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“Technological innovation and R&D, the disregarded dimension of the creative industries: the case of book publishing”

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Abstract: Cultural and creative industries (CCIs) have aroused an increasing attention in recent years. The academic production is growing in parallel with the emergence of general reports aiming at supporting governments’ strategies. Notwithstanding this increasing and comprehensive interest, a very important matter is usually disregarded, that is the characteristics of the management of R&D and the way of functioning of technological innovations in the value chains organization. This issue is really under investigated in the book publishing sector. Paradoxically, innovations based on technology are “hidden” in CCIs: actors in the cultural industries never think specifically about technological innovations that are considered coming from outsiders. Yet technology plays a key role in the current structure of cultural industries such as the book publishing. Given this context, this article aims at retracing the key aspects linked to the unusual and recent changes due to the Internet and ICTs revolution on the secular book publishing industry. This analysis highlights that digital technologies are not only appropriated by editorial houses (cf. e-books and e-readers) but they have also to be regarded as development. Notwithstanding, publishers seem to play a marginal role, because the main technologies are coming from outside their value chain and thanks to the involvement of new

actors like intermediaries. This calls for changes in the traditional vision of CCIs' policies and regulation.

Introduction

Cultural and creative industries (CCIs) have aroused an increasing attention in recent years (Unesco, 2013). This interest is reflected not only in the more traditional academic literature, but also in public reports commissioned by local and national governments. The seminal contributions of authors like Florida (2002) and Scott (2006), have been followed by recent unexpected original focus on very specific issues like “creative atmosphere” (Bertacchini, Santagata, 2012) or “creative cities” (Lazzeretti, 2013). This perspective has been completed by analyses of CCIs “business models” (Benghozi, Lyubareva, 2014). The academic production is growing in parallel with the emergence of general reports aiming at supporting governments’ strategies (e.g. Roxane, 2014; CBI, 2014; SGS, 2013; HKU, 2010). Notwithstanding this increasing and comprehensive interest, a very important matter is usually disregarded, that is the characteristics of the management of R&D and the whereabouts of technological innovations in the value chains organization.

This article aims at showing that the development of Internet and ICTs revolution in the secular book publishing industry¹ is not only a matter of appropriation (in order to propose e-books and online retail) but also of R&D development. In particular, publishers seem to have a marginal role in the ecosystem identifiable for R&D and innovation organization: the main technologies are coming from outside their value chain and thanks to the involvement of new actors like intermediaries.

The paper is structured as follows: section 1 provides an outlook of the digital technologies in the book publishing sector and a brief overview of the industrial framework of this traditional industry. Section 2 highlights the place of the publishers in the emergence of innovation and R&D ecosystems structuring. Finally, section 3 provides discussion and concluding remarks.

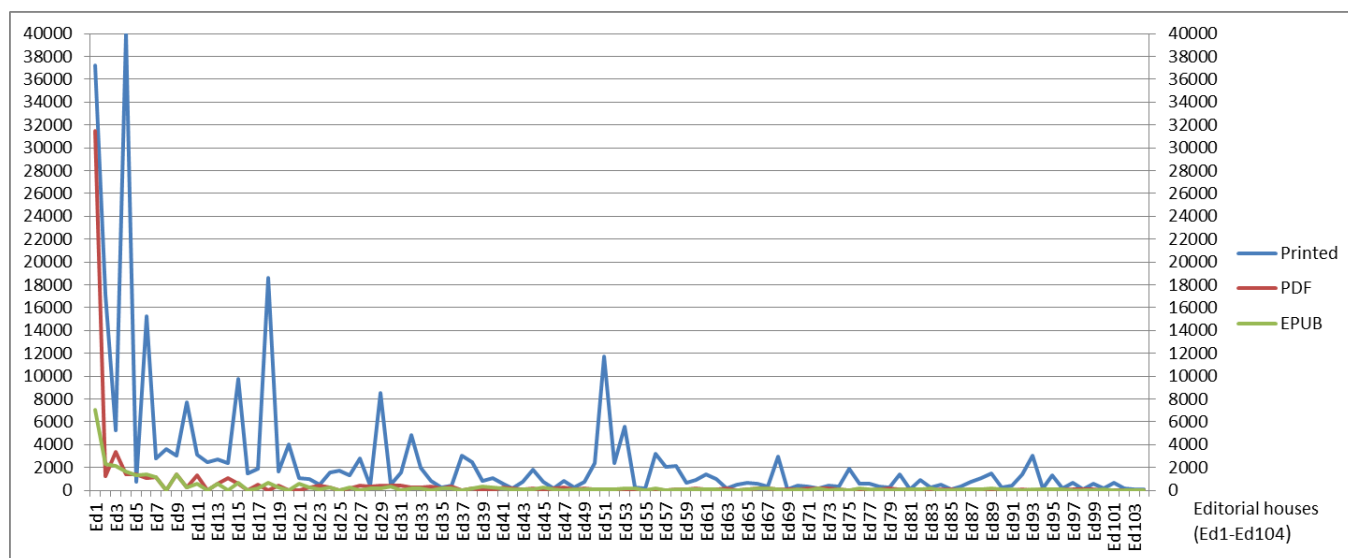
1. Digital technologies in the book publishing industry: not only appropriation but also development

The book publishing industry is the oldest subsector of the media and content industries, and, in this context, is the only market where European companies are leaders (Simon, de Prato, 2012). The book publishing has usually been a low growth business, but in recent years something has upset radically this industry (OECD, 2012) since it has been troubled by

¹ Acknowledgements: this article is based on a research project undertaken between 2012 and 2015 on “R&D in cultural and creative industries” with the support of the Centre National du Livre (CNL), the Ministère de la Culture et de la Communication (Paris), the European Joint Research Center – IPTS (Seville). Detailed and further information are available in the articles Benghozi-Salvador listed in the references.

unanticipated and disruptive changes (Greco, 2011; Lebert, 2009; Patino, 2008). The main drivers of change may be identified in the Internet and ICTs: e-books, printing-on-demand and the rapidly evolving e-book readers are impacting all the phases of the traditional book publishing value chain. But all these changes are happening under a slow revolution. In recent years, editorial houses - traditionally focused on printed books - are digitalising their catalogue, but only for a small percentage. While novelties are now available in both e-book and printed versions since the beginning, the rest of the catalogue is only partially available in digital formats. Figure 1 highlights the difference in the size of the printed catalogue and the size of the PDF and EPUB catalogue of 104 French editorial houses² at June 2014 (Benghozi, Salvador, 2015c). This Figure clearly emphasizes a strategy still anchored to the printed catalogue, with a few exceptions.

Figure 1: A comparison between the printed, the PDF and the EPUB catalogues (104 publishers)



While Amazon started to revolutionize some aspects with its on-line distribution system of traditional paper books, the e-book, really appeared on the market in the 2000s, has recently and rapidly upset all the phases of the traditional book value chain (Benghozi, Salvador, 2015a). Thus, most publishers conceive their strategy in order to adapt their content to the new digital demand and available devices (appropriation) rather than investing in the technological development and the design of the technology architecture of standards, devices and software (development).

² Data come from Electre bibliographical databank: Electre is the trading company of the *Cercle de la librairie*, an institution active since 1847 alongside the book professionals. Electre is the most complete and active tool of information and services for book professionals in France. The list of 104 editorial houses has been chosen on the basis of the size of the catalogue of e-books: all the editorial houses with an e-book catalogue of a minimum size of 89 e-books have been taken into account.

Consequently, the e-book is actually a very good illustration of the new economic frameworks at stake in the CCIs. The literature on the comparison between traditional books and e-books is flourishing (cf. Benhamou, 2014; Greco, 2011; Howard, 2009).

Notwithstanding these revolutionary novelties, the issue of R&D and innovation remains under investigated in the book publishing sector. By a general point of view, in the CCIs innovation technology is usually considered by a single point of view, meaning creation of works, content production modalities and artistic inventions (Potts, 2009). Paradoxically, innovations based on technology are “hidden” in CCIs (Cunningham, 2013; Barge-Gil et al., 2011; Brandellero, Kloosterman, 2010; Miles, Green, 2008): actors in the cultural industries never think specifically about technological innovations because these are considered coming from outsiders. Yet technology plays a key role in the current structure of cultural industries such as the book publishing. As a result of technical developments, the book publishing industry has experienced in recent decades a profound change in its practices linked to the continuous technological improvements (cf. e-readers market) and making difficult to produce updated analyses. We can consider that these developments have been driven - pulled - by new technologies or, on the contrary, that they called - pushed - for specific requirements that have accelerated the adoption of the technologies in order to respond to. The digital offering has transformed this industry through a completely disruptive revolution in just a few years: the e-book is really emerging in recent years, even if it appeared more than forty years ago (Howard, 2009).

The e-book development provides a good illustration that economic changes are clearly drawn by the technology that enabled not just to improve internal performance and productivity of publishers, as it is the case in traditional industries (Brynjolfsson, Hitt, 2003), but also to completely redefine market designs, business models (of publishers, distributors, authors or other intermediaries), borders and even components of the book industry. The starting point was identifiable in the arrival of the e-ink technology (electrophoretic ink), a specific proprietary type of electronic paper manufactured by E-Ink Corporation (see Box 1 for details). The e-book started to concurrence the printed book thanks to the implementation of this technology (and its successive improvements, i.e. e-ink pearl) in e-readers. Besides ink and display, the e-book has been supported by other main technological innovations focused on improving the quality of light, image and sound (Benghozi, Salvador, 2015b). This overall process is still in progress but publishers mainly aim at adapting themselves and identifying steady and sustainable business models. These developments have been marked by streamlining publishers' costs as part of a book chain remaining broadly unchanged (lower

storage, optimization runs, streamlining of supply chains). This rationalization of costs resulted in a better control of distribution but also in the coupling of an overproduction of titles with increasing concentration of sales on a few bestsellers. This movement is also accompanied by a rationalization and recurring movements of concentration (in both production and distribution or in bookstores).

Box 1: The e-ink technology

The e-ink (also referred to as e-paper) was firstly commercialised in Japan in 2004 (Simon, de Prato, 2012). The e-ink is a display technology on a thin flexible substrate (paper, plastic), portable and rechargeable. It is used as a component for e-books and electronic magazines, mobile phones and laptops. This technology has revealed to be vital for the development of e-books from 2012 (Simon, 2014). The elimination of the backlit display is identified as one of the main benefits of this new display. Light is reflected in the same way as real paper does, eyes are not strained and reading is easier also outdoors and in direct sunlight. The lack of glare, a less consumption of battery life, a lighter weight, a thinner size, and a more durable display compared to glass are cited as other key characteristics (Leal, 2009). The company Plastic Logic, a spin-out of Cambridge University, has been one of the main actors in the commercial application of e-ink (Simon, de Prato, 2012). The e-ink was therefore created by labs affiliated with several corporations. Xerox Corporation is one of these. According to Howard (2009, p. 154), “the Xerox Corporation uses what they call “Gyricon” technology (from the Greek word gyro meaning “rotate” and icon, meaning “image”), while the E-Ink Corporation (founded in 1997) has developed “RadioPaper”. The names are different but what these e-papers have in common is a thin, high-resolution display that allows images or text to appear, be erased, and change based on electronic input”.

Source: authors' personal elaboration

2. The place of CCIs in the innovation and R&D ecosystem: the example of the book publishing sector

The recent dynamics of innovation in the book publishing value chain may be differentiated according to several technical levels³ identifiable following the classical Open Systems Interconnection (OSI) reference model, applied in telecommunication and Internet economy (Zimmermann, 1980). The specific strategic perspectives highlight significant output at every level of the cartography. As said in the preceding section, the e-ink and electronic paper displays (EPD) technologies played a significant key role in the starting phase of the e-book introduction (Level 1, operating systems standards). The e-ink influenced digital printing and the subsequent emerging competition among tablets, e-readers⁴ and personal digital assistants (PDAs), (Levels 2-3, terminals and hardware). Afterwards, intermediation systems (i.e. blogs, social networks), platforms, consortia and partnerships among publishers emerged (Level 4, standards and software). This development underlines the key role of a connection to

³ For a detailed description of the content of every level and a graphical representation of the overall cartography of the actual book publishing value chain, see Benghozi and Salvador (2015a).

⁴ See Benghozi and Salvador (2015b) for a comparison between the main characteristics of the innovation technologies' evolution of six different brands of e-readers now leading the market.

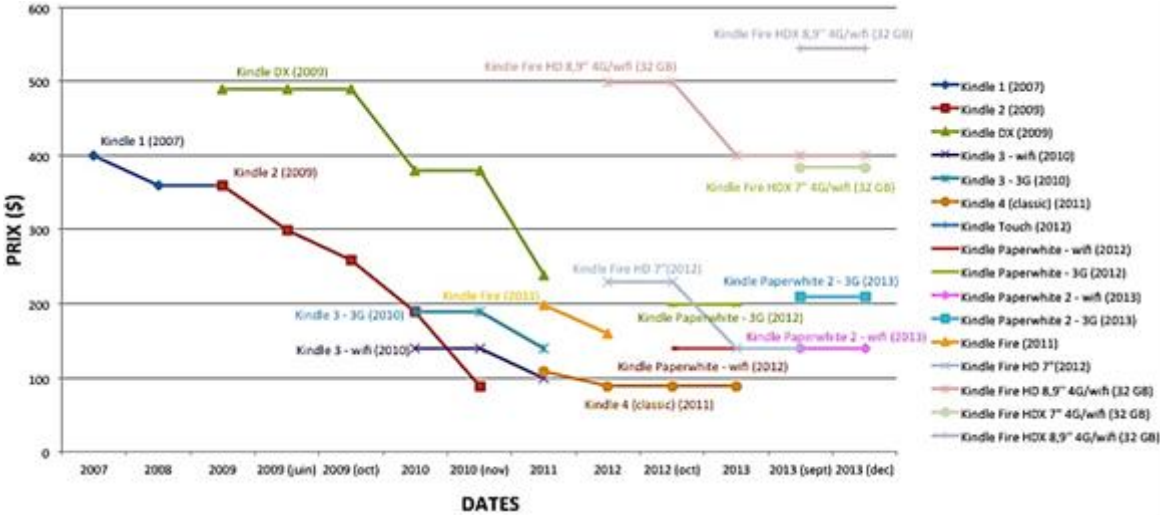
consumers through print on demand, digital aggregators, digital libraries and distribution platforms (Level 5, infrastructures and networks). In this context, piracy is still an open problem (Level 6, middleware). Future innovations, technical interfaces and an increasing attention to ergonomics (i.e. innovations in progress) are an actual main focus (Level 7, terminals).

By a general point of view, positioning the different innovations in such a technological layer perspective highlights how the strategies of economic actors are shaping in the digital world and are structured around a pivotal role played by technology. Hence the importance of “standards” in this area, contrary to most rudimentary technologies, less flexible and appropriable because carrying their own dynamics (cf. printed book sector). As an example, the e-book diffusion resulted in a proliferation of formats: about downloading PDF and EPUB for instance, among the best known, without talking about the diffused use of streaming (Cercone, 2009). This movement meets a stratification of strategies related to conflicts of standards. Most often, technology standards are not the choice of publishers but they are established at the international level through consortia or dominant firms (cf. the case of EPUB2).

In point of fact, R&D and technological innovations structure the renewal of the book publishing industry by organizing the design of new industrial ecosystems characterized by cooperation and cooptation (Brandenburger, Nalebuff, 1996). Alliances have greatly increased in the last twenty years (consortium, platforms, standards and norms) as they allow, in very flexible terms, the acquisition and development of complementary skills (cf. Simon, de Prato, 2012; OECD, 2012). These alliances are rather offensive when the partners are from different sectors. In alliances of firms in the same sector, like publishers in the book publishing industries, strategies are rather defensive, including incremental or easily replicable innovations, especially because the aim is not to lose the benefits yet gained. In the specific case of the book sector, the goal is to maintain the secular dominant position of an industry characterized by very few and slow changes. The use of open solutions, facilitating relationships with a wide spectrum of publishers, is a way to resolve the contradictions facing a dominant external player like Amazon. This movement is similar to that of airline companies defining coherent proprietary ecosystems where competition takes place between such “alliances” than between companies themselves (Goolsbee, Syverson, 2008). In such dynamics, the actual position of editorial houses in the emerging ecosystems turns so far to become more marginal.

Besides, the recent development of successive e-readers illustrates a process of co-competition and collaboration: to innovate regularly, businesses must cooperate and collaborate with competitors to develop common standards and technological "rules of the game" on which they agree. The coupling of repeated minor innovation strategies and co-competition leads to a coevolution process and mutual imitation. The various e-reader producers focused also their developments on a few specific variables on which they seek to compete and differentiate through a strategy of technological convergence: weight, autonomy, Internet connectivity, screen size and memory capacity (Benghozi, Salvador, 2015b). The analysis of technological trajectories development of some of the best known e-readers (i. e. Kindle, Nook, Cybook, PRS, Kobo, Pocketbook; cf. Figure 2 about Kindle) shows that technology platforms express particularly sophisticated forms of competition: parallel development of products by competitors starting from the same technical basis proposed by these platforms. Some competitors are thus in a position of strategic collaboration for the definition of standards and formats of reading, as well as for the collective development of the e-book market. They work in parallel with the same third-party provider in a form of technical incrementalism (Quinn, 1978).

Figure 2: Price and technology evolution of Kindle e-readers and the tablet Kindle Fire



Source: authors' personal elaboration

The logic of partnerships is essential in technological components because the heterogeneity of technologies is a nightmare for publishers: they are forced to multiply the e-book formats but also the supports of interfaces (online, offline, USB, linux ...) and they are not able to advance alone. Hence, the diffusion of alliances, partnerships and co-competition processes around ecosystems structuring (Corallo et al., 2007) appears the simplest and most obvious

solution. The consequence arising from these ecosystems structuring is the emergence of an economy of platforms in a sector - the book publishing - that was used to have success through the traditional chain of physical bookstores.

The emergence of new actors supporting innovative tools and new business proposals is a related consequence of this context. Among them, intermediaries and platforms conceived for (e)-books selling and/or consultation are among the most impressive novelties. Traditional forms of intermediation, like bookstores or music stores, existed for long time but are disappearing in favor of new intermediary forms, like online stores, aggregation platforms and specialized search engines (Benghozi, Paris, 2014). New actors, like software developers offering specific solutions for e-book platforms, are emerging as well.

In the French book publishing market the distribution platform Numilog has a well-known place (see Box 2). Numilog plays both a role of distributor and of diffusor. Founded in 2000, it is not only a digital bookshop but also a business to business services' provider.

Box 2: The distribution platform Numilog

"In March 2000, Numilog was founded by Denis Zwiern near Paris, France, as a company specializing in the distribution of digital books. Numilog launched in September 2000 an online bookstore that became the main French-speaking aggregator of digital books over the years. Numilog has sold books and audiobooks in partnership with a number of publishers, including Gallimard, POL, Le Dilettante, Le Rocher, La Découverte, De Vive Voix, Eyrolles or Pearson Education France. Numilog was bought in May 2008 by Hachette Livre, a leading publishing group" (Lebert, 2009, p. 66). In 2012 Denis Zwiern bought again Numilog from Hachette. Numilog is the oldest general French company focused on distribution and dissemination of e-books. Numilog offers to libraries and documentation centers a catalog of general literature available in multiple formats readable on various reading materials: computers, e-readers, smartphones and tablets. Numilog is the pioneer of e-books in France and the leading French broadcaster-distributor. Numilog is developing for 15 years simple and open solutions for publishers and for all the players in the book chain. With its solid experience in this market and its techniques, and continuous innovation, Numilog supports all the e-book marketing process: from digitalization to promotion across all sales channels. Partner of the largest market players, Numilog helps publishers, booksellers and librarians to make their transition to digital through personalized support. The axes that guide Numilog are: each job in the traditional book value chain keeps its place in the world of e-books (Numilog does not believe in the disintermediation); the technical solutions have to be mutualized so that all the players in the book sector, each within its role, are able to offer to their customers services at the same level of the very large international players in e-book market; the respect of copyright and intellectual property is the key in the book market, and the digital world must preserve them carefully: protect rights to ensure sustainable and balanced development of the book chain.

Source: Numilog website <http://www.numilogpro.com/default.html> and authors' personal elaboration

Book platforms enable to sell only (or also) e-books and they may concurrence a physical bookstore. One of the most notable consequences is that they can capture new clients but also and most of all their personal data for marketing goals. Readers are also changing their traditional habits: they buy on-line instead of in the traditional physical library. As a consequence, suggestions for selling books are changing as well as incentives for capturing clients' fidelity through promotions and subscriptions. Intermediaries are active third parties

operating alongside producers and consumers, in order to structure the offer of products or services, or to support part of the responsibility of the consumers' decision. The diffusion of the Internet has opened many reconfiguration possibilities encouraging experimentation of new forms of intermediation. The dematerialization of reproduction, enabled by online diffusion (i.e. e-books), indeed substantially modifies the constraints arising from the physical production and distribution of copies which are at the heart of the organization and economics of cultural industries. About distribution, in particular, the link between distributors and intermediaries originates another new role played by the so-called "infomediaries" (Chantepie, 2010; Chantepie, Le Diberder, 2010). As described above, this actual configuration is giving rise to new ecosystems structuring where competition and cooptation coexist (Ritala et al., 2014).

If Amazon may be defined the pioneer in the on-line distribution system of traditional paper books, actually, a plethora of online platforms selling (e)-books may be identified (Benghozi, Salvador, 2014). These platforms are characterized by an active interaction and involvement of the users: the visibility given by social networks like Facebook and Twitter may enable the platform to grow naturally, to be enriched by users' contributions and, perhaps, to reach a leading position and/or a brand name in the longer period.

In the scientific literature, Gawer (2011: 1) provides the following definition of platforms: "industry platforms are products, services or technologies that are developed by one or several firms, and serve as foundations upon which other firms can build complementary products, services or technologies". These complementary products increase the overall value for the platform through network effects (Cusumano, 2011). According to Baldwin and Woodard (2009), the fundamental architecture behind all platforms is fundamentally the same: a set of core components with low variety and a complementary set of peripheral components with high variety are the two main partitions of the system.

Technology platforms and distribution and marketing digital platforms are based on different economic mechanisms and objectives: increase sales and market share on the one hand, constitution of a base installed by grant of terminals on the other hand, in order to benefit from network effects and impose a standard to lock consumers in a given supply and distribution and marketing platform (Benghozi, 2014). The emergence and variety of distribution and marketing platforms have provided support for new deals and new forms of competitive dynamics. This new context is particularly noticeable in on-line e-book publishers: many small editorial houses have been able to emerge in recent years selling only

e-books and only on-line through their personalized Internet website (see Box 3 for the example of Emoticourt editions).

Box 3: Emoticourt: a publisher focused only on e-books

Emoticourt is a publishing house founded in 2011 in Paris that made the choice to propose texts in digital format: all the works published are "100% digital native". This initiative is due to a desire to promote and publish texts that would be difficult to print, distribute and sell in paper because of their short length. Moreover, the choice of digital texts expresses a desire to wake up the short stories category in France and to introduce more widely the works of renowned writers, using modern tools of reading. Today Emoticourt offers 40 titles of which 5 are now exceptionally available in print format in "série limitée" in order to communicate and to organize physical events around the authors and their works, in partnership with bookshops, book fairs and events. The entire catalog consists of short stories (consisting in one novella to a collection of short stories), categorized by the reading time (from 15 mn to 75 minutes maximum). These books cost on average 3 euros. The e-books are available in epub, mobi and pdf formats in order to meet the maximum requirements of e-readers. This publishing house has chosen to distribute its books on its own website, through an eponymous app for Apple and on all major online booksellers like Amazon Kindle Store, Apple's iBookstore, Kobobooks...

Source: Nadine Bayle, Directrice générale et créatrice des éditions Emoticourt, <http://www.emoticourt.fr/>

As a matter of fact, e-readers and e-books are linked by strong externalities and network effects. Beyond the technological lock-in a standard that is associated with sales legacy platforms (e.g. Kindle and Amazon), customers who buy their e-books on a major international platform naturally tend to continue to buy their books there then. Next to the technological rivalry of technology platforms, competition in digital channels therefore also operates on the distribution and marketing digital platforms, through price and terms of sale. This price war takes place about two different levels: e-books on the one hand, e-readers on the other hand. In the emerging market phase, the issue was that of stimulating the market by taking a dominant position from the outset: lower the price of e-readers and e-books to boost their sales.

E-books and distribution and marketing platforms provide the basis for new relations with readers through functions of recommendation and prescription, but also by establishing the basis of a lasting formal relationship, over time, between the publisher or distributor on the one hand, the reader on the other hand. This is, especially on this last point, something radically new for publishers who, hitherto, were selling books by losing sight of their consumers once the book sold. Through features like tattooing, each e-book is printed with the name and e-mail address of the person who bought the book and also the date of purchase. Publishers also have the opportunity to build a new relationship with their consumers-readers, customizing and "following" this relationship after the transaction instead of simply selling their works to anonymous readers. This is a movement analogous to that found, for example, in the automobile industry with some business models associated with the connected car.

3. Conclusions

The pace of evolutions in ICTs and the Internet deeply impacts the traditional book publishing industry. Nonetheless, the process of adoption of these changes is rather slow and looks like being pressed by outsiders rather than fully controlled and orientated by the incumbent of the industry. Given the general lack of attention towards technology and innovation adoption, European publishers have difficulties in adopting an effective business model and in responding to the threats of actors like Amazon with a convincing strategy (Simon, 2014, 2015).

The emergence of new economic actors is the main engine of the reorganization of cultural industries and technological infrastructure plays a key role in the success of these new cultural intermediaries (Benghozi, Paris, 2014). Platforms contribute, in particular, to the empowerment and reorganization of the prescription chain. New business models and the organization of new value chains and ecosystems around platforms structuring are heavily transforming the economics and competition of CCIs (Unesco, 2013; Abecassis-Moedas, Benghozi, 2012; Green Paper, 2010; Benghozi, Paris, 2007). The emergence of book platforms is generally changing the ways publishers (have to) innovate (Gawer, 2011). These platforms organize the aggregation of content on the supply side and the matching with consumers' interest on the demand side: one may argue that they modify the traditional intermediation process and distribution channels.

Intermediation therefore relates to prescription mechanisms and informational dimension induced on consumption practices and user choices. But, because of its logistics perspective, intermediation influences also the terms of delivery and availability of works, including their availability in time and in space. This phenomenon yet happened in the music industry through the Apple's iTunes App Store (Blanc, Huault, 2014).

In the particular field of CCIs, the impact of ICTs may be defined as "hidden": innovation in the CCIs depends more and more on technologies and standards that are "external" to these industries. As a consequence, the actors in the CCIs' sectors need to be integrated into existing business ecosystems in order to survive and grow, but it is not possible to identify who has the leadership power within these ecosystems because of the hidden aspect. In other words, it seems that the R&D skills are the way for some external actors to increase their market power over the traditional players of the CCIs: the recent new comers have good chances of reaching soon a position of business ecosystem's leader. Nonetheless, given the recent emergence of this technology revolution in the book publishing sector, the debate about

who will be the winning leader is still open. Technology may play a determinant role in this process, but also the effectiveness of the involved actors in adopting standards (“appropriation”) and responding to technological advances with a convincing strategy of “development” is another key aspect.

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