of a decade. *Abasyn Journal of Social Sciences, 12*(2). https://doi.org/10.34091/ajss.12.2.03

Marquardt, K. (2017). Smart services – characteristics, challenges, opportunities and business models. *Proceedings of the International Conference on Business Excellence, 11*(1), 789–801. https://doi.org/10.1515/picbe-2017-0084

Marques, I. C. P., & Ferreira, J. J. M. (2020). Digital transformation in the area of health: systematic review of 45 years of evolution. *Health and Technology, 10*(3), 575–586. https://doi.org/10.1007/s12553-019-00402-8

Martinez, V., Neely, A., Velu, C., Leinster-Evans, S., & Bisessar, D. (2017). Exploring the journey to services. *International Journal of Production Economics*. https://doi.org/10.1016/j.ijpe.2016.12.030

Mikalef, P., & Pateli, A. (2017). Information technology-enabled dynamic capabilities and their indirect effect on competitive performance: Findings from PLS-SEM and fsQCA. *Journal of Business Research, 70*, 1–16. https://doi.org/10.1016/j.jbusres.2016.09.004

Miles, I. (2009). Innovation in Services. In *The Oxford Handbook of Innovation*. https://doi.org/10.1093/oxfordhb/9780199286805.003.0016

Milian, E. Z., Spinola, M. de M., & Carvalho, M. M. d. (2019). Fintechs: A literature review and research agenda. *Electronic Commerce Research and Applications, 34*. https://doi.org/10.1016/j.elerap.2019.100833

Miozzo, M., & Soete, L. (2001). Internationalization of services: A technological perspective. *Technological Forecasting and Social Change, 67*(2–3), 159–185. https://doi.org/10.1016/S0040-1625(00)00091-3

Monteiro Cavalieri Barbosa, A., & Pego Saisse, M. C. (2019). Hybrid project management for sociotechnical digital transformation context. *Brazilian Journal of Operations & Production Management, 16*(2), 316–332. https://doi.org/10.14488/bjopm.2019.v16.n2.a12

Mukhopadhyay, S., & Bouwman, H. (2019). Orchestration and governance in digital platform ecosystems: a literature review and trends. In *Digital Policy, Regulation and Governance* (Vol. 21, Issue 4, pp. 329–351). Emerald Group Publishing Ltd. https://doi.org/10.1108/DPRG-11-2018-0067

Nazir, S., Nawaz, M., Adnan, A., Shahzad, S., & Asadi, S. (2019). Big Data Features, Applications, and Analytics in Cardiology—A Systematic Literature Review. *IEEE Access, 7*, 143742–143771. https://doi.org/10.1109/ACCESS.2019.2941898

Nissen, V., Lezina, T., & Saltan, A. (2018). The role of IT-management in the digital transformation of Russian companies. *Foresight and STI Governance, 12*(3), 53–61. https://doi.org/10.17323/2500-2597.2018.3.53.61

Nissen, Volker, Seifert, H., & Blumenstein, M. (2018). A Method to Support the Selection of Technologies for the Virtualization of Consulting Services. *Digital Transformation of the Consulting Industry: Extending the Traditional Delivery Model*, 243–274. https://doi.org/10.1007/978-3-319-70491-3_10

Nooteboom, B. (1992). Information Technology, Transaction Costs and the Decision to 'Make or Buy.' *Technology Analysis & Strategic Management, 4*(4), 339–350. https://doi.org/10.1080/09537329208524105

Nosratabadi, S., Mosavi, A., & Lakner, Z. (2020). Food supply chain and business model innovation. *Foods, 9*(2). https://doi.org/10.3390/foods9020132

Okoli, C., & Schabram, K. (2012). A Guide to Conducting a Systematic Literature Review of Information Systems Research. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1954824

Orduña-Malea, E., & Delgado-López-Cózar, E. (2018). Dimensions: Redescubriendo el ecosistema de la información científica. *Profesional de La Informacion, 27*(2), 420–431. https://doi.org/10.3145/epi.2018.mar.21

Osterrieder, P., Budde, L., & Friedli, T. (2020). The smart factory as a key construct of industry 4.0: A systematic literature review. *International Journal of Production Economics, 221*. https://doi.org/10.1016/j.ijpe.2019.08.011

Overby, E. (2012). Migrating Processes from Physical to Virtual Environments: Process Virtualization Theory. In *Information systems theory* (pp. 107–124). Springer. https://doi.org/10.1007/978-1-4419-6108-2_6

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: how to benefit from digitalization in practice. *International Journal of Information Systems and Project Management, 5*(1), 63–77. https://doi.org/10.12821/ijispm050104

Petticrew, M., & Roberts, H. (2006). Systematic Reviews in the Social Sciences. In M. Petticrew & H. Roberts (Eds.), *Systematic Reviews in the Social Sciences: A Practical Guide*. Blackwell Publishing Ltd. https://doi.org/10.1002/9780470754887

Ponsignon, F., Kleinhans, S., & Bressolles, G. (2019). The contribution of quality management to an organisation's digital transformation: a qualitative study. *Total Quality Management and Business Excellence, 30*(sup1), S17–S34. https://doi.org/10.1080/14783363.2019.1665770

Pulsiri, N., & Vatananan-Thesenvitz, R. (2018). Improving systematic literature review with automation and bibliometrics. *PICMET 2018 - Portland International Conference on Management of Engineering and Technology: Managing Technological Entrepreneurship: The Engine for Economic Growth, Proceedings*. https://doi.org/10.23919/PICMET.2018.8481746

Ramey, J., & Rao, P. G. (2011). The systematic literature review as a research genre. *IEEE International Professional Communication Conference*. https://doi.org/10.1109/IPCC.2011.6087229

Rom, A., & Rohde, C. (2007). Management accounting and integrated information systems: A literature review. *International Journal of Accounting Information Systems, 8*(1), 40–68. https://doi.org/10.1016/j.accinf.2006.12.003

Rousseau, R., & Leuven, K. U. (2018). The Australian and New Zealand Fields of Research (FoR) Codes. *ISSI Newsletter, 14*(3), 59–61. www.dimensions.ai

Rowley, J., & Slack, F. (2004). Conducting a literature review. In *Management Research News* (Vol. 27, Issue 6, pp. 31–39). Emerald Group Publishing Limited. https://doi.org/10.1108/01409170410784185

Rubalcaba, L. (1999). *Business Services in European Industry: Growth, Employment and Competitiveness* (European Communities (ed.)).

Sahlin, J., & Angelis, J. (2019). Performance management systems: reviewing the rise of dynamics and digitalization. *Cogent Business and Management, 6*(1). https://doi.org/10.1080/23311975.2019.1642293

Sako, M. (2010). Outsourcing Versus Shared Services. *Article in Communications of the ACM, 53*(7), 27–29. https://doi.org/10.1145/1785414.1785427

Sanchez-Gonzalez, P. L., Díaz-Gutiérrez, D., Leo, T. J., & Núñez-Rivas, L. R. (2019). Toward digitalization of maritime transport? In *Sensors (Switzerland)* (Vol. 19, Issue 4). MDPI AG. https://doi.org/10.3390/s19040926

Sandberg, J., & Alvesson, M. (2011). Ways of constructing research questions: gap-spotting or problematization? *Organization, 18*(1), 23–44. https://doi.org/10.1177/1350508410372151

Schäffer, T., & Leyh, C. (2017). Master data quality in the era of digitization - toward inter-organizational master data quality in value networks: A problem identification. *Lecture Notes in Business Information Processing, 285*, 99–113. https://doi.org/10.1007/978-3-319-58801-8_9

Schinagl, S., & Shahim, A. (2020). What do we know about information security governance?: "From the basement to the boardroom": towards digital security governance. *Information and Computer Security, 28*(2), 261–292. https://doi.org/10.1108/ICS-02-2019-0033

Seifert, H., & Nissen, V. (2018). Virtualization of Consulting Services: State of Research on Digital Transformation in Consulting and Future Research Demand. *Digital Transformation of the Consulting Industry: Extending the Traditional Delivery Model*, 61–73. https://doi.org/10.1007/978-3-319-70491-3_2

Smith, V. (2003). Constructivist and ecological rationality in economics. In *American Economic Review* (Vol. 93, Issue 3, pp. 465–508). https://doi.org/10.1257/000282803322156954

Smith, V. (2012). Adam Smith on Humanomic Behavior. *The Journal of Behavioral Finance & Economics, 2*(1), 1–20.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104*, 333–339. https://doi.org/10.1016/J.JBUSRES.2019.07.039

Strozzi, F., Colicchia, C., Creazza, A., & Noè, C. (2017). Literature review on the 'smart factory' concept using bibliometric tools. In *International Journal of Production Research* (Vol. 55, Issue 22). Taylor and Francis Ltd. https://doi.org/10.1080/00207543.2017.1326643

Teece, D., & Pisano, G. (1994). The Dynamic Capabilities of Firms: An Introduction. *Industrial and Corporate Change, 3*(3), 537-556. https://doi.org/10.1093/icc/3.3.537-a

Thelwall, M. (2018). Dimensions: A competitor to Scopus and the Web of Science? *Journal of Informetrics, 12*(2), 430–435. https://doi.org/10.1016/j.joi.2018.03.006

Thorpe, R., Holt, R., Macpherson, A., & Pittaway, L. (2005). Using knowledge within small and medium-sized firms: A systematic review of the evidence. In *International Journal of Management Reviews* (Vol. 7, Issue 4, pp. 257–281). https://doi.org/10.1111/j.1468-2370.2005.00116.x

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Journal of Management, 14*, 207–222.

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics, 84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*. https://doi.org/10.1016/0263-2373(88)90033-3

Visnjic, I., Wiengarten, F., & Neely, A. (2016). Only the Brave: Product Innovation, Service Business Model Innovation, and Their Impact on Performance. *Journal of Product Innovation Management*. https://doi.org/10.1111/jpim.12254

Vom Brocke, J., Simons, A., Niehaves, B., Riemer, K., Plattfaut, R., & Cleven, A. (2009). Reconstructing the giant: On the importance of rigour in documenting the literature search process. *17th European Conference on Information Systems, ECIS 2009*. www.uni.lihttp://aisel.aisnet.org/ecis2009/161/

Waltman, L., Van Eck, N. J., & Noyons, E. C. M. M. (2010). A unified approach to mapping and clustering of bibliometric networks. *Journal of Informetrics, 4*(4), 629–635. https://doi.org/10.1016/j.joi.2010.07.002

Webster, J., & Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly, 26*(2), xiii--xxiii. https://www.jstor.org/stable/4132319

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180.

Werth, D., & Greff, T. (2018). *Scalability in Consulting: Insights into the Scaling Capabilities of Business Models by Digital Technologies in Consulting Industry* (pp. 117–135). Springer, Cham. https://doi.org/10.1007/978-3-319-70491-3_5

Wichmann, J., & Wißotzki, M. (2019). An Exploration of Enterprise Architecture Research in Hospitals. *Lecture Notes in Business Information Processing, 373 LNBIP*, 89–100. https://doi.org/10.1007/978-3-030-36691-9_8

Wiedenmann, M., & Größler, A. (2019). The impact of digital technologies on operational causes of the bullwhip effect – a literature review. *Procedia CIRP, 81*, 552–557. https://doi.org/10.1016/j.procir.2019.03.154

Wilson, M., Wnuk, K., Silvander, J., & Gorschek, T. (2018). A literature review on the effectiveness and efficiency of business modeling. In *E-Informatica Software Engineering Journal* (Vol. 12, Issue 1, pp. 265–302). Politechnika Wroclawska. https://doi.org/10.5277/e-Inf180111

Wohlin, C. (2014). Guidelines for snowballing in systematic literature studies and a replication in software engineering. *ACM International Conference Proceeding Series*, 1–10. https://doi.org/10.1145/2601248.2601268

Wulff, A., Montag, S., Marschollek, M., & Jack, T. (2019). Clinical Decision-Support Systems for Detection of Systemic Inflammatory Response Syndrome, Sepsis, and Septic Shock in Critically Ill Patients: A Systematic Review. *Methods of Information in Medicine, 58*(6), E43--E57. https://doi.org/10.1055/s-0039-1695717

Zhang, H., Xu, X., & Xiao, J. (2014). Diffusion of e-government: A literature review and directions for future directions. In *Government Information Quarterly* (Vol. 31, Issue 4, pp. 631–636). Elsevier Ltd. https://doi.org/10.1016/j.giq.2013.10.013

Zhang, W., & Banerji, S. (2017). Challenges of servitization: A systematic literature review. *Industrial Marketing Management, 65*, 217–227. https://doi.org/10.1016/j.indmarman.2017.06.003

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Estudios Gerenciales
vol. 39, no. 167, p. 142 - 158, 2023
Universidad Icesi,
ISSN: 0123-5923

DOI: https://doi.org/10.18046/j.estger.2023.166.5498