XI International Conference Triple Helix

July 8 - 10, 2013 Birkbeck and UCL, London, UK

"Investment strategies in the value chain of the book publishing sector: how and where the R&D someway matter in creative industries ?"

Conference Theme : **1. Building the innovative markets, places and networks**, Business models in the digital economy.

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Abstract: Creative industries are deserving an ever increasing interest in recent years. The scientific literature on this field is growing and several local governments are calling for reports and discussion papers in order to support policy strategy guidelines. Notwithstanding, very few studies are dealing with a new and emerging topic like technological innovation. In the creative industries, innovation is in general considered from a single viewpoint: a means to develop new creative contents. However, one very important issue is surprisingly neglected both in the scientific literature and in the committed reports: this is the technological innovations and, therefore, the characteristic and the management of R&D in the creative industries. The present paper aims at understanding where R&D takes place in the cultural sectors, which economic actors are taking charge of it, where they are located in the value chain, how they are articulated with content producers. The research focuses on the publishing sector. A systematic analysis of the R&D developments of the e-book technology has been achieved and supplemented with face-to-face interviews in selected case-studies. The methods provide an original cartography of the value chain. This framework helps to understand the new digital ecosystem of the publishing sector and the investment strategies carried out by editorial houses regarding R&D partnerships and new technological innovations.

Keywords: creative industries; publishing industries; R&D; value chain; e-book

JEL Classifications: O3; L2

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Introduction

Creative industries are deserving an ever increasing interest in recent years. Starting from the initiatives taking place in the UK in the year 2001 (Department of Culture, Media and Sport, 2001), the concept gave rise to numerous developments. A large part of them has been dedicated to the creative class and the management of talents (Caves, 2000; Florida, 2002; Scott, 2006). The literature is nowadays focusing on the establishment of networks, creative atmosphere (Bertacchini, Santagata, 2012), creative industries clusters and creative cities (Lazzeretti et al., 2012; Foord, 2008; United Nations-UNCTAD, 2008; Crossick, 2006) seen as regional development strategies. Among the potentialities of the creative sectors, opportunities of economic wealth, growth and jobs creation at local level are identified as main key factors (Henry, de Bruin, 2011; Piergiovanni et al., 2012). Lastly, research has been developed more specifically on the strategic and economic dimensions of creative industries and their business models (Throsby 2001; Howkins 2001; Benghozi, Paris 2007; Lyubareva *et al*. 2013).

The scientific literature on this field is therefore growing (Lazzeretti, 2012) and both qualitative and quantitative studies are emerging[1] as well as special issues of several scientific reviews specialized in this field[2]. Furthermore, several local governments are calling for reports and discussion papers in order to imagine and support future policy strategy guidelines[3].

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[1] e.g. for the qualitative ones: Cunningham, 2009; Flew, Cunningham, 2010; Harper, 2011; Hotho, Champion, 2011; Jaw *et al*., 2012; for the quantitative ones: Muller et al., 2009; Lazzeretti et al., 2010; Chaston, Sadler-Smith, 2012; Piergiovanni et al., 2012, Abecassis-Moedas, Benghozi 2012.

[2] cf. Industry & Innovation, 2008, special issue: Managing Situated Creativity in Cultural Industries; International Journal of Cultural Policy, 2009, special issue: After the Creative Industries; Innovation: Management, Policy and Practice, 2009, special issue: Innovation Policy in the Creative Industries; Organization Studies, 2012, special issue: Misfits, Mavericks and Mainstreams: Drivers of Innovation in Creative Industries.

[3] e.g. Foundation for Research, Science and Technology, 2003; QUT CIRAC Cutler & Company, 2003; KEA, 2006; Santagata 2009; UNCTAD 2008.

Notwithstanding this interest and inflation of contributions in both the scientific and the grey literature, the related contents are in most of the cases very general. Innovation in creative industries is a new and emerging topic and very few studies are more specifically considering the cultural industries (Brandellero, Kloosterman, 2010; Green *et al*., 2007). Yet the several papers dealing with such issue are all thinking about innovation as a means to develop new creative contents. However, one very important issue is surprisingly neglected both in the scientific literature and in the committed reports: this is the characteristic and the management of R&D in the creative industries, especially in the cultural sector. Even the few studies that aim at investigating the potential of R&D to support the creative industries (e.g. Foundation for Research, Science and Technology, 2003; Cunningham *et al*., 2004) do not provide any analysis of the processes and/or technologies adopted. Investments in basic and applied research are seen as crucial for creative sectors competitive advantage but the main suggestion is simply to build creative industries consortia (Foundation for Research, Science and Technology, 2003): it bears no previous investigation of the various phases of the value chain nor understanding of what the R&D really means for these companies and how and where the R&D is undertaken. Actually, disruptive technological innovations come from outside and creative firms are not really able to control their evolution.

We assume that the general absence of investigations on R&D activities in the creative industries is due to a biased vision of the real relevance of these assets for creative companies. In other words, the main reason for poor investments in R&D is usually linked to the specific size, skills and capitalization. But another possible explanation can be made investigating what the concept R&D really means for creative firms. This is perfectly illustrated by the famous saying made in the 60s by the French ministry of culture André Malraux who characterized movie industry as a prototype industry. Creative firms conceive the new product

development as the development of innovative content and never consider them as technological R&D activities. Consequently, the main disruptive innovations in the creative industries have always taken place outside these industries: this was the case for sound movie, for instance, invented by General Electric in the early XXth, for the innovative devices in music (K7, Walkman or CD), created in the 70s and 80s by Philips or Sony, and more recently, for the MP3 and Appstore in music.

Within this context, our research perspective aims at understanding where R&D actually takes place in creative industries, how the articulation is made with content and development projects, which economic actors are taking charge of it, where they are located in the value chain, how they are articulated with content producers. From this viewpoint, the situation is, of course, different according to cultural sectors and creative fields: one could think, for instance, of the contrasting situations of movies and videogames. As a consequence, one of our objectives in this paper is to reconstruct and map all the main phases of the R&D value chain in a specific sector. We have decided to focus on the book publishing sector, one of the most prominent creative industry sectors. In recent years it has experienced many innovations due to the diffusion of the Internet and ICT technologies (Guiry *et al.*, 2012; Ronte, 2001). Traditional books are confronted with the emerging e-books: the literature on this comparison is flourishing both in terms of scientific or technical articles and in terms of books (cf. Howard, 2009; Dacos, Mounier, 2010; Greco, 2011). Actual policies and/or R&D strategies in this sector call for new analysis since editorial houses conceive their editorial strategy in order to adapt their content to the new digital demand and available devices rather than investing in the technological development and the design of the technology architecture. Moreover, the transformation process of a traditional editorial house in a digital one has not

still been investigated in terms of evolution and changes in the production chain and the editorial tools as well as the investment strategies adopted in the R&D.

Hence, the objective of the paper is to characterize the technological R&D ecosystem of this creative sector and to identify the investments and partnership strategies of creative firms.

The paper will be structured as follows. After the introduction, the theoretical framework will present literature and conceptual perspective on R&D and will analyse new technologies in the book publishing sector. The empirical background will then focus on the value chain phases and its recent evolution. Afterwards, the methodology will be described and the main results of the cartography of the main layers in the e-book publishing value chain and the case-studies analysis will be highlighted. Discussion and some concluding remarks will be presented at the end.

1. Theoretical framework

The general lack of significant investments in R&D of creative companies gives an echo to the absence of specific studies on the management of R&D in the cultural sector (Green et al., 2007). One of the reasons explaining the poor investments in R&D may of course be linked to the general size of these companies. Most of the firms in the creative industry sectors are SMEs (Bouquillion, Le Corf, 2010) therefore with difficulties in financing R&D activities. Notwithstanding, other motivations may explain this deficiency, because also large creative companies are known for under investing in R&D projects (Foundation for Research, Science and Technology, 2003). Therefore, the main motivation seems to be that companies in the creative industry sectors are considering that they take already so much commercial and aesthetic risk by creating new content that they cannot take in charge additional technical risks and therefore prefer to appropriate the R&D results coming from other industrial sectors instead of investing directly in R&D projects. This is a

direct consequence of the fact that each creative project turns out to be an innovative and prototype project in these industries. Therefore, firms merely consider R&D as something related more to investments in projects and contents rather than directly referring to the design and innovation on processes, infrastructure and devices.

This confused context is someway confirmed by the literature: on the one hand, Jaw *et al*. (2012) argued that innovation within creative industries is a subject dealt by very few studies and the theory on how creative firms develop innovation activities is limited. On the other hand, Potts (2009, p. 139) affirmed that "*there are many studies on innovation processes within the creative industries*" and "*Yet R&D has a very different meaning in the creative industries...in effect constituting a normal business model, not an exceptional (i.e. un-incentivised) activity*" (Potts, 2009, pp. 141). Innovation is seen as a normal aspect of business operations and strategy. And Jisun (2010) underlined the singularity of innovation patterns in creative industries: innovative creative products are mostly reliant on non-technological "soft" innovation (Stoneman, 2007) linked to the creation of new ideas or the recombination of existing ones.

In this context, in recent years new particular forms of cooperation are emerging: partnerships and consortia in the form of business ecosystems have been created for applying open innovation among several companies working together in order to advance on new innovation axes (Mussinelli, 2010, 2011).

Nonetheless, the absence of practical and implementable solutions emerges. This is reflected in the findings and the general conclusions of some latest studies on R&D and innovation in the cultural industries specifically focused on extra-EU as well as EU

countries[4]. It seems that both public institutions and creative industries display little attention to R&D and innovation. As demonstrated with more details in the following section, the situation turns to be exactly the same in the book publishing sector.

1.1 R&D, new technologies and the specific case of the book publishing sector

"*Book publishing has traditionally been regarded by European governments and industry actors not simply as an industry, but as an essential element of the backbone of national (or regional) cultural identity*" (European Commission, 2005, p. 120). As a consequence, the government cultural and political agenda has always developed specific policies for the book publishing sector, ranging from public subsidies to structural regulations aimed at protecting diversity. In fact, a key characteristic of the book publishing industry is its diversity: this sector includes very large international companies, which account for most sales, as well as very small specialist companies with niche markets. This diversity is nowadays confronted with the emerging revolution due to the Internet and ICT technologies: new actors are appearing on the scene and the diffusion of e-books, tablets, e-readers and personal digital assistants (PDAs) are demanding new strategies as well as updated business models.

According to Simon and de Prato (2012), in the media and entertainment markets the book publishing market is the only one where European companies are leaders. Notwithstanding, the US dominates the electronic book market because of the highlighted rapid response to technological innovation (Greco, 2005). In the European Union the e-book market is still negligible and it is fragmented, expanding fast in the UK and lagging behind in

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[4] Cf. Australia, QUT CIRAC Cutler & Company, 2003; New Zealand, Foundation for Research, Science and Technology, 2003; the UK, Green *et al*., 2007; France, PIPAME, 2012; the Netherlands, Stam *et al*., 2008; Austria, Muller *et al*., 2009, 2008.

other EU countries (Simon, de Prato, 2012). The US concurrence calls for a rapid and effective response of the EU market.

According to the European Commission report (2005, p. 94), innovation in the publishing industry tends to be incremental, like low-cost high-quality colour printing for books, rather than radical, like the e-book or the audio-book that aim to create entire new markets. The Internet and ICT technologies have prompted publishers to develop and launch online products and services and this incentive is more and more intensified as ICT technologies are constantly evolving. New initiatives like online platforms are fostering the publishing industries to integrate into their offerings new content applications in the form of communication technologies and not only information or content technologies (European Commission, 2005).

From the more distinctive technological perspective, the book publishing industry has gone, in recent years, through various developments (Simon, de Prato, 2012). According to Hsieh *et al*. (2011, p. 206), the main e-book technology milestones can be identified as follows: Content (information), Composer (software necessary to create an e-book), Container (the distribution medium and/or file format), Storage, and Access (the technology and software used to provide access to the content).

Formats and printing, in particular, have been characterized by several technological revolutions in rapid succession (Cercone, 2009). While the relationship between print and publishing houses has historically been very strong, publishers have become progressively autonomous in relation to printing and bookshop industries (Rouet, 2007). Publisher industry needs intangible investments, flexibility and customization, while technical equipments of graphic industries are always under the challenge of concurrence and modernisation and the need to work at full capacity. Publishers and printers are linked through a relationship of

specialisation in terms of collections, formats, kind of paper, and with the aim of reaching an optimum result of quality-costs-delays (Rouet, 2007; Gaymard, 2009).

According to Simon and de Prato (2012, p. 68), "*digital technologies were introduced in the publishing value chain upstream, but not used for the final product. The players appeared to have been reluctant to opt for this direction. Historically, the 80s went through some kind of "cd-rom fever" which never delivered its promises and increased the caution toward digital technologies*".

From all these considerations we can assume that the main factor for the evolution of the graphic chain and the relationships between publishers, printers and booksellers is linked to the computer age and the impact of computerization of the graphic chain and the computer-aided publication. Digital printing and printing on demand accelerated this process with cost reduction and rapidity of delay (Rouet, 2007).

In order to understand the characteristics of the book publishing sector and its recent evolution, the following section provides some insights on the value chain phases that have historically characterised this sector.

1.2 The traditional book value chain and its recent evolution

The digital revolution has had a later and less severe impact on the digital publishing sector compared to the music and cinema industries, where several changes happened in a brief time (Patino, 2008; Gaymard, 2009). Publishing has usually been a low growth business (Ronte, 2001), but in recent years something has changed radically this industry (OECD, 2012). In recent years, technology has had an unusual disruptive impact on publishing (Carreiro, 2010). But all these changes are happening under a slow revolution. The first attempts at introducing e-books failed because of their weight and cost (Patino, 2008). The main change happened when new materials were tested and implemented in new e-readers.

The digital revolution supports, therefore, disruptive economic change in the publishing sector: it changes the traditional business model of printing, it lowers entry barrier to incomers such as technological suppliers, it gives a key role to new distribution channels such as aggregation platforms. At the end of the day, this is, consequently, the very new and prominent role of R&D and innovation which is at stake and might call for an alternative strategy from editorial houses. This is clearly demonstrated by the recent evolution in the book value chain.

The printed book is an astonishing model: mobility, the presence of an index as a search engine, a semi-open system (it is possible to write on it and turn pages), a perfect autonomy (no source of energy is necessary), possibility of usage everywhere, instant and definitive ownership from the time of purchase (Patino, 2008). An e-book, instead, is an emerging and still not well defined model, that requires new technical skills and know-how, specialized software expertise, management of new commercial relationships, new methods of digital marketing and distribution, new negotiations and networks (OECD, 2012; Guiry *et al*., 2012).

Simon and de Prato (2012) considered the redistribution of the components of the book chain as well as the shifting role of the new and existing industry players following the e-book introduction.

The revolutionary aspects brought by the Internet and ICT technologies are impacting all the phases of the publishing value chain (Ronte, 2001). Publication, distribution, sale and reading are changing. The passage from physical to digital distribution, the zero marginal cost of producing an additional book, the emergence of new intermediaries, the many competitors entering this industry thank to the digital technologies, the problems linked to electronic security, are only some of the characteristics of this revolution.

According to Lebert (2009), following the many changes underwent by traditional publishing since the 1970s, digital publishing became mainstream in 1997. New typesetting machines, desktop publishing and graphic art studios disrupted the traditional printing mechanism. Digital "on demand" printing and digitization also accelerated the publication process, because publishers, designers and others could all work at the same time on the same book. Digital and traditional publishing became complementary.

In this context, publishers tend to take the role of content brokers and aggregators who cooperate with other actors (Jha *et al*., 2010). According to Dacos and Mounier (2010), the practices of collaborative elaboration of contents changed the very notion of book chain. The book is now an object resulting from the joint work of several actors with different professional specialisations, but the different actors work in networking with new cooperation models instead of coordinating the work on a unidirectional production chain. This is possible because of the technological peculiarities of digital text, meaning the infinitely rewritable characteristic of electronic texts. Practices of sharing and collaborative creation of contents emerged in a context now known as Web 2.0.

The traditional value chain for printed books has been described by the OECD report (2012, p. 25) as *"the wholesale model. It is based on the book's progression from raw created content, through manufacture and wholesale/distribution to retail, and finally to the consumer"*. Simon and de Prato (2012) underline the supplier position of the author and the core position of publishers. Their functions include the aggregation, presentation, pricing and marketing of books and dealing with the other actors of the value chain, like technical intermediaries and specialised workforce. With the emerging development of e-books and online distribution, printers, retailers and traditional distributors are in a weaker position. New aggregators and distributors are appearing. The United Nations-UNCTAD report (2008)

focuses on changes in the distribution channel because of the introduction of new product delivery formats. In general, the present trend is towards greater concentration to face the increased competition. Vertical integration in distribution and retail channels are also included in this trend. And about the competencies necessary to deal with the consequences of the Internet and ICT revolution in the creative sector in general, "*the so-called creative workforce nowadays has a high level of education and good knowledge and skills to make use of new ICT tools and the emergence of new business models. In this changing environment, the role of the intermediaries is gradually disappearing or being replaced by that of the infomediaries, and creators are increasingly recognizing the importance of developing creative entrepreneurial skills with a view to combining art, creations and business*" (United Nations-UNCTAD report, 2008, p. 208).

2. Methodology and results

Our research is supported by a multidimensional methodology. A mapping of the R&D ecosystem of the book publishing industry has been elaborated through a methodical codification of the various investments made by creative firms, of the partnerships created and the technological developments adopted. An exploration of technical documents has been used: it aimed at identifying the category of innovation being developed, the specific setting in the value chain for R&D development and the economic actors supporting it (internal or external to the traditional boundaries of the publishing sector). Furthermore, case studies of some of these actors (publishing houses, electronic platforms, technology suppliers) and face-to-face interviews with experts in publishing technologies have complemented the mapping perspective, identifying precise strategies and industrial policies implemented in the e-book publishing ecosystem.

The following sections describe in details the methodology adopted and the results coming from the reconstruction of the e-book publishing value chain as well as the interview results.

2.1 The empirical analysis: methodological insights

A cartography of the value chain in the e-book publishing sector has been built starting from an analytical coding of the main characteristics of all the versions of the most diffused e-readers and tablets. In particular, the different versions of Kindle, Kobo and Nook e-readers have been explored. Starting from a deep analysis of all the main features of the different e-reader versions, all the specific technologies that influenced the characteristics of these e-readers have been identified, investigated in details and catalogued in various groupings. The exploration of technical documents and Internet websites enabled to study in depth the specificities of these technologies. The main technology groups identified revealed that several specific technologies have been introduced for ink and display characteristics development, for light and quality image improvements, for sound property ameliorations and for aspects of augmented e-books. Furthermore, the second step of the analysis consists in face-to-face interviews in order to confirm the key findings of the cartography in progress and to capture the main editorial response facing the e-book revolution.

A sample of publishing houses and technology professionals were selected from the list of the most important ones in the French market and/or the most active in the digital technologies adoption. The aim was to understand the actual strategy of publishing houses about the e-book and the adoption of e-book technologies. This approach enabled us to reconstruct the content of the different phases of the value chain. In particular, the interview findings enabled to build the final layers of the cartography of the e-book value chain.

2.2 Results

The e-book value chain has been built in a chart structured in several levels. The cartography building and the content of each level will be deeply described and completed with the interview results in the following sections.

2.2.1 Cartography of the main layers in the e-book publishing value chain

The methodical exploration of the main actors in the e-book market and of the specific characteristics of the different versions of Kindle, Kobo and Nook e-readers appeared since their introduction on the market, enabled to structure a first draft of the e-book value chain cartography.
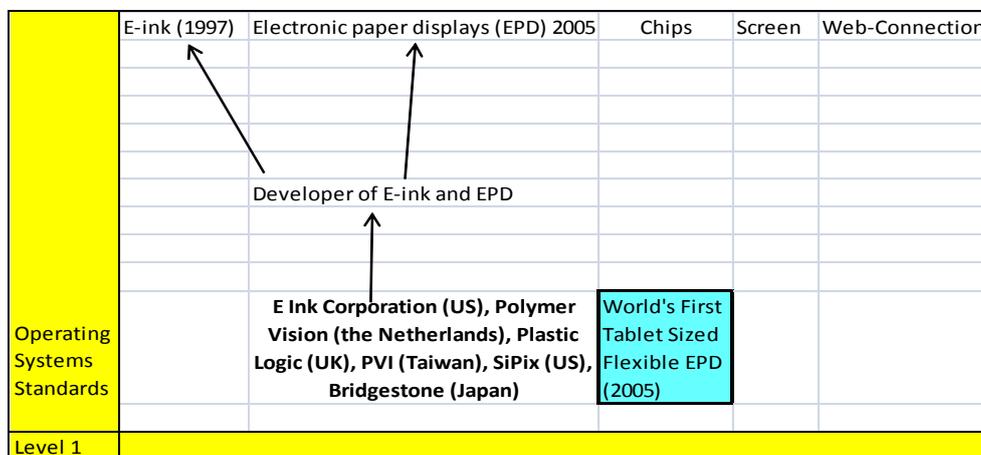
In order to build a cartography of the value chain of the e-book publishing sector, we adopted a model structure inspired by the robust and traditional perspective usually used in the digital sectors. Actually, we considered six main structural and technical layers adapted from the classical Open Systems Interconnection (OSI) seven layers reference model, used in telecommunication and Internet economy (Zimmermann, 1980). This model portrays the architecture of the industry assuming a hierarchical vertical division of the technical layers. Each consistent layer is considered to be ruled by technological specificities characterizing technological concerns, investments, skills, industrial companies, economic models and clients' perspective. Consequently the various layers help to understand the technological structuration, the articulation and interrelations between the various levels of the value chain, as well as the distinctive partnerships, investments and strategies implemented by the numerous actors.

Level 1 focuses on the *operating systems standards*: the starting point is the introduction of e-ink technology and electronic paper displays (EPD) between the end of the '90s and the beginning of the 2000s. These technologies are linked to Level 2 that is focused

on the *hardware and technology of terminals*: e-ink technology influenced digital printing and the emergence of the first tablets, e-book readers and personal digital assistants (PDAs). Several formats succeeded one after the other till the prominence at international level of e-pub and pdf formats. Recent improvements are identifiable in the attempt at creating augmented books with additional properties like optical reader-embedded pen and audio-books. Level 3 is focused on *standards and software*: blogs and social networks like Facebook and Twitter, and the diffusion of publishers' platforms, consortia and partnerships are impacting and influencing the infrastructures and networks linked to the connection to consumers (*Architecture of infrastructures and networks*, Level 4). Print on demand (POD), digital aggregators, digital libraries, distribution platforms, are some key examples. In this context, Level 5 (*Middleware*) is focused on the tools structuring economic relations and exploitation rights. It includes, in particular, those against piracy like digital rights management (DRM) and digital object identifiers (DOI). Finally, Level 6, dedicated to *users interfaces*, identifies the main work in progress like 3D e-books and environmental consequences of toxic substances for e-reader production.

2.2.2   *Focus on these layers and the interview results*

Level 1: Operating systems standards: the key role of e-ink and EPD technologies

	E-ink (1997)	Electronic paper displays (EPD) 2005	Chips	Screen	Web-Connection
		Developer of E-ink and EPD			
Operating Systems Standards		E Ink Corporation (US), Polymer Vision (the Netherlands), Plastic Logic (UK), PVI (Taiwan), SiPix (US), Bridgestone (Japan)	World's First Tablet Sized Flexible EPD (2005)		
Level 1					

The first commercial application of e-ink (also referred to as e-paper) was launched in Japan in 2004 (Simon, de Prato, 2012). The leading developer of electronic ink (e-ink) and electronic paper displays (EPD) is E-ink Corporation. In 2005 it introduced the "World's First Tablet Sized Flexible Electronic Paper Display" that is considered its first flexible tablet-sized EPD. This was later utilized in the Sony Reader Portable Reader System in 2006 (Leal, 2009). One of the main benefits of this new display has been the elimination of the backlit 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. Other benefits are identifiable in the lack of glare, a reduced consumption of battery life, a lighter weight, a thinner size, and a more durable display compared to glass (Leal, 2009). E-paper products are focused on electrophoretic technologies and e-ink is a major supplier for the technology and basic materials. Other key players include the Dutch Polymer Vision and the English Plastic Logic (Simon, de Prato, 2012). In the publishing sector, Plastic Logic has been one of the main players in the commercial application of e-ink (Simon, de Prato, 2012). Plastic Logic is a spin-out of Cambridge university and it develops plastic electronics technology. The company builds on over ten years of fundamental academic research and it exploits intellectual property based on inkjet printing of active electronic circuits through the use of advanced plastic materials (Druilhe, Garnsey, 2004, pp. 276-277). E-paper was therefore created by labs affiliated with several corporations. Xerox Corporation is one of these.

E-ink and e-paper, on which text is displayed, are innovations specifically developed for displaying text on the electronic screen of an e-reader. The aim was to have a result as much as possible similar to the look of physical print on paper (OECD, 2012). Initially, e-ink/e-paper technology was designed to display text in black and white: in recent years, colour e-readers, with image capabilities and with early stage technology, have been released (OECD,

2012). To sum up, the advantages of e-ink can be summarised as follows: "*first, only a very small amount of energy is required to create a sharp image with e-ink, and once the image is formed no additional energy is required to maintain it. This makes the technology highly efficient and-in the end-affordable. Second, e-ink is lightweight and can therefore be applied to an array of surfaces, from plastics to paper to metal. Finally, e-ink is highly flexible, so that when applied to a plastic, it can be bent around very small objects, such as a pencil*" (Howard, 2009, p. 155).

Terminals and Hardware

Digital printing ⟷ Device ⟷ Tablets ⟷ Digital publishers
Electronic Schoolbag
E-book reader, tablets, PDAs

Rocket eBook of Gemstar (1998) *project failed in 2003*
Softbook (1998)
Franklin eBookMan (1999)
Cytale Cybook (2001) *project failed in 2002*
Sony Librié (2004) *project failed*
Sony Reader Portable Reader System (2006)
iRex iLiad (2006) *project failed in 2010*
Apple's iPhone (2006), Apple's iPad (2010)
Amazon Kindle (2007), Kindle2 (2009), KindleDX (2009), Kindle3 (2010), Kindle4 (2011), Kindle Touch (2011), Kindle Fire (2011), Kindle Paperwhite (2012), Kindle FireHD (2012)
Sony PRS-700 (2008)
Polymer Vision Readius cell phone/e-reader (2008) *project failed*
Barnes&Noble Nook (2009), Nook Wifi (2010), Nook Color (2010), Nook Simple Touch (2011, 2012), Nook HD (2011), Nook HD+ (2012)
Kobo (2010), Kobo Wifi (2010), Kobo Touch (2011), Kobo Mini, Kobo Glo, Kobo Vox (2011), Kobo Arc (2012)
Barnes&Noble Plastic Logic Que eReader (2010)
PDAs: Palm Pilot (1996), Microsoft Pocket PC (2000), Hewlett-Packard, Sony, Handspring, Toshiba, Casio

Augmented book: audio books, mp3 player, Semtoyou Optical Reader-Embedded Pen with Speaker and LCD Display, Violet's RFID Reader 'Mir:ror'

E-book formats: AZW (Kindle), TXT, PDF, DOC, BBeB, EPUB, Hyper Text Markup Language (HTML), Exchange Data Format (EDF), and XML formats.
1999: Open eBook (OeB), based on XML, Open eBook Publication Structure (OeBPS); 2005: OeB replaced by ePub format

Level 2

Electronic paper displays (EPD) 2005

E-ink (1997)   Chips   Screen   Web-Connection

Level 2: Terminals and hardware: the competition between e-book tablets, readers and PDAs

According to Lebert (2009), the Palm Pilot was the first PDA, launched in March 1996. Microsoft in April 2000 launched the Pocket PC, while Hewlett-Packard, Sony, Handspring, Toshiba and Casio also entered the market with their PDAs. In the meantime, at the beginning of the 2000s the first smartphones by Nokia and Sony Ericsson were created. The early e-readers were also introduced in the market: heavy and low technology advanced materials as well as a very high price did not attract the interest of readers (Patino, 2008; Gaymard, 2009). The first handheld e-book reader devices were introduced in 1998, the Rocket e-book of Gemstar and Softbook, released by NuVoMedia and Softbook Press, respectively (OECD, 2012; Leal, 2009). Other first e-books were introduced at the beginning of the 2000s: Cybook of the French company Cytale, that failed in 2002 (Rouet, 2007; Patino, 2008). Rocket e-book of Gemstar exited the market in 2003 (Simon, de Prato, 2012).
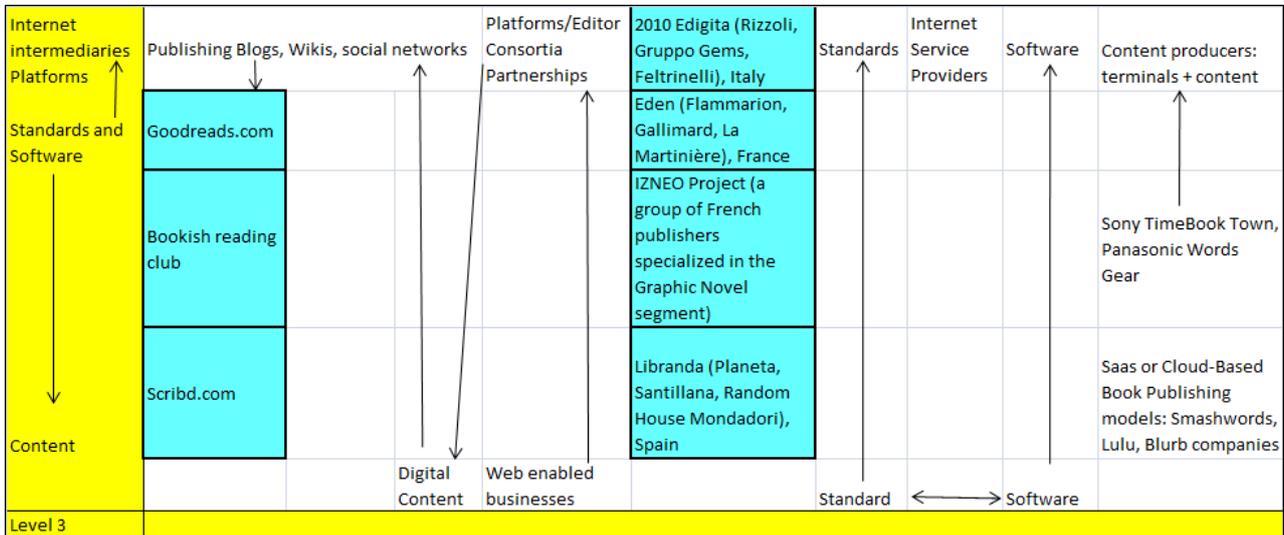
From 2006 to 2010 several new e-reader devices entered the market, most of them using the new e-ink technology. In particular, the attention towards e-books and digital reading increased conspicuously when Sony released its reader Librié in 2006 in the US market and Amazon launched the Kindle e-book reader with its online sales mechanism in 2007, followed by Barnes and Noble with its Nook reader in 2009. More specifically, the first version of Kindle was released in the United States in November 2007. The successor, Kindle 2, was introduced in February 2009, and the expanded version, Kindle DX, was brought to market in June 2009 (Loebbecke *et al*., 2010). Then, in 2010 Kobo e-reader was released and Apple launched the multi-purpose device with e-reader capability, known as the iPad (Simon, de Prato, 2012).

Recent improvements in memory size, number of supported formats, and clarity of reading are characterizing the new e-readers (Mussinelli, 2010, 2011). Former e-books started as downloadable documents to a computer. Early formats were PDF and ASCII text (Leal, 2009). The actual official open standard of the International Digital Publishing Forum (IDPF) is the electronic publication format e-pub (OECD, 2012) and PDF and e-pub formats are currently the standard of the market (Mussinelli, 2010, 2011). Kindle is the only mainstream e-reader on the market with a proprietary format and resistance to embrace the e-pub format (OECD, 2012).

Other improvements are observable also in sound quality. Yet in the late '80s, audio books started to be developed and distributed (Simon, de Prato, 2012), but it is specifically in recent years that new technological developments are improving the quality of sound. The development of voice recognition systems and synthesis technologies for facilitating the automation of book recording processes are going to increase the efficiency and effectiveness of audio book creation (Simon, de Prato, 2012).

We are also assisting to the evolution of paper books to augmented and enhanced books (Park *et al*., 2010) with not only audio-books but also book-apps even more popular. Furthermore, sharing e-books was not possible with the first e-book devices: electronic files could only be downloaded to the e-reader device and other devices synced with it, but the owner's account was necessary for each recipient application (Leal, 2009). The latest innovations are changing also this aspect.

Level 3: Standards and software: the intermediary role of blogs, social networks, platforms, consortia and partnerships among publishers

| Internet intermediaries Platforms / Standards and Software / Content / Level 3	Publishing Blogs, Wikis, social networks		Platforms/Editor Consortia Partnerships	2010 Edigita (Rizzoli, Gruppo Gems, Feltrinelli), Italy	Standards	Internet Service Providers	Software	Content producers: terminals + content
	Goodreads.com			Eden (Flammarion, Gallimard, La Martinière), France				
	Bookish reading club			IZNEO Project (a group of French publishers specialized in the Graphic Novel segment)				Sony TimeBook Town, Panasonic Words Gear
	Scribd.com			Libranda (Planeta, Santillana, Random House Mondadori), Spain				Saas or Cloud-Based Book Publishing models: Smashwords, Lulu, Blurb companies
		Digital Content	Web enabled businesses		Standard	← →	Software	

Some publishing houses, like the ones working in the tourist guides sector, are establishing narrow links with readers. To this aim, interactive, animation and evolutive technologies are necessary. Nonetheless, alliances seem necessary with other platforms: an autonomous strategy has weak complementarities. The main challenge is the creation of trust between readers, publishers and authors, that can complete the quality of published texts (Dacos, Mounier, 2010). Collaborations with Facebook and game developers to create content that combines the strengths and appeal of the various formats are on the way: the social media interest in the book publishing sector is exemplified by the Facebook's purchase of book app developer Push Pop Press and the partnership with Kobo and Net Flix (Guiry *et al.*, 2012). As a consequence, the latest e-readers and tablets are offering links with social networks such as Facebook and Twitter.

Partnerships among publishers and other actors are also emerging: an example is given by BooksOn.de created by the partnership between Ciando.de, one of the most important

German online bookstores, and Deutsche Telekom (Mussinelli, 2010). Other major digital platforms were launched in 2010[5].

Level 4: Infrastructures and networks: the role played by connection to consumers
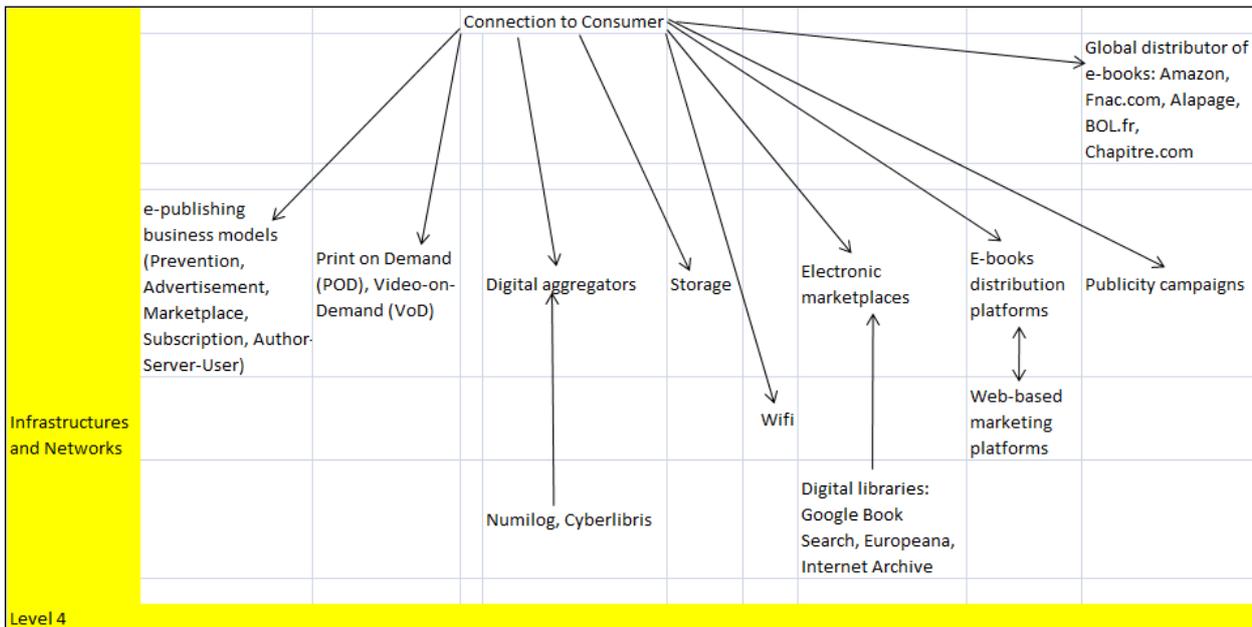
Digital text has changed the manner in which texts are not only created, but also distributed and read. Since the end of the 1990s, many traditional libraries have created a website for their collection (Lebert, 2009). In the 2000s publishers started to sell digital versions of their books on-line on their website or on Amazon.com or Barnes&Noble.com. Furthermore, in the year 2000 new on-line bookstores were created for selling only e-books: Palm Digital Media, renamed Palm eBook Store, Mobipocket, or Numilog (Lebert, 2009; Patino, 2008).

Advertising investments in the book sector promotion are an important link to consumers and they have been recently analyzed in France by Beuscart and Mellet (2012). They highlight the weakness of investments in advertising in the French publishing industry,

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[5] E.g. the Italian Edigita (RCS, Mauri Spagnol and Feltrinelli), the French Eden (Flammarion, Gallimard, La Martinière), the Spanish Libranda (Planeta, Santillana and Random House Mondadori), (Simon, de Prato, 2012). In France Virgin Megastore has a partnership with Amazon and Booken for selling Kindle and Cybook, while Fnac has a partnership with Kobo for selling the e-reader with access to its own e-bookshop (OECD, 2012).

as yet highlighted by Rouet (2007). Advertising campaigns are expensive, but necessary because of intense competition. Promotion and marketing initiatives in the French publishing value chain are focused mostly on relationships with the press and the direct work of agents in libraries for fostering the so-called "*Point on Sale advertising*". Publicity expenses are usually made in the written press with a tradition of "*advertising posters*", because book readers are expected to read also journals and magazines. Second to the written press, the radio is the second advertising publicity media utilized by the publishing industry (see also Rouet, 2007), and billposting is the third one. Since 2006 the Internet has a place in the publicity strategy, but its position is still weak.

According to Gaymard (2009) and to Lebert (2009), French Internet sales of books in recent years have been led by five main players: Amazon, Fnac.com, Alapage, BOL.fr and Chapitre.com. Amazon.com created in 1995 (Greco, 2005; Lebert, 2009), can be considered the first mover in the e-book market, because it first introduced the business model, and it secured its time advantage by making a significant part of its business model proprietary. Then, in 1997 Barnes&Noble, a leading US bookseller, entered the world of e-commerce, it launched its America OnLine website and began a fierce price war with Amazon.com for the best book discounts (Lebert, 2009). Well established distribution channels, in-house knowledge concerning storefront and the related processes, and an international scope provided benefits and complemented Amazon's strategy (Loebbecke *et al.*, 2010). Since 1998, Amazon created a new way of buying books and distributing books with its website Amazon.com. The ordered e-books are delivered to Kindle through Amazon's integrated Whispernet mobile data connection (Park *et al.*, 2010). Lab 126 was founded by Amazon as its subsidiary for conceptualizing, designing and building in-house Kindle device, while the manufacturing was outsourced to the Taiwanese firm Foxconn Technology Group, which has

experience in producing high quality technical devices (Loebbecke *et al*., 2010). The characteristic of Amazon Kindle is that users are forced to purchase e-books exclusively through the Kindle store. Amazon thus uses the e-book format AZW in order to foster its vertically integrated, proprietary system (Loebbecke *et al*., 2010).

Other key actors in the e-book value chain are digital aggregators like Numilog and Cyberlibris that play the role of distributors (Patino, 2008).
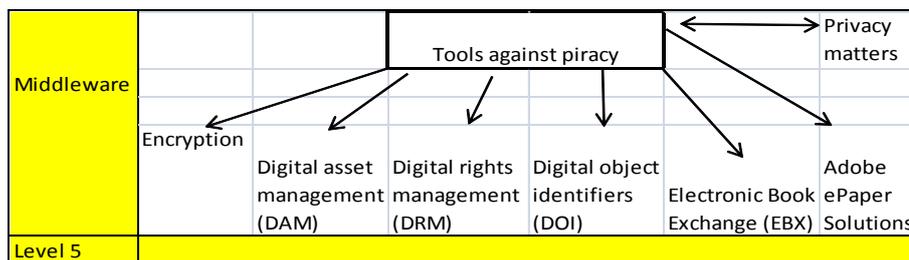
Connection to consumer can nowadays benefit from the introduction of print-on-demand (POD), where books are printed only on demand from readers. POD and e-ink, developed at the MIT Media Lab in 1997, have recently become the two techniques at the forefront in the print evolution. Several publishers are using these new technologies not only to cut costs but also to broaden their audiences and to adapt to changed economic climate (Leal, 2009). From technological commodities books became micro-technological innovations, meaning the result of wholesale mechanization of printing (Howard, 2009).

POD was introduced in the early 1990s. It utilizes digital printing: production is quicker than offset printers and excess print materials do not need to be kept on hand, because POD enables to print only what is needed to meet current demand (Leal, 2009).

The relationship with the consumer is amplified also by the launching of digital library projects like Google Print project, from 2006 known as Google Book Search, and the European digital library (Simon, de Prato, 2012; Dacos, Mounier, 2010; Patino, 2008). The first one was launched in 2004 as the attempt at digitalising as many books as possible of major public libraries. The second one is the reaction to the Google initiative: Europeana was launched in November 2008 (Dacos, Mounier, 2010; Lebert, 2009). It is sponsored by the European Commission (OECD, 2012; Simon, de Prato, 2012).
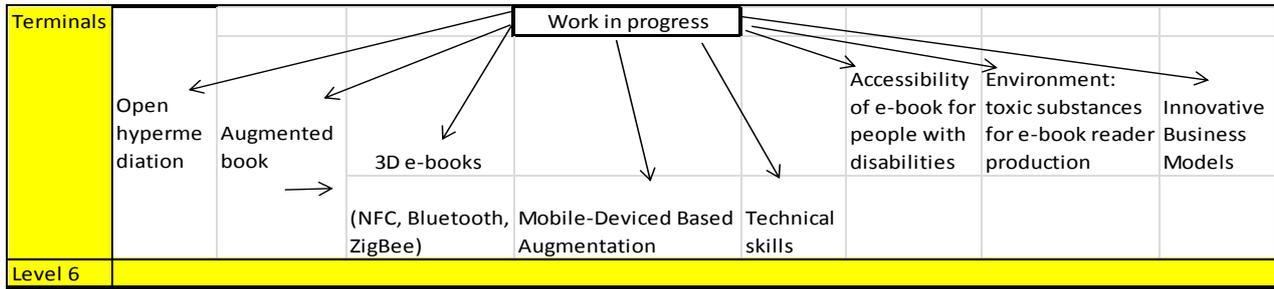
Platforms are another key step: Gallica 2, launched in 2008, is a consultation platform that offers free content through the BNF collections, as well as paid content through partnerships with publishers (Patino, 2008). Furthermore, e-book platforms such as the ones of Amazon and Apple offer the possibility to have a direct customer interface on their online stores to self-published authors (OECD, 2012).

Level 5: Middleware: economic structuring and piracy concerns

						Privacy matters
Middleware			Tools against piracy			
	Encryption	Digital asset management (DAM)	Digital rights management (DRM)	Digital object identifiers (DOI)	Electronic Book Exchange (EBX)	Adobe ePaper Solutions
Level 5						

Piracy is one of the main problems faced by the digital revolution and currently there are few studies on digital book piracy (Simon, de Prato, 2012). Tools like encryption, digital asset management (DAM), digital rights management (DRM), and digital object identifiers (DOI), are helping publishers to find a suitable solution (Carreiro, 2010; Dacos, Mounier, 2010). In particular, DOI is attributed by the agency Crossref: it consists in the creation of a sort of warehouse of single logins for identifying every text. This identification gives a strategic and monopolistic position to Crossref (Dacos, Mounier, 2010). Vulnerability to digital piracy is an important threat in the book sector: "*the industry has limited experience in dealing with digital piracy with no international forum for cross-industry agreement about protection policies and technologies (Italy and UK have such forums)*" (European Commission, 2005, p. 73).

Level 6: Terminals and users : technical interface and ergonomy

Terminals				Work in progress			Accessibility of e-book for people with disabilities	Environment: toxic substances for e-book reader production	Innovative Business Models
	Open hypermediation	Augmented book	3D e-books						
			(NFC, Bluetooth, ZigBee)	Mobile-Deviced Based Augmentation	Technical skills				
Level 6									

An interesting activity in progress is e-book accessibility to people with print disabilities: features like the translation of the visual digital text of an e-book into voice-audio mode, increases the accessibility to persons with disabilities (OECD, 2012). Notwithstanding, the digital divide and technical competence gaps can still be an obstacle for individuals willing to access electronic books and in particular enhanced e-books with apps and richer features.

There are also aspects linked to technological improvements not still understood, like environmental consequences of these new technologies: e-ink does not require materials to be printed, but the environmental impact of the materials used in technological devices is not clear (Leal, 2009). E-book readers are produced with toxic substances that are not-biodegradable (OECD, 2012).

Regarding the next future, Tian and Martin (2010) analyzed the Australian book publishing industry and they found that those technologies which emerged as likely to offer most in regard to the future of book publishing included production, content and communication technologies. Park *et al*. (2010) underlined that researches on the attempt to build 3D model of e-books for more natural and convenient reading are emerging (Chu et al. 2004; Hong, Chi & Card 2005; Almeida et al. 2006 [*all these 3 references are cited in Park et al., 2010*]), but there have been not yet 3D e-books appearing in industry.

3. Discussion: the actual publishers' strategy

R&D is carried out by creative companies without corresponding formally to effective R&D activities. As highlighted by Brandellero and Kloosterman (2010) and Green *et al.* (2007), creative industries are generally associated with various forms of "hidden innovation", difficult to measure with traditional indicators.

The reconstruction and map of all the specific phases of the R&D value chain in a specific creative sector like the book publishing one, enabled to understand where the technological innovation actually takes place, and whether creative companies have a perception of what really R&D means or not as well as to understand how and where the R&D activities someway matter. It seems that the e-book diffusion has fostered publishers to an increased attention towards appropriateness of R&D and technological innovation: the revolution in printing, formats, e-readers, tablets and PDAs, are at the origin of several changes in the publishers' strategy and new investments. As a consequence, publishers are defining and implementing new commercial strategies but all these strategies are depending on the new technologies demand without a leading position of the publishers. Digitization alters the legacy cost structure, because some costs disappear while new ones appear mostly on the software side of the equation, others remain unaffected or are shifted, like the ones of promotion through blogs (Simon, de Prato, 2012). In this context publishers are focusing on some particular aspects and, therefore, could not be able to adopt a global reactive strategy against competitors and incomers: global editorial projects as well as effective business models are still missing.

Using the mapping layers described help to understand how publishers are actually focusing on investments on some specific aspects. The e-ink's technology (*Level 1*) revolutionized the e-readers world. They became lighter, more compact, and easier to read

with increased and/or more displayed screen sizes. They also improved the battery life and the capacity to hold more and more information with expandable memory (*Level 2*). But, according to Patino (2008), in recent years the e-readers have succeeded one another without the dominance of one particular of them. Everything is open: actually, a reference and standard model of digital reading support does not exist, yet. Contrary to the music and film sectors, where supports have changed several times over the last decades, the book industry still cares for a secular reference model.

In this context, publishers are investing mostly on skills development for adapting their strategy to the e-book market needs: specific courses for acquiring competences are attended by internal staff. Furthermore, several platforms (*Level 3*) appeared on the market: these platforms are established in the form of a consortium among several publishers or they are managed by external actors playing the role of intermediaries.

What is still missing is a real publishers' business model for the e-book: it seems that editorial houses are following the market needs without playing an effective role of leaders. In other words, the interview results highlighted that French publishers are using the several platforms and enterprises appeared on the market in recent years for distributing books through the Internet. They are also clients of societies that offer aid in building standard formats like e-pub (*Level 2*), they adopt tools like DRM or electronic watermark, but they are aware of the lack of strong support of tools structuring economic relations and exploitation rights and in particular those against piracy (*Level 5*), and they are not facing piracy through an effective solution. All this is happening through an imitation process among publishers rather than through an emulation process (DiMaggio, Powell, 1983; Hannan, Freeman, 1984, 1989). This is also due to the heterogeneity of techniques and supply of e-readers, tablets and PDAs (*Level 2*): this heterogeneity is seen like a nightmare and publishers do not know which

way to go for not losing power on the market. Their main concern is about the need to be visible everywhere: they are looking for a link with social networks (*Level 3*), an application with I-Phone and I-Pad, a presence on all the main diffusion platforms. But publishers are not giving the same importance to the establishment of a stable and durable business model. As a consequence, investments in R&D and innovation are not linked to the creation of a real business model, but mostly to visibility. This means that the actual editorial strategy is focused more on maintaining the secular place and role of the publishers in the book value chain through an adaptation-imitation process rather than updating their role and functions to the new emerging, instable environment and changing cultural habits. This raises question about the durability of this fragile system and about who is taking the leadership role. R&D and innovation are somehow leading this evolutionary process but publishers are not really well aware of this aspect as they seem not to have the willingness to build a model for using effectively and efficiently these innovations. This is proven by the fact that one of the key points resulting from the interviews was linked to technological standards (*Level 2*): e-pub and pdf formats have not been a *choice*, but an *imposition* at the international level. To this aim, several companies specialised in digital editing are becoming the pivotal tools for developing these formats and many publishers are depending on these societies while others have invested in staff training. Notwithstanding, French publishers are willing to maintain their place in the digital market: to this aim they are focusing on "trust" building in the relationship with distributors (*Level 4*). The latter are playing a key role for the visibility of the catalogue on all the main important digital bookshops. Several platforms specialised in technologies for digital publications are continuously appearing. This aspect is also linked to the growing importance of blogs and links with social networks like Facebook and Twitter (*Level 3*).

The relationship between publishers and Internet advertising for books (*Level 4*) is another key confirmation of our assumptions. Publishers are well aware of the importance of the Internet in terms of promotion activities and marketing, but they use this tool only for experimenting weak initiatives. As a consequence, French publishing seems a sector "*for the most part still rooted in the tradition, with little publicity, preferring the press, and converting very slowly to the Internet* [authors' own translation]" (Beuscart, Mellet, 2012, p. 122). Notwithstanding, Internet is considered an effective tool for buying books. As a consequence, all the publishers are forced to have their own Internet website at least for information and communication. The Internet website is a complement of the physical bookshop and services like the possibility to turn some pages of a book on-line is a method in competition with sales in bookshops (Rouet, 2007). The evolution towards collaboration with social networks like Facebook and Twitter is a means for knowing better readers' needs and habits. Younger generation habits are demanding ever more and more innovative reading experiences (OECD, 2012). The sub-sectors related to the youth generation, like comics, are attracting most of the interest of many publishers, because young generations are more used reading on tablet and e-reader screens than on printed paper.

One of the main problems raised by the emerging role of actors like Amazon and Fnac (*Level 4*) is that their window influences the readers' choice, because a great amount of information is available on the net, but one cannot have a real possibility of choice. The suggestions coming from the experience of a physical bookseller cannot be replaced by the promotion of books on the main window of a digital platform. According to Loebbecke *et al*. (2010, p. 55), Amazon introduced a radical innovation by changing its core design concept. For the first time in the book market, hardware sales were being combined with content delivery: this business model has been proven to be successful in other major content markets

such as music and software. But there is also a general concern that publishers are losing control of their business to giants from outside the industry, like Amazon, Apple and Google (Guiry *et al*., 2012). While at the beginning publishers refused to give book files to actors like Amazon, at the end they were obliged to provide these files losing the power and the full control of the distribution channel. Notwithstanding, the publishers' attitude towards these emerging giants is not proactive: a general lack of active initiatives and global programmes for counteracting these actors emerged.

Finally, some projects in progress focused on 3D e-books (*Level 6*), but they are so expensive and risky that it is difficult to find publishers willing to take this challenge.

To sum up, digital libraries, publishing-related community blogs, social media and social networking sites are emerging as key tools for attracting new clients and fostering the diffusion of e-books (Carreiro, 2010; Tian, Martin, 2010). Collaborative e-book distribution platforms created by a consortium of major publishers and coproduction agreements among publishers and developers who specialized in the area of new technologies are other key tools (Mussinelli, 2010, 2011). In this context the effective role played by publishers is not emerging as a pivotal factor.

The European Commission report (2005, p. 70) highlighted that one of the main weaknesses of the EU book publishing market and industry is that this is a mature sector with no immediate driver for change. There is no evidence suggesting that the number of people buying books is growing.

In conclusion, the actual main problem is linked to the absence of investments in technological development focused on an effective business model. Publishers are adapting their editorial strategy to the succeeding new digital demand needs, but they are not leading this evolving process with a convincing strategy.

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