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Coming face to face with innovation and digitization: the case of book printing in Spain

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Abstract

This paper deals with how technological change and digitization in the Spanish book printing sector are challenging existing business models and encouraging printers to modify their product portfolio and core competencies. This research analyzes the impact of digitization on the business models of Spanish book printing houses. The case studies conclude that: a) book printing houses, although aware of the necessary digital transformation, continue to maintain the traditional business model alongside the new one, b) customers are the main driving force for digital transformation in book printing houses, c) there is a trade-off between cultural and environmental policies as drivers of the paradigm shift in book printing houses and d) the digital context is a motivating factor for book printing houses to integrate vertically downstream.

Keywords: core competences, cultural policy, digital transformation, book printing house, business model

1. Introduction

Technological changes have influenced book production, mainly through the computerization of printing processes (Tian and Martin, 2010; Steinberg, 2017; Brillenburg Wurth, Driscoll and Pressman, 2018; Zimmermann, Ferreira and Carizzo Moreira, 2019), and have driven the development of digital printing, providing book printing houses with a more efficient and flexible tool to meet the new demands and requirements of the market: shorter print runs, printing on-demand and customization of print copies, among others (Gallagher, 2014; Wilson-Higgins, 2017).

The printing industry – one of the most technically advanced and complex – faces significant technology management challenges, particularly since the emergence of innovations, such as, among others, the new digital workflows or digital printing technologies. This pace shows no sign of slowing and seems to have sped up in recent years. The printing industry could now be said to be in a state of almost continual change. Nonetheless, many of those problems display significant opportunities for the analysis and further development of solutions (Prakhya and Hull, 2006). The introduction of new technologies and the Internet in

book printing houses significantly improved their production processes and communication with their customers (Longhi and Rochhia, 2014; Clark, and Phillips, 2019). Accordingly, a new online printing model appears, characterized by Internet sales and the digital printing system. There is an unfolding of the channel, so both channels coexist simultaneously: the ‘offline’ with the ‘online’ (Wang, Tsai, and Chang, 2016; North and Kumta, 2018). Internet sales have meant for book printing houses the possibility of connecting with a new customer profile beyond their area of geographical influence and increasing its efficiency by shortening delivery times (Minguela-Rata, Arias-Aranda and Opazo-Basáez, 2014; Świerczek, 2014; Wang and Disney, 2016). Nowadays, more and more book printing houses allow the production of books ordered on the Internet without the publisher having to go to the book printing house (or conversely) with a file to print since it is possible sending it through File Transfer Protocol (FTP).

Innovation and technological change in book printing houses increasingly depend on technologies and standards external to this industry (Benghozi and Salvador, 2016; Fleischmann, Daniel and Welters, 2017; Grodach, O’Connor and Gibson, 2017; Protogerou, Kontolaimou and Caloghirou, 2017). Digital printing or new printing

materials, such as mineral paper, would be examples of how book printing houses adopt innovations from more technical sectors (Zimmermann, Ferreira and Carizzo Moreira, 2016; Schulte-Holthaus, 2018). In this regard, it can be noted that the most frequent is the adoption of innovations, basically, from the world of technology, and managing the implementation of new technology efficiently and effectively will be, thus, a critical success factor in the printing industry (Prakhya and Hull, 2006).

The transition to digital technologies of book production has influenced trades and professions, which, until relatively recently, were significant in graphic arts, such as linotypists or proofreaders, among others. Procedures that were recently highly labor-intensive have been automated, digitized, and replaced by workers skilled in the use of digital-based technologies. In this case, there is a process of creative destruction associated with new companies, new technologies, and qualified human resources. Creative destruction generates the possibility of new businesses within the book printing houses, such as on-demand printing and online title management, while, on the other, it displaces processes from conventional to digital printing. Those book printing houses best adapting to the publishing market dynamism will be the ones sustained over time. As said above, two printing formulas coexist: conventional and digital.

One of the relative advantages of digital printing, in comparison with conventional printing, has to do with cost reduction in short print runs: in digital printing, the unit cost is fixed and independent of the number of printed copies, while in conventional printing, the unit cost per copy diminishes according to print runs, which places digital printing as an ideal option for short print runs (Kranz and Picot, 2016).

The academic literature underlines that technological changes can redefine any industry where inserted and modify its pre-existing business models (Christensen, 1997; Bindra, Parameswar and Dhir, 2019), but also stresses that the changes operated are gradual and go through different stages before the consolidation of a new dominant paradigm or productive model (Abernathy and Utterback, 1978; Dodgson and Gann, 2018). On the other hand, the little existing research on digitization in graphic arts has been based mainly on describing changes in production processes, but not on their impact on business models. (Magadán Díaz and Rivas García, 2019).

A study of the impact of digitization on book printing houses' business models is the general goal of this research, and the specific objectives focus on finding answers to the following questions: a) how does dig-

itization affect the business models of book printing houses?; b) how do book printing houses adapt to the new private demand needs?; c) to what extent can public policies influence changes in the book printing paradigm?; and d) does digitization lead book printing houses to integrate vertically downstream?

Innovation is not a choice but a need in this era of rapid changes in the printing industry. The printing industry is the perfect one to analyze rapid technological changes and problems associated with these and develop methods for overcoming all those difficulties, guaranteeing technical changes proceed appropriately (Prakhya and Hull, 2006).

The study is structured as follows: the second section offers the theoretical framework; the third section describes the case study; the fourth section includes the main findings derived from the analysis and, finally, the fifth section summarizes the conclusions reached.

2. Theoretical framework

This section presents the leading theories on business models, digitization, and innovation management, which constitute the conceptual and analytical framework for carrying out case studies in this work.

2.1 Business models

A business model defines how organizations create and deliver value to their customers and structures the market in which runs, placing themselves within a value chain composed of suppliers, intermediaries, and customers (Amit and Zott, 2001; Teece, 2010; DaSilva and Trkman, 2014; Spieth, Schneckenberg and Ricart, 2014; Wirtz, et al., 2016; Foss and Saebi, 2017; Mazzarol and Reboud, 2020). In short, a business model: i) represents the operative architecture behind the value chains and supply of a product, and ii) facilitates both the understanding and the response given by organizations to the market and its needs (Foss and Saebi, 2018).

Digital transformation and technological change – in the book printing sector – not only foster new ways of presenting their products through digital printing but also favor the development of new business models, among which online sales can be highlighted (Peng, 2016; North and Kumta, 2018; Wirtz, 2019). The joint result of all these changes for organizations is the need to adapt their respective business models to make profitable the changes derived from technological innovations (Sabatier, Mangematin, Rousselle, 2010; DaSilva and Trkman, 2014; Spieth, Schneckenberg and Ricart, 2014; Wirtz, et al., 2016; Foss and Saebi, 2017; Mazzarol and Reboud, 2020).

Companies belonging to sectors that are considered mature – such as graphic arts – should be dynamized and adapted to improve both their competitiveness and their sustainable development in the face of environmental changes, so it is necessary to study the interactions among innovation, digitization, and business model in the framework of the current economy (Andreini and Bettinelli, 2017; Afuah, 2014; Visnjic, Wiengarten and Neely, 2014; Martins, Rindova and Greenbaum, 2015; Evans, et al., 2017).

It is significant to highlight the role of an open innovation culture within organizations (Stanko, Fisher and Bogers, 2017; Enkel, Bogers and Chesbrough, 2020). Business organizations will be able to detect new business opportunities, either from within their structures or in collaboration with other digital organizations, driving the transformation of mature sectors with new products, services, techniques, and ideas, that is, with new logics for value creation (Viljakainen, Toivonen and Seisto, 2016; Massa, Gianluigi and Tucci, 2018; Majchrzak and Malhotra, 2020).

2.2 Knowledge and innovation

Knowledge and innovation are the main factors for today's organizations, as they represent the essence of their competitive advantage and promote changes in business models to better adapt to environmental conditions (Luong, et al., 2017; Magadán Díaz and Rivas García, 2019). The redefinition of an existing business model demands the capability to produce or absorb new knowledge (Afuah, 2014; Hsieh and Wu, 2019; Snihur and Wiklund, 2019).

Innovation is a fundamental source of competitive advantages for business organizations, promoting, at the same time, the sectoral development in which they locate (Schumpeter, 1934; Dodgson, 2018; Malerba and Pisano, 2019). However, innovation processes depend on the size of an organization: a) to make bigger R+D+I (Research, Development, and Innovation),

b) to hire technically qualified personnel, and c) to compensate for the risks from the investment in R+D+I with higher sales (Schumpeter, 1934). From the knowledge perspective, innovation is supposed to be a paramount factor in any production process and a source of value-generating competitive advantages with cumulative effects (Alvarez and Barney, 2017; Dayan, Heisig and Matos, 2017). One of these innovation sources is the business organizations' ability to access and strategically manage knowledge, also known as absorption capacity (Reid, et al., 2018; Patel, 2019; Kafouros, et al., 2020).

Knowledge and innovation in the graphic arts sector are increasingly dependent on technologies and standards that are external to this industry, which will boost the search for open innovation in companies from the graphic arts sector, both via knowledge overflow and via agreements with specialized organizations (Benghozi and Salvador, 2016; Fleischmann, Daniel and Welters, 2017; Grodach, O'Connor and Gibson, 2017; Magadán Díaz and Rivas García, 2019; Protogerou, Kontolaimou and Caloghirou, 2017).

2.3 Print digitization

The impact of the Internet and digitization on economic systems causes very different effects among diverse industries depending on whether they integrate technical changes into their respective production processes or not. For organizations integrating technical changes, this can mean gains in productivity, while for non-integrators it implies just the opposite, to the point that the sectoral transformation operated by the organizations integrating change ends up undermining the old existing business models of the organizations outside such impacts, and that finally see themselves close to closure (Martin and Tian, 2016; Magadán Díaz and Rivas García, 2019). In sum, the transition from offline to online portfolio products will pose critical challenges and changes for the graphic arts industry (Mohammed Ali, et al., 2019; Gallagher, 2014).

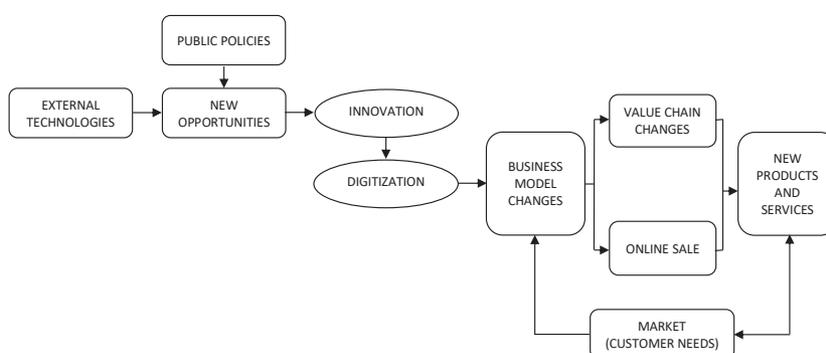


Figure 1: Research and conceptual framework of the case study

2.4 Research and conceptual framework

Once analyzed the theoretical framework to study the impact of digitization on printing business models, Figure 1 provides the research framework for this study. This research and conceptual framework show the relationships among the following aspects: the adoption of technology, adaptation to market needs, the influence of public policies and their effects on the value chain, and possible vertical integration.

From the research and conceptual framework shown in Figure 1, it is proceeded to present the case studies together with the findings obtained.

3. Case studies: digitization in Spanish book printing houses

This section presents the case studies conducted on the digitization of three Spanish book printing houses, according to their size, and the Spanish context.

3.1 The Spanish context

Spain is one of the European countries with the largest number of companies and production volumes in the graphic industry. It is a very atomized sector, with numerous companies: 13 032 companies linked to graphic arts that employ 56 830 people (INE, 2019), with companies of very small size, with an average workforce of three people in 70 % of cases. They are usually family businesses and of domestic capital, although, in recent years, some investment funds are joining the graphic industry (CESCE, 2017).

The communities with the highest weight in the graphic arts sector are Madrid (23 %) and Catalonia (22 %), followed by Andalusia (11 %) and the Community of Valencia (10 %). There are also a few large companies and leading positions: the first five companies in the sector absorb 10 % of the market share and are integrated into international groups (CESCE, 2017).

Firstly, customers of book printing companies benefit from the existence of an excess of supply in the market and, secondly, by the little or almost no differentiation in the quality of the products and services offered. Consequently, changing the printing service provider does not imply a significant opportunity cost. This industry suffers an excess of capacity (oversupply), causing closures and concentrations and forces the remaining book printing houses to be more productive.

Although the graphic arts sector has generated 5523 million euros (CESCE, 2017), the number of companies operating in Spain has been reducing since 2008.

Many of these companies merged with others to survive, mainly due to their low production and profitability. This decline was more pronounced since the Great Crisis of 2008, experiencing a hard adjustment in recent years, with the disappearance of small-sized companies and a meaningful diminishing in production, motivated by the reduction of advertising investment and publishing activity.

A circumstance that contributes to the shortening of book printing activities is the spread of information through digital media (Davis, 2014; Wolford, 2016). Digital distribution of information and e-publishing has reduced the volume of production of the book printing houses (Cherian, 2015). Only analyzing the reduction of print runs published in Spain, for example, while in 2016 the average print run was 2749 copies, in 1997 it was of 6 670 copies, which has meant a reduction of 59 % (Magadán-Díaz and Rivas-García, 2020).

Increasing production costs (machinery, paper, ink, and energy) and changing customer needs explain the fall in turnover in Spanish book printing houses. Hence, more and more companies in the sector focus on new online business models allowing them to: a) diversify their offer, b) streamline their production processes, and c) optimize costs.

The book printing sector in Spain is evolving and innovating permanently, which is an essential process to guarantee the survival of companies that operate in a highly complex, dynamic, and hostile environment given the high intra-sectoral competitiveness that forces an update and improvement of their processes, increasingly oriented to digital printing – one of the fundamental sectoral innovations of recent years.

3.2 Case method

The method used to carry out the empirical study is that of the case study method. This approach is fundamentally interpretive (Cresswell, 2003) and fits the scope and objectives of this research because it offers the possibility of explaining or understanding a phenomenon, a process, or a combination of these (Corbetta, 2003).

This methodology turns out to be very suitable when the key questions are what (description), how, and why (application) in the generation of a theory (Snow and Thomas, 1994).

From the vast academic literature on the case study method, its foundations, and applications, must be underlined works and studies such as those of Eisenhardt (1989), Chetty (1996), Gerring (2007), Simons (2011), Yin (2011) or Elman, Gerring, and

Table 1: Description of cases of study

Company	Named as	Operating years	Legal form	Employees rank	Turnover rank (in millions of €)
Book printing house 1	P1	59	Individual company	5–25	0.6–1.5
Book printing house 2	P2	28	Limited liability company	5–25	1.5–3
Book printing house 3	P3	66	Public limited company	25+	6–30

Mahoney (2016). These works are considered seminal in an updated approach to the case study method, both in understanding and implementation.

The case study method has been applied to business management research on business cooperation associations and agreements (Wilson and Vlosky, 1997; Yin, 2009), on managerial and organizational processes (Grunow, 1995; Mintzberg, 1973) or related to operations management (Ketokivi and Choi, 2014), among others. In this context, we have chosen to use this methodology to develop the empirical analysis since the case study is one of the fundamental research strategies within the qualitative field, especially concerning organizational change and innovation (Brown and Eisenhardt, 1997; McCutcheon and Meredith, 1993; Pettigrew and Whipp, 1991; Van de Ven and Poole, 1990).

The book printing houses that make up this study were selected according to a criterion of convenience (accessibility and profile sought for the set of cases); therefore, given the difficulty of accessing professionals in this field, only those who could effectively contribute to the questions of this research were selected, a necessary condition in the case studies (Cresswell, 2003; Miles, Huberman and Saldaña, 2013).

In a case study, there should be a cross-check of data sources, which guarantees: a) its constructive validity, since the use of different data sources and analysis methods will allow a more accurate picture of the subject studied, and b) the possibility of replicating, with analogous researches, to confirm or refute the findings obtained (Bartlett and Vavrus, 2016; Elman, Gerring and Mahoney, 2016; Gummesson, 2017).

Among the different methods of evidence collection, this research used the following: a) search and review of documents of the book printing houses analyzed (documentary shreds of evidence like advertising, catalogs, reports, and memorandums of the companies analyzed, as well as financial data, among others), and b) conducting structured interviews (face to face or via Skype). All this collection process responds to the

methodological need for an informative triangulation that assesses the alignment of the responses obtained from the book printing houses to the existing documentary evidence and is publicly available.

As said above, the method used to carry out the empirical study is the case method, as it is considered that two primary conditions or dimensions are met for its implementation: a) the type of questions that are sought to answer with the development of this investigation facilitates the application of the case study and b) the problem addressed is novel and complex enough to require an approach through this method (Yin, 2014; Ridder, 2017; Roseli Wunsch Takahashi and Araujo, 2019).

This research selected three book printing houses – using, as said, a convenience sampling –, named as P1, P2, and P3. Next, the profile of each organization studied is summarized (see Table 1).

Three interviews were conducted from October to November 2019, with representatives of each one of the three selected book printing houses and carried out by the authors of this research; of those, one was in person (face to face), and the rest was by Skype. The questions formulated were broad enough so that those responsible interviewed could freely delve into the issues raised. These open questions, despite having made the analysis more complex, have allowed us to achieve a much richer and more nuanced interpretation.

The questionnaire was prepared following Josselson (2013), considering, among others, the following recommendations: a) predominance of open versus closed questions; b) design questions that promote the narrative discourse of the interviewee so that the information flows naturally and organically; c) avoid the abuse of questions that require an answer to a ‘why’ and force an intellectualization process of the interviewee that should be carried out by the person conducting the research; d) take into account how the interviewee expresses himself when addressing a question or proposed topic to better assess his position on the question.

Finally, a narrative approach was adopted to convey the results of the analysis, seeking to establish a connection between the themes. This narrative was paired with the bibliographic references, seeking validation of the results collected in the theoretical framework. This process culminated in reaching the main theoretical and practical implications of this research, described in the final observations of this study.

3.3 Digitization at a company level

To understand the challenges and opportunities in the graphic arts industry in Spain related to digitization, it is proceeded to the case studies of three reference printers, according to their size.

3.3.1 P1 book printing house

The P1 book printing house, established in 1958, takes the legal form of an individual company. It offers conventional and digital printing services in short runs and on-demand. It was a pioneer in Spain in introducing digital printing and variable data over 21 years ago. Since the 1980s, P1 integrated pre-press, printing, and post-press services into its organization, being the first book printing house in its environment to incorporate a binding machine so as not to have to outsource this phase of the process and thus provide better service to its customers. Although P1 retains conventional printing, this only accounts for 10 % of the total workload currently.

Since 1994, P1 has a web page that offers the presentation of the company and compliance with the privacy policy but does not offer an online quote request (only provided by email), or access to product catalogs, or access to price lists, or file delivery via FTP. Together with conventional printing services, P1 also offers, in addition to content digitization, the transformation of files into ePub or PDF format.

The P1 company has a brand for self-publishing, a downstream vertical integration, which its manager describes as *'one more service we offer to our customers. We facilitate the procedures of the ISBN, and it comes out with a stamp without appearing author-editor, but, for me, that is not an editorial'*, admits that, *'although we were the first to introduce a digital book printing house in Spain, we still maintain an offset printing machine, but that we hardly use'* and finally concludes *'right now, 90 % of our turnover comes from digital printing'*.

The manager of P1 points out that, for the moment, *'we only produce paper books, from a copy up to those that our customers wish'* and that *'once finished, we deliver it to them'* and adds *'It is we who manage the ISBN and the legal deposit. The book comes out with our stamp, which*

we created for it'. Although they do not publish, for the moment, e-book, *'we offer our customers the possibility of generating the e-file in ePub or PDF so that later they can upload it to some platform of e-books'*.

Its manager highlights the quality of printing obtained, which is comparable to the print quality of an offset machine, noting that *'with the new digital machines it is very difficult, with the naked eye, to know whether it is digital printing'*. One of the brakes that have made digital printing no longer extend is that *'digital printing machines cannot standstill. For each copy we print, a percentage is paid to the equipment manufacturer plus a fixed fee, so you must ensure a good workflow and set the prices per sheet printing to avoid financial problems'*, and points out that many book printing houses have suffered bad moments and have even closed as a result of *'an aggressive pricing policy to attract customers so that the digital machine did not stop, but without covering costs'*. Finally, the manager of P1 stresses that the future of book printing unavoidably goes through digital printing.

3.3.2 P2 book printing house

The P2 book printing house has a history of 28 years. Established in 1992, it adopts the legal form of a limited liability company. With net equity of 320 000 euros, the turnover of P2 moves in the range of 1.5 and 3 million euros in 2019. However, the CEO of P2 acknowledges that the trend of its turnover was downward since 2014, with a fall estimated at approximately 6.5 %. The P2 printing house has a powerful web page that shows: a) the presentation of the company, b) the request for online quotes, c) the monitoring of the evolution of the order, d) the possibility of sending files via FTP, and e) compliance of the privacy policy. Together with conventional and digital printing services, it also offers, in addition to the digitization of content, the possibility of making e-books with the incorporation of multimedia content adaptable to any reading device. The P2 has its FTP server for the reception of files using the client/model and works so that each publishing company can send them through this system. All the aforementioned tasks are performed by offering quotation request services through its website and with real-time response. For this, users must be registered as customers, who are provided with a digital identification and a password. Once the budget has been provided, users have the option to place the order or leave it. For more than four years, P2 offers publishers the possibility of distributing and marketing their funds, both those of paper and e-books, managing the relationship with digital platforms, and offering sales control tools. It stands out that those who are making more use of this distribution tool are those who self-publish. So far, P2 has not developed its publishing label.

Although the book printing house began its journey with conventional printing, its CEO points out that *'our book printing house is fully digital'*. Also, it is highlighted that the print quality achieved has nothing to envy to an offset machine: *'the introduction of digital machines has allowed us to do more work in less time and improve the service we offer to our customers'*, to which adds that *'digital printing is very fast, the ink comes out dry and can be bound instantly. If offset printing was done, the job would take at least three days because you must generate the plates, print, let the ink dry to avoid rubbings, and, in the end, bind'*.

The P2 has taken another step and is positioning itself as an online book printing house. Its CEO underlines that *'the future of book printing goes through digital printing'*, and acknowledges that *'we have made a great investment, both in the new digital machinery and in a portal with all the technology available at the moment'* aimed at *'offering a close deal, more competitive prices, reducing delivery times of the final product to the customer and expand our catalog of products and services'*. At the moment, P2 offers graphic design, layout, processing, and transformation services to any format (ePub, Mobi, among others) so that it can be read on e-devices, as well as the management of the marketing of e-books on Amazon, Apple, Book House, Kobo. According to its CEO, *'we are a living company, in constant movement to live up to the current markets and cover all their needs'* and, besides, announces that the online tracking of shipments and a virtual library will be launched for books, both in paper or digital format, of *'those publishing companies with which we reach an agreement'*. The CEO of P2 admits that cannot say what has been the most outstanding innovation, although *'perhaps it is the computerization of the entire production process'* and recognizes that innovations carried out in P2 are focused both in processes and in products, although without specifying in detail.

3.3.3 P3 book printing house

The P3 book printing house, established in 1954, has the legal form of a public limited company. With a registered capital of 60 000 euros, the turnover of P3 moves in a range between 6 and 30 million euros in 2019. It offers solutions for sheet-fed offset printing, web offset, and digital printing. The P3 company has opted for the finished product and thus, since the 1990s, has incorporated folding and binding systems in the plant so as not to depend on other external companies, shorten delivery times and control the quality offered to customers. Also, at that time, P3 integrated services of pre-press, printing, and post-press. It has been a pioneering book printing house in going out to the foreign markets at the end of the 1990s, with entrenched customers in France, Germany, Italy, Belgium, Portugal, Holland, and

Morocco, allowing P3 to create an international department and undertake, from the quote request and the order of production, the monitoring, and compliance in time and form of the entire production process, thus giving an immediate service and maintaining maximum control of production. According to its manager, *'we have had dare to go beyond national borders, building over time a reputation based on consolidated knowledge, reliability, financial strength, the willingness to innovate and experiment'*, and stresses that the future of book printing goes through digital printing.

The P3 has also become an online book printer where customers can calculate the printing price of a book, brochure, or catalog. According to the manager of P3, *'we are aware that the company has to be in continuous renovation to be able to compete with the same weapons in an increasingly close league, where the digital technology implemented in this sector was sweeping those companies that resisted to adapt to the new digital environment'*, adding that *'the market always rewards those organizations that invest in the incorporation of new technologies and that assume technological change'*.

The P3's commitment to online printing has allowed it to reduce fixed costs, improve customer accessibility and shopping experience. According to its manager, *'customers access our website, select the products and the quantity wished from each one and finalize their purchase choosing the place and term of delivery'*. Having an online-based business model, P3 has had to create a strong enough infrastructure to support all the daily orders received, forcing to have a team of software engineers to support and maintain the technological modules, which in turn is driving the growth of the company. The P3 can manage, in just one day, a volume of up to 4500 orders, from printing a single copy to 800 copies. According to its manager, *'we can meet any demand, from the urgent printing of a book or catalogs to the careful edition of a book with luxury finishes'* and assures that the future of book printing involves developing digital printing and having an online service of book printing.

Currently, P3 is committed to environmental sustainability by researching and developing printing on new ecological materials, such as stone paper or plant paper, using recycled paper to print customer orders, and using ecological inks, that is, replacing the polluting components by others more environmentally respectful. In this sense, P3 invests in ecological printing systems, such as the LED-UV system, which eliminates pollutants such as mercury or ozone, among others, thereby reducing the ecological footprint.

The manager of P3 underlines that *'the book printing house has made a deep digital and technological trans-*

formation that has allowed it to expand its service offer and adapt existing ones to new market demands'. In short, 'the coexistence of the online world, new management applications and traditional sales teams have profoundly modified this business', because 'it has generated significant integration, automation, and complimentary services needs for our customers'.

4. Discussion of findings

The answers obtained to the research questions initially formulated are summarized in Figure 2 where the location of findings within the research and conceptual framework is shown.

The first finding (F1) stresses that the book printing houses have recognized the need for digitization within their business models but have not yet fully traveled that path and recognizing the need to do it. The second finding (F2) refers to the fact that there is an insufficient adaptation from book printing houses to private demand needs. The third finding (F3) shows a significant impact of public policies on the change in the printing paradigm. Finally, the fourth and last finding (F4) underlines that digitization is driving book printing houses to integrate vertically downstream.

Next, the findings obtained from the case study performed are discussed.

4.1 Digitization in existing business models

First, the book printing houses studied have begun to explore new digital products but with little progress in aspects such as the following: a) the building of interoperable digital infrastructures, b) the definition of industrial standards, and c) the development of joint distribution systems.

Second, the Internet and mobile connectivity are changing the printing business model and, therefore,

how book printing houses and customers interact: shortening the production process, reducing delivery times, or expanding online services, are some effects derived from the adaptation of the business model of the book printing houses analyzed.

Third, although the printers studied are clinging to the traditional business model and distribution networks, they are making several incursions to explore new business opportunities such as digital printing and online printing. Many of the initiatives of a digital nature promoted in the book printing houses studied are still limited and fragmented in terms of internal organization. In any case, printers are receptive to the phenomenon of digitization. The Spanish publishing printing houses analyzed combine several business models. However, the traditional model remains dominant.

Fourth, the book printing houses analyzed are aware of the need to incorporate new specialized talent that provides the new skills necessary for the transformation of their respective business models, so to extract maximum performance from all technological developments, they must invest a lot, either in training, or in the attraction of that qualified personnel, since the control of the variables of the new context of the printing business will no longer depend on the 'physical' or 'manual' ability of the person, but on their technological knowledge to fix properly the appropriate parameters to each support and printing difficulty. In short, the new printing model will use less 'touch' and more 'brain'.

4.2 Insufficient adaptation to private demand needs

Firstly, the most critical issue faced by printing companies is, without a doubt, the one related to delivery times: since customers perceive print work as a homogeneous product – given the similarity in quality offered by the printers in the sector together with low-priced and competitive prices that are not very differentiated –, these tend to demand increasingly shorter

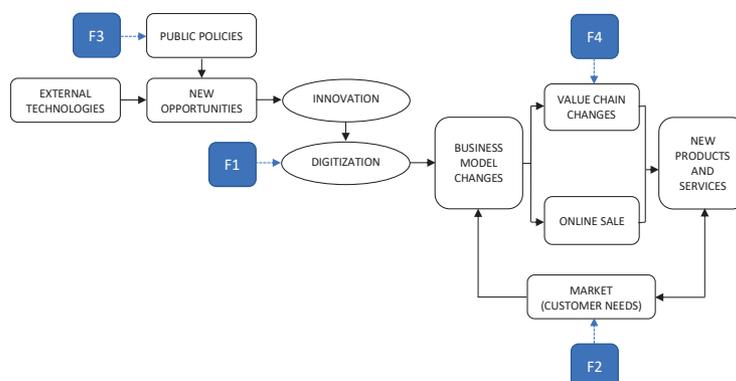


Figure 2: Location of findings within the research and conceptual framework

delivery times and opt for those printers that are capable of performing the work within that timing. A tendency that presses the book printing houses to offer the development of a work from days to hours avoiding the bottlenecks associated with a simple template reinforcement at certain stages of the printing work.

Secondly, to offer competitive prices and reduced delivery times, it is necessary to implement automation in the various processes of printing work. Automation is seen as the only possible way to survive in the market. From the perspective of those responsible for the book printing houses studied, there is no other way.

Thirdly, the print runs continue to shorten. To produce short print runs cost-effectively, it is imperative to use software that automates the entire workflow, from design to billing, through shipping; and all with the minimum human intervention, which implies both an adaptation and innovative effort in each of the phases of the printing process.

4.3 Public policies and change of book printing paradigm

How book printing houses relate to innovation, technical change, digitization, and their impact on existing business models, can also be understood from the public policies surrounding the graphic arts sector. Specifically, there are two kinds of influences on book printing paradigms: a) promoted by cultural policies and b) promoted by environmental policies.

Firstly, cultural policies promote publishing projects to favor all links in the publishing value chain, which implies a priority commitment to paper format over the digital. Failure to do so would, from a political perspective, turn its back on three links in the value chain: book printing houses, middlemen (distributors), and bookstores. Whether public resources address publishing projects with no favoring the paper format, then their effects on those three links – in their traditional version – would be null.

Second, environmental policies promote a paradigm shift from the printing business model to digital printing and online processes using less polluting raw materials to make it more sustainable and environmentally responsible.

4.4 Digitization and vertical integration

The development of digital printing and new technologies will lead to the book printing houses being able to grow their business model through the vertical integration downstream, assuming a publisher role and even a commercial function through the online sale.

Digital transformation – in the opinion of the book printing houses analyzed – will continue to be a priority in their respective agendas, searching for greater efficiency and better positioning of their product and service portfolios.

Finally, the graphic arts sector – unlike what happens in other sectors analyzed by academic literature – develops a type of strategy around its digital transformation not oriented towards the formation of barriers to market entry for other potential external competitors, which, presumably, may favor adequate assimilation and adoption of both adaptive and disruptive innovations.

5. Conclusions

The graphic arts sector in Spain is immersed in an increasingly digital reality, which implies a redefinition of production processes and a constant rethinking of the business model.

The book printing houses studied are absorbing digital knowledge to try to position and respond adequately to changes in the market and changing technologies. However, they acknowledge not fully exploiting the full potential of new digital technologies through their respective business models.

The technologically motivated book printing houses are concerned with introducing process innovations to increase its efficiency, both in product development and in its commercialization: digital printing or new printing materials, such as mineral paper, would be some examples of how they adapt to the printing innovations coming from more technical sectors.

The introduction of new technologies and the Internet in the printing houses: a) significantly improves communication with their regular customers, b) makes it possible to connect with a new customer profile beyond their geographical range of action, and c) increases their efficiency by shortening times of delivery. As a result of all this, a new online book printing model appears characterized by Internet sales and the digital book printing system. Thereby, there is an unfolding of the channel so that offline and online printing coexist together.

The studied book printing houses find that users of their services have different expectations of digital products compared to their analog predecessors. The data provided by the book printing houses show the changes experienced in their respective companies are produced not by their initiative but by the necessary customer orientation, which makes them their reason to innovate, forcing the book printing houses to permanent evolution in products and services.

There is a trade-off between cultural policies, consolidating the traditional printing model against environmental policies, driving a sustainable model that favors the digital transition in graphic arts.

The book printing houses – as the first link in the publishing value chain – have a significant incentive for a forward vertical integration based on self-publishing, avoiding, among others, the costs associated with the search for authors or those related to the negotiation of the publishing contract. Finally, this incentive for a forward vertical integration seems to be independent of its size.

Finally, the trends that will mark the sector will be: a) a better adaptation to customer demands, with a product customization and faster deliveries, b) a growing investment in digital technology, c) a higher environmental responsibility, with the use of recyclable products and of less impact on the environment and d) a necessary search for workers with new skills and abilities that can use tools such as the use of artificial

intelligence, big data, and that allow improving the productivity of printing processes.

In conclusion, digitization manifests itself as a fundamental piece for the graphic arts sector to improve its productivity and profitability. It is not only a question of taking full advantage of the broad possibilities of digital printing but also about increasing the efficiency of printing processes thanks to the automation and use of resources offered by digital marketing, the big data, or the implementation of the web-to-print so that the printers adapt adequately to the demands and requirements of the client.

Though this research has focused on the printing industry, this case method approach can be applied to any industry undergoing rapid or continuous change to take a snapshot that helps understand not only the impacts derived from innovation and technical change but to draw a future profile of trends from a strategic management perspective.

References

- Abernathy, W.J. and Utterback, J.M., 1978. Patterns of industrial innovation. *Technology Review*, 80(7), pp. 41–47.
- Afuah, A., 2014. *Business model innovation: concepts, analysis, and cases*. Abingdon, UK: Routledge.
- Alvarez, S.A. and Barney, J.B., 2017. Resource-based theory and the entrepreneurial firm. In: M.A. Hitt, R.D. Ireland, S.M. Camp and D.L. Sexton, eds. *Strategic entrepreneurship: creating a new mindset*. Hoboken, NJ, USA: Wiley, pp. 87–105.
- Amit, R. and Zott, C., 2001. Value creation in e-business. *Strategic Management Journal*, 22(6–7), pp. 493–520. <https://doi.org/10.1002/smj.187>.
- Andreini, D. and Bettinelli, C., 2017. Business model definition and boundaries. In: *Business model innovation: from systematic literature review to future research directions*. Cham, Switzerland: Springer International Publishing, pp. 25–53.
- Bartlett, L. and Vavrus, F., 2016. *Rethinking case study research: a comparative approach*. London, UK: Routledge.
- Benghozi, P.-J. and Salvador, E., 2016. How and where the R&D takes place in creative industries? Digital investment strategies of the book publishing sector. *Technology Analysis & Strategic Management*, 28(5), pp. 568–582. <https://doi.org/10.1080/09537325.2015.1122184>.
- Bindra, S., Parameswar, N. and Dhir, S., 2019. Strategic management: the evolution of the field. *Strategic Change*, 28(6), pp. 469–478. <https://doi.org/10.1002/jsc.2299>.
- Brillenburg Wurth, K., Driscoll, K. and Pressman, J. eds., 2018. *Book presence in a digital age*. London, UK: Bloomsbury Publishing.
- Brown, S.L. and Eisenhardt, K.M., 1997. The art of continuous change: linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, 42(1), pp. 1–34. <http://dx.doi.org/10.2307/2393807>.
- CESCE, 2017. *Informe sectorial de la economía española: papel y artes gráficas, 2017*. [online] Available at: <https://issuu.com/cesce.es/docs/isectorial_09-papel_artes_graficas_> [Accessed February 2021].
- Cherian, J., 2015. Emergence of digital publishing – a great challenge to the print publications. *Procedia Economics and Finance*, 23, pp. 576–586. [https://doi.org/10.1016/S2212-5671\(15\)00361-5](https://doi.org/10.1016/S2212-5671(15)00361-5).
- Chetty, S., 1996. The case study method for research in small- and medium-sized firms. *International Small Business Journal*, 15(1), pp. 73–85. <https://doi.org/10.1177/0266242696151005>.
- Christensen, C.M., 1997. *The innovator's dilemma: when new technologies cause great firms to fail*. Boston, MA, USA: Harvard Business School Press.
- Clark, G. and Phillips, A., 2019. *Inside book publishing*. 6th ed. Abingdon, UK: Routledge.
- Corbetta, P., 2003. *Metodología y técnicas de investigación social*. Madrid: McGraw-Hill Interamericana.
- Cresswell, J.W., 2003. *Research design: qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA, USA: Sage Publications.

- DaSilva, C.M. and Trkman, P., 2014. Business model: what it is and what it is not. *Long Range Planning*, 47(6), pp. 379–389. <https://doi.org/10.1016/j.lrp.2013.08.004>.
- Davis, R.H., 2014. Business economics and the printing industry. *Business Economics*, 49, pp. 122–126. <https://doi.org/10.1057/be.2014.9>.
- Dayan, R., Heisig, R. and Matos, F., 2017. Knowledge management as a factor for the formulation and implementation of organization strategy. *Journal of Knowledge Management*, 21(2), pp. 308–329. <https://doi.org/10.1108/JKM-02-2016-0068>.
- Dodgson, M., 2018. *Technological collaboration in industry: strategy, policy and internationalization in innovation*. Abingdon, UK: Routledge.
- Dodgson, M. and Gann, D., 2018. *Innovation: a very short introduction*. Oxford, UK: Oxford University Press.
- Eisenhardt, K.M., 1989. Building theories from case study research. *Academy of Management Review*, 14(4), pp. 532–550. <https://doi.org/10.2307/258557>.
- Elman, C., Gerring, J. and Mahoney, J., 2016. Case study research: putting the quant into the qual. *Sociological Methods & Research*, 45(3), pp. 375–391. <https://doi.org/10.1177/0049124116644273>.
- Enkel, E., Bogers, M. and Chesbrough, H., 2020. Exploring open innovation in the digital age: a maturity model and future research directions. *R&D Management*, 50(1), pp. 161–168. <https://doi.org/10.1111/radm.12397>.
- Evans, S., Vladimirova, D., Holgado, M., Van Fossen, K., Yang, M., Silva, E. A. and Barlow, C. Y., 2017. Business model innovation for sustainability: towards a unified perspective for creation of sustainable business models. *Business Strategy and the Environment*, 26(5), pp. 597–608. <https://doi.org/10.1002/bse.1939>.
- Fleischmann, K., Daniel, R. and Welters, R., 2017. Developing a regional economy through creative industries: innovation capacity in a regional Australian city. *Creative Industries Journal*, 10(2), pp. 119–138. <https://doi.org/10.1080/17510694.2017.1282305>.
- Foss, N.J. and Saebi, T., 2017. Fifteen years of research on business model innovation: how far have we come, and where should we go? *Journal of Management*, 43(1), pp. 200–227. <https://doi.org/10.1177/0149206316675927>.
- Foss, N.J. and Saebi, T., 2018. Business models and business model innovation: between wicked and paradigmatic problems. *Long Range Planning*, 51(1), pp. 9–21. <https://doi.org/10.1016/j.lrp.2017.07.006>.
- Gallagher, K., 2014. Print-on-Demand: new models and value creation. *Publishing Research Quarterly*, 30(2), pp. 244–248. <https://doi.org/10.1007/s12109-014-9367-2>.
- Gerring, J. (2007). *Case study research: principles and practices*. Cambridge, UK: Cambridge University Press.
- Grodach, C., O'Connor, J. and Gibson, C., 2017. Manufacturing and cultural production: towards a progressive policy agenda for the cultural economy. *City, Culture and Society*, 10, pp. 17–25. <https://doi.org/10.1016/j.ccs.2017.04.003>.
- Grunow, D., 1995. The research design in organization studies: problems and prospects. *Organization Science*, 6(1), pp. 93–103. <https://doi.org/10.1287/orsc.6.1.93>.
- Gummesson, E. (2017). *Case theory in business and management: reinventing case study research*. London, UK: SAGE Publications.
- Hsieh, Y.-J. and Wu, Y.J., 2019. Entrepreneurship through the platform strategy in the digital era: insights and research opportunities. *Computers in Human Behavior*, 95, pp. 315–323. <https://doi.org/10.1016/j.chb.2018.03.033>.
- Miles, M.B., Huberman, A.M. and Saldaña, J., 2013. *Qualitative data analysis: a methods sourcebook*. Thousand Oaks, CA, USA: SAGE Publications.
- INE, 2019. Estadística estructural de empresas: sector industrial. [online] Available at: <https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=estadistica_C&cid=1254736143952&menu=ultiDatos&idp=1254735576715> [Accessed February 2021].
- Josselson, R., 2013. *Interviewing for qualitative inquiry: a relational approach*. New York, NY, USA: The Guilford Press.
- Kafouros, M., Love, J.H., Ganotakis, P. and Konara, P., 2020. Experience in R&D collaborations, innovative performance and the moderating effect of different dimensions of absorptive capacity. *Technological Forecasting and Social Change*, 150: 119757. <https://doi.org/10.1016/j.techfore.2019.119757>.
- Ketokivi, M. and Choi, T., 2014. Renaissance of case research as a scientific method. *Journal of Operations Management*, 32(5), pp. 232–240. <https://doi.org/10.1016/j.jom.2014.03.004>.
- Kranz, J.J. and Picot, A., 2016. Internet business strategies. In: J. Bauer and M. Latzer, eds. *Handbook on the economics of the internet*. Cheltenham, UK: Edward Elgar Publishing, pp. 365–384.
- Longhi, C. and Rochhia, S., 2014. «Ceci tuera cela»? Dynamique des changements dans l'industrie du livre. *Revue d'économie industrielle*, 145(1), pp. 121–154. <https://doi.org/10.4000/rei.5761>.
- Luong, H., Moshirian, F., Nguyen, L., Tian, X. and Zhang, B., 2017. How do foreign institutional investors enhance firm innovation? *Journal of Financial and Quantitative Analysis*, 52(4), pp. 1449–1490. <https://doi.org/10.1017/S0022109017000497>.
- Magadán Díaz, M. and Rivas García, J., 2019. Digitalización y modelos de negocio en la industria editorial española. *Journal of Technology Management & Innovation*, 14(1), pp. 63–72. <https://doi.org/10.4067/S0718-27242019000100063>.

- Magadán-Díaz, M. and Rivas-García, J.I., 2020. La industria editorial española: dos décadas clave de transformación y cambio (1996–2016). *Economic History Research*, 16(2), pp. 1–15. <https://doi.org/10.33231/j.ihe.2020.04.003>.
- Majchrzak, A. and Malhotra, A., 2020. What is crowdsourcing for innovation? In: *Unleashing the crowd: collaborative solutions to wicked business and societal problems*. Cham, Switzerland: Palgrave Macmillan, pp. 3–46.
- Malerba, F. and Pisano, G., 2019. Innovation, competition and sectoral evolution: an introduction to the special section on industrial dynamics. *Industrial and Corporate Change*, 28(3), pp. 503–510. <https://doi.org/10.1093/icc/dtz017>.
- Martin, B. and Tian, X., 2016. Books, bytes and business: the promise of digital publishing. New York, NY, USA: Routledge.
- Martins, L.L., Rindova, V.P. and Greenbaum, B.E., 2015. Unlocking the hidden value of concepts: a cognitive approach to business model innovation. *Strategic Entrepreneurship Journal*, 9(1), pp. 99–117. <https://doi.org/10.1002/sej.1191>.
- Massa, L., Gianluigi, V. and Tucci, C., 2018. Business models and complexity. *Journal of Business Models*, 6(1), pp. 59–71. <https://doi.org/10.5278/ojs.jbm.v6i1.2579>.
- Mazzarol, T.W. and Reboud, S., 2020. Planning, business models and strategy. In: *Entrepreneurship and innovation: theory, practice and context*. Singapore: Springer, pp. 191–225.
- McCutcheon, D.M. and Meredith, J.R., 1993. Conducting case study research in operations management. *Journal of Operations Management*, 11(3), pp. 239–256. [https://doi.org/10.1016/0272-6963\(93\)90002-7](https://doi.org/10.1016/0272-6963(93)90002-7).
- Minguela-Rata, B., Arias-Aranda, D. and Opazo-Basáez, M., 2014. Processes integration and e-business in supply chain management. In: F. Martínez-López, ed. *Handbook of strategic e-business management*. Berlin, Germany: Springer, pp. 217–236.
- Mintzberg, H., 1973. *The nature of managerial work*. New York, NY, USA: Harper & Row.
- Mohammed Ali, N.A., Azahari, M.H., Mohd Rosnan, S. and Sumarjan, N., 2019. The digital printing technologies and survival of the commercial printers in Malaysia printing industry. *Journal of Printing Science and Technology*, 56(1), pp. 18–23. <https://doi.org/10.11413/nig.56.18>.
- North, K. and Kumta, G., 2018. Knowledge management: value creation through organizational learning. Berlin: Springer.
- Patel, P.C., 2019. Opportunity related absorptive capacity and entrepreneurial alertness. *International Entrepreneurship and Management Journal*, 15(1), pp. 63–73. <https://doi.org/10.1007/s11365-018-0543-2>.
- Peng, Y., 2016. Mobile and digitally-mediated publishing strategies in China: an overview of evolving business models. *Publishing Research Quarterly*, 32(3), pp. 247–260. <https://doi.org/10.1007/s12109-016-9467-2>.
- Pettigrew, A. and Whipp, R., 1991. *Managing change for competitive success*. Oxford, UK: Blackwell.
- Prakhya, S.H. and Hull, C.E., 2006. The six facets model of technology management under conditions of rapid change: a study in the pre-media segment of the printing industry. *International Journal of Innovation and Technology Management*, 3(4), pp. 407–420. <https://doi.org/10.1142/S0219877006000867>.
- Protogerou, A., Kontolaimou, A. and Caloghirou, Y., 2017. Innovation in the European creative industries: a firm-level empirical approach. *Industry and Innovation*, 24(6), pp. 587–612. <https://doi.org/10.1080/13662716.2016.1263551>.
- Reid, M., Marion, T.J., Hultink, E.J. and Barczak, G., 2018. Open innovation, IT orientation, and external collaboration: implications for the use of new media and social networking IT in new product development. In: S. Nambisan, ed. *World scientific reference on innovation: Vol. 3, Open innovation, ecosystems and entrepreneurship : issues and perspectives*. Singapore: World Scientific Publishing, pp. 37–76. https://doi.org/10.1142/9789813149083_0003.
- Ridder, H.-G., 2017. The theory contribution of case study research designs. *Business Research*, 10(2), pp. 281–305. <https://doi.org/10.1007/s40685-017-0045-z>.
- Roseli Wunsch Takahashi, A. and Araujo, L., 2019. Case study research: opening up research opportunities. *RAUSP Management Journal*, 55(1), pp. 100–111. <https://doi.org/10.1108/RAUSP-05-2019-0109>.
- Sabatier, V., Mangematin, V. and Rousselle, T., 2010. From recipe to dinner: business model portfolios in the European biopharmaceutical industry. *Long Range Planning*, 43(2–3), pp. 431–447. <https://doi.org/10.1016/j.lrp.2010.02.001>.
- Schulte-Holthaus, S., 2018. Entrepreneurship in the creative industries. In: E. Innerhofer, H. Pechlaner and E. Borin, eds. *Entrepreneurship in culture and creative industries: perspectives from companies and regions*. Cham, Switzerland: Springer, pp. 99–154.
- Schumpeter, J.A., 1934. *The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA, USA: Harvard University Press.
- Simons, H., 2011. *El estudio de caso: teoría y práctica*. Madrid, Spain: Ediciones Morata.
- Snihur, Y. and Wiklund, J., 2019. Searching for innovation: product, process, and business model innovations and search behavior in established firms. *Long Range Planning*, 52(3), pp. 305–325. <https://doi.org/10.1016/j.lrp.2018.05.003>.
- Snow, C.C. and Thomas, J.B., 1994. Field research methods in strategic management: contributions to theory building and testing. *Journal of Management Studies*, 31(4), pp. 457–480. <https://doi.org/10.1111/j.1467-6486.1994.tb00626.x>.
- Spieth, P., Schneckenberg, D. and Ricart, J.E., 2014. Business model innovation – state of the art and future challenges for the field. *R&D Management*, 44(3), pp. 237–247. <https://doi.org/10.1111/radm.12071>.
- Stanko, M.A., Fisher, G.J. and Bogers, M., 2017. Under the wide umbrella of open innovation. *Journal of Product Innovation Management*, 34(3), pp. 543–558. <https://doi.org/10.1111/jpim.12392>.

- Steinberg, S.H., 2017. *Five hundred years of printing*. Mineola, NY, USA: Dover Publications.
- Świerczek, A., 2014. The impact of supply chain integration on the “snowball effect” in the transmission of disruptions: An empirical evaluation of the model. *International Journal of Production Economics*, 157, pp. 89–104. <https://doi.org/10.1016/j.ijpe.2013.08.010>.
- Teece, D.J., 2010. Business models, business strategy and innovation. *Long Range Planning*, 43(2–3), pp. 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>.
- Tian, X. and Martin, B., 2010. Digital technologies for book publishing. *Publishing research quarterly*, 26(3), pp. 151–167. <https://doi.org/10.1007/s12109-010-9164-5>.
- Van de Ven, A.H. and Poole, M.S., 1990. Methods for studying innovation development in the Minnesota innovation research program. *Organization Science*, 1(3), pp. 315–335. <https://doi.org/10.1287/orsc.1.3.313>.
- Viljakainen, A., Toivonen, M. and Seisto, A., 2016. Digitalisation and service business model innovation in media. *Journal of Print and Media Technology Research*, 5(2), pp. 145–158. <https://doi.org/10.14622/JPMTR-1604>.
- Visnjic, I., Wiengarten, F. and Neely, A., 2014. Only the brave: product innovation, service business model innovation, and their impact on performance. *Journal of Product Innovation Management*, 33(1), pp. 36–52. <https://doi.org/10.1111/jpim.12254>.
- Wang, C.-C., Tsai, L.-S. and Chang, C.P., 2016. Trade-off among online, offline, and online-to-offline business models: a perspective based on the four Ps of product characteristics. *International Journal of Electronics Communication and Computer Engineering*, 7(4), pp. 234–240.
- Wang, X. and Disney, S.M., 2016. The bullwhip effect: progress, trends and directions. *European Journal of Operational Research*, 250(3), pp. 691–701. <https://doi.org/10.1016/j.ejor.2015.07.022>.
- Wilson, E.J. and Vlosky, R.P., 1997. Partnering relationship activities: building theory from case study research. *Journal of Business research*, 39(1), pp. 59–70. [https://doi.org/10.1016/S0148-2963\(96\)00149-X](https://doi.org/10.1016/S0148-2963(96)00149-X).
- Wilson-Higgins, S., 2017. *The impact of print-on-demand on academic books*. Cambridge, MA, USA: Chandos Publishing.
- Wirtz, B.W., 2019. *Digital business models: concepts, models, and the Alphabet case study*. Berlin, Germany: Springer International Publishing.
- Wirtz, B.W., Pistoia, A., Ullrich, S. and Göttel, V., 2016. Business models: origin, development and future research perspectives. *Long Range Planning*, 49(1), pp. 36–54. <https://doi.org/10.1016/j.lrp.2015.04.001>.
- Wolford, C., 2016. *Commercial print: strategies for improving profit in a contracting market*. Master of science research project. University of Oregon. Available at: <<http://hdl.handle.net/1794/22338>> [Accessed February 2021].
- Yin, R.K., 2009. *Case study research: design and methods*. 4th ed. London, UK: Sage Publications.
- Yin, R.K., 2011. *Applications of case study research*. 3rd ed. London, UK: Sage Publications.
- Yin, R.K., 2014. *Case study research: design and methods*. 5th ed. London, UK: Sage Publications.
- Zimmermann, R., Ferreira, L.M.D.F. and Carrizo Moreira, A., 2019. Strategic fit between innovation strategies and supply chain strategies: a conceptual study. *International Journal of Value Chain Management*, 10(3), pp. 258–273.

