

FIELDS IN FLUX: INSTITUTIONAL BRICOLAGE DURING THE ERA OF FERMENT OF A TECHNOLOGICAL SHOCK

ABSTRACT

How do established institutions interact with proto-institutions during the adoption of a technology shock? In this paper, I examine the interplay between existing institutions and the proto-institutions originated as a consequence of a technology shock during a period of incremental progress. I depict *institutional bricolage* as the process by which new technology adoption occurs as a result of the active combination of elements from both old and emerging proto-institutions. I use a dialectical framework to depict three selective mechanisms at play: persistence, contestation and synthesis. By doing so, I begin to unpack the mechanisms whereby an arrangement is selected.

Keywords:

Technology shock; technology adoption; institutional bricolage,

INTRODUCTION

Technological shock is commonly understood as the technological changes that affect production outcomes through, for example, the invention of new production processes or the improvement of existing ones (Alexopoulos, 2011; Hansen and Prescott, 1993). Anderson and Tushman (1996) argue that a technological shock inaugurates an era of ferment in which competition amongst variations of the original breakthrough culminates in the selection of a single dominant configuration of the new technology.

How certain technologies come to be adopted widely is a question that has occupied researchers for some time. Research in technological adoption generally agrees that firms are substantially affected by the evolution of the technology in which is based. And, that technology adoption is key for the firm to keep competitive advantage (e.g. Ginsberg, Vekatraman, 1992; Suarez, 2014). However, although sophisticated theories of the drivers and the processes that lead adoption are available, existing explanations typically focus on inherent functional and

economic advantages of new technologies. Thus, consistent with a prevailing view of technology as a discontinuity that can diminish competitive advantage in firms, past research on technological shocks has placed emphasis on the need of firms to adapt to the dominant technological design.

In the last few years, however, a series of studies has highlighted a more ‘institutional’ understanding of the phenomenon that leads to the widespread adoption of radically new technologies (e.g. Garud and Rappa, 1994; Garud et al., 2002). Research along this line suggests that understanding technological shocks in purely functional terms may provide only a partial account of the process. Students of technology adoption from an institutional perspective acknowledge either that institutional pressures provide a framework by which a new technology becomes adopted or not (e.g. Pattit, 2012, DiVitto, 2012), or, that a new technology gets legitimated through a socially constructed process (e.g. Orlikowski, 2001, Munir, 2005). Thus, past studies in technology and institutions have focused on 1) how institutions affect technology ,or, on 2) the mechanisms by which a new technology gets legitimated in isolation. However, an integrated theoretical framework accounting for the interplay between institutional pressures and emerging forms of legitimacy is still missing. With the aim of tackling this gap, this research attempts to give a response to the issue of how institutional pressures that existed prior to the technology shock interact with emerging proto-institutions resulting from a new technology.

We define proto-institutions as “new practices, rules and technologies that transcend a particular collaborative relationship and may become new institutions if they diffuse sufficiently” (Lawrence, Hardy and Phillips, 2002). We argue that along the era of ferment, a new technology can generate new practices as proto-institutions, and, that the new practices as proto-institutions interplay with existing institutions in a process of institutional bricolage by creatively using historical remains of structures to assemble new things (Levi-Strauss, 1962/66). An institutional perspective on practice emphasizes that the shared meanings ascribed to

practices are informed by wider cultural beliefs shared at the institutional field level (e.g., Thornton et al., 2012: 128 –131).

To improve understanding of how existing institutions interplay with emerging proto-institutions, I carried out a qualitative study of the introduction of a technological shock in an institutional field. Specifically, I analyse the introduction of the electronic book¹ in the institutional field² of trade³ book publishing in the United Kingdom from the early 2000's to 2015. I considered this setting appropriate to my research purpose, because the era of ferment of this new technology lasted for a substantial period, thus it had the potential to generate proto-institutions that could interact with the existing institutions. The introduction of the electronic book in the late 90's brought along a variation of the technology – the Hard DRM – a software embedded in the electronic book created to protect the copyright license from being abused. Approximately 12 years after the implementation of Hard DRM, another variation of the technology emerged: Social DRM – a technology that involves the incorporation of ownership identity information into an electronic book so that its origin can be tracked in case of copyright infringement. In 2012, Social DRM represented an alternative to Hard DRM and acquired a critical role in the process through which the new electronic book gains acceptance.

From the qualitative case, I develop a dialectical model that advances understanding of this less investigated and undertheorised form of new technology adoption. The model describes the institutional processes during the era of ferment as dialectical process based on three interrelated mechanisms: *persistence, contestation and synthesis*. By doing so, the model offers a

¹ An electronic book (also referred to as ebook, eBook, e-book, digital book or e-edition) is a book-length publication in digital form, consisting of text, images or both, readable on computers or other electronic devices (Gardiner and colleagues, 2010).

² An institutional field is defined here as an arena, whose participants partake of a common meaning system and interact more frequently and fatefully with one another than with actors outside the field (McAdam and Scott 2005, p. 10; Scott, 1994, pp. 207-208).

³ The field of trade book publishing is sector of the publishing industry that is concerned with publishing books, both fiction and non-fiction, that are intended for general readers and sold primarily through bookstores and other retail outlets (Thompson, 2012, p. 12).

way to reconcile path-dependent processes with institutional change in which proto-institutions play a crucial role.

THEORETICAL BACKGROUND

Technology shock and the ‘era of ferment’

Most literature on how new technologies come to be adopted, roughly follows the Darwinian, natural selection model – in which the period of competition ends with the original breakthrough culminating in the selection of a single dominant configuration of the new technology (Abernathy and Utterback, 1978; Ginsberg and Vekatraman 1992; Sosa 2014; Suarez 2014; Tushman and Murmann, 1998). This research has confirmed that in most industries radical change is brought about through radical technological changes or ‘discontinuities’ (variations). Findings in these studies resonate with the idea that a competitive advantage can be eroded by technical change (Thushman and Anderson, 1986, Henderson and Clark 1990, Leonard-Barton 1992). Thus, one of the core assumptions lies on the idea that the survival of firms is substantially affected by the evolution of technology in which it is based.

Following these discontinuities, there is seen to be an era of ‘ferment’ in which actors struggle to develop applications based entirely, or partially, on the new technology. During this process, several competing designs typically emerge employing widely different architectures, configurations, features and standards (e.g. Henderson and Clark, 1990; Garud and Kumaraswamy, 1995; Utterback, 1994; Tushman and Murmann, 1998). Findings from these studies have shown which predictors can explain technology adoption (e.g. Ginsberg, Vekatraman, 1992, Seitz, Beuttenmüller, Terzidis, 2000) or the characteristics of the process itself (e.g. Hisao, Lee, 2006; Woiceshyn, 2000). For example, Ginsberg and Vekatraman (1992) showed that the competitive posture, as reflected in firm’s efficiency and quality orientations, influenced adoption of available technology through issue interpretation. Later research, has

further defined what drives technology adoption in order for the firms to be competitive. Seebauer (2014), for instance, identifies the group most likely to adopt an electric bicycle as those who hold pro-environmental and technophile attitudes. Instead of explaining predictors of technology adoption, another stream of research has focused on understanding the characteristics of the process by which firms adopt a new technology. For example, drawing on knowledge theory (Huber 2001; Sambamurthy and Subramani 2005); Hsiao, Tsai and Lee (2006) show how knowledge attributes and their relation with work contexts enable technology adoption.

Whilst the existing body of research in technological shock and the area of ferment has gone to great lengths in explaining how new technologies get adopted, this research assumes that these turbulent periods of innovation and uncertainty are seen to end with the emergence of an industry standard or a dominant design. Thus, understanding how field-level socio-political factors determine the path evolution has remained under-researched.

Technological shock and institutions

Institutional theory (Meyer and Rowan, 1977; DiMaggio and Powell, 1983) seeks to explain why certain ideas and practices come to be widely accepted across a variety of settings. Institutional theory implies that new technologies may come to be accepted because of regulative, normative, and cognitive reasons (Scott, 1995a). Thus, unlike previous theories in technological shock that emphasise the competition-related drivers of technology adoption, institutional theories for technology adoption explain the relevance of the taken-for-granted beliefs around a new technology.

On the one hand, existing studies on new technology adoption from an institutional perspective have focused on the legitimating role that institutions play in providing and industrial system that embodies the social, economic, and political infrastructure that any technical community needs (e.g. Abrahamson, 1993; Casper, 2000; Anchoydoguy et al., 1999;

Casper, 2004; Casper et al., 2004; Reinstaller, 2005; Hung et al., 2011; Pattit, 2012, DiVitto et al., 2012). These studies establish a causal relationship between the characteristics of regulative and normative pillars of institutions – e.g. a weak intellectual property regime of the catch up system in Japan (Ang et al., 1997) – and patterns in technology adoption.

While the previous stream of research treats technology adoption as a dependent variable and institutions as an independent one, this area of research focuses on the co-evolution between technology and institutions. Theories along this line draw on structuration theory (Giddens, 1979), social construction of technology (Pinch and Bijker, 1987) and institutional transformation (Meyer and Rowan, 1977; Zucker, 1988) to explore how technology is socially constructed within an institutional context. Central to this perspective is an interpretive understanding of technology, as a product of ongoing human action, design and appropriation (e.g. Garud, 2002; Leonardi, 2008; Pinch, 2002; Orlikowski, 2001; Munir, 2004; 2005). Through a field level study, for instance, Pinch and colleagues (2002) showed how the music electronic synthesiser became institutionalised by acting as a boundary object, "an object that can pass between different worlds, can take on different meanings on these works and in the process transform these worlds" (2002: 13), enacted by boundary shifters, "actors that go around different social worlds and morph identities as they go" (2002: 15).

Although existing research in technology and institutions has advanced the idea that taken-for-granted values and beliefs are key to understand new technologies adoption, existing theories struggle when it comes to explaining how previous institutions interact with new forms of legitimacy originated by new technology during the process of new technology adoption.

Institutional bricolage

Neo-institutionalists agree that culture is a tool kit (Swidler, 1986), and that actors engage in bricolage (Douglas, 1986). The notion of institutional bricolage focuses attention on

the creation of new assemblages of institutional elements. By this process, the ‘bricoleur’ creatively assembles new things by using the historical remains of structures (Levi-Strauss, 1962/66). Thus, “from an institutional perspective, bricolage may be conceptualized as a mechanism related to institutional and organizational change where solutions to problems involve the recombination of available and accessible institutional elements” (Christiansen and Lounsbury, 2011: 204).

Over the past decade, the concept of bricolage has increasingly been used by neo-institutional scholars to describe historical contingency and path dependence (e.g. Rao, 2005; Schneiberg, 2003; Leca and Naccache, 2006; Zietsma and McKnight, 2009; Christiansen and Lounsbury, 2013). Research in this line of inquiry has highlighted that contingent events or decisions matter in the establishment of institutions that persist over long periods of time. According to models of institutional bricolage, change is evolutionary rather than revolutionary since novel institutions embody remnants of the past. For example, residues of an old institutional order (i.e. Schneiberg, 2007; Hargadon, 2001; Zietsma and Lawrence, 2003; Zietsma and McKnight, 2009); cultural elements such as symbols or logics (Christiansen and Lounsbury, 2013), calculative tools and devices (Déjena et al., 2004) or narratives and metaphors (Slager et al., 2012).

These studies have done a great effort in highlighting the relevance of past dependent processes. For example, Christiansen and Lounsbury (2013) explain that ‘the bricoleurs’ respond to institutional complexity by combining existing logics. Rao (2005) emphasises that boundaries facilitate change because maintaining boundaries around decision making is crucial to initiate the cycle of conflict. However, with a few exceptions (i.e. Hargadon, 2001; Boxenbaum, 2014), the mechanisms whereby an arrangement is selected are less specified. Thus, how these path-dependent processes work and why the specific aspects exhibit more evolutionary than

revolutionary features is largely missing from theories of institutional bricolage.

A Dialectical Process Model of the Technology Adoption and Institutions

The dialectical process model specifically highlights path-dependency as in how past developments constrain and enable present ones. The dialectic analysis of institutional development advanced here places at the centre of analysis the process through which institutional arrangements are maintained and transformed (Benson, 1977). Furthermore, it focuses on continuous contest between opposing forces. Thus, it allows us to explain both persistence and change. The particular variant of dialectic analysis presented next draws on the main tenets of the contested view: its focus on conflict as a source of change, the convergent forces and its weaker form of institutionalisation. We focus on proto-institutions as a weaker form of institutionalisation to emphasise the relevance of “the path not taken” in the adoption of a new technology.

Specifically, this model locates sources for change not in institutional success (i.e. DiMaggio, 1988; Leblebici et al., 1991), but rather in the contradictions generated by institutionalisation as well as the alternatives it promotes. Finally, in highlighting the path-dependent process by which institutions persist or get transformed when a technology arrives in a field, the model provides an alternative to accounts of technology adoption from an institutional perspective by integrating both institutional pressures and forms of legitimacy.

METHODS

This article draws on a qualitative case study of the introduction of the new technology of the electronic book in the field of trade book publishing in the UK and the changes in practices related to the subsequent variations (Hard DRM and Social DRM). My aim was theory

elaboration by extending and refining current understandings of technology adoption and institutional struggles so as to ascertain its particular dynamics in fields in flux.

Research site. I chose to study technological shock in the field of trade book publishing in the United Kingdom because certain theoretical issues were readily transparent in that field (Eisenhardt, 1989; Yin, 2003). First, it was clear from preliminary investigations that significant changes in practices related with the introduction of Digital Rights Management in the field were occurring during the period between 2000 and 2015. Second, the fact that the history of the field and events related to our case were well documented meant that we could draw upon numerous data sources (cf. Garud et al., 2002).

Data collection

Data collection followed common recommendations for qualitative case study (Eisenhardt and Graebner, 2007) and combined archival search, participant observation and formal semi structured interviews. Table 1 describes our data sources and how to use them.

Insert Table 1 about here

Archival data

I collected a wide range of articles from industry-specific magazines as well as posts generated by authors and publishers. Industry-specific publications are an appropriate data source for retrospective longitudinal research studies because their purpose is to communicate to their target audiences the facts surrounding relevant current events (Hoffman, 1996). Such publications offer specialised coverage for a certain audience, typically participants in a specific industry. I identified as potential data sources two generalist book publishing periodicals: The

Bookseller⁴ and Publishers Weekly⁵, using the key words “electronic book”, “Hard DRM”, and “Social DRM” for the period 2000 to 2015. I then followed a snowballing process for additional publications that, while relevant to my focus of research, could have escaped my initial selection criteria. The final number of relevant articles identified amounts to 161.

Interviews

Archival data was supported by formal interviews. First, I conducted preliminary interviews with journalists and industry experts to explore the main actors and motivations of DRM related practices. Second, focused interviews with publishers, authors and DRM providers concentrated on how DRM related practices are enacted in the field. Preliminary and focused interviews followed different protocols. All interviews were tape-recorded and transcribed. Theoretical considerations led the selection of informants and differed for the two types of interviews. The identification of the preliminary interviews was based on the actors that appeared in archival data. Preliminary interviews included journalists and industry experts from the field of trade book publishing in the UK. Initial interviewees directed me to authors and publishers in the field suitable for the focused interviews. A list of members to be contacted included a mix of positions related to DRM (pro-Hard DRM, pro-Social DRM and anti-DRM) and roles in the field (i.e. publishers from different backgrounds, authors and activists), and other characteristics as criteria. The focused interviews identified the interests and roles of actors fostering changes in practices and the meanings ascribed to the DRM related practices by actors.

⁴ *The Bookseller* (since 1958, London, UK) Independent source of business intelligence and analysis for the book trade. It produces the official "Top 50" chart and previews all key forthcoming books three months before publication. Online, the bookseller.com is the book trade's most visited UK site with over 150,000 unique monthly users.

⁵ *Publishers Weekly* (since 1872, USA) Focused on the international book publishing business. It has an average weekly circulation of 68,000 users including booksellers, publishers, public and academic librarians, wholesalers, distributors, educators, agents and writers. Blogs from legitimated actors in the field (i.e. authors).

Data analysis

My analysis proceeded through multiple steps. For the sake of simplicity, I present 3 stages sequentially, although, in reality, multiple iterations occur. In the first stage I developed a narrative account (Eisenhardt and Bourgeois, 1988) that chronicled the emergence and institutionalisation of the field. I traced the evolution of the field from the first arrival of the technology shock (the electronic book) until today when the Social DRM is emerging as an alternative to Hard DRM. Table 2 provides a chronology of the key events and actors related to implementation or changes of the DRM-related practice.

Insert Table 2 about here

In a second step of analysis I used interview data to identify the interests and roles of actors fostering changes in practices, as well as to identify the meanings ascribed to the DRM related practices by actors. I used interview transcripts as primary data for the analysis, and archival data and field notes to support and refine the roles of actors in changes in practices. Using this analysis I gathered changes in practices in six groups of aggregated similar practices around the technology variations (see Table 4).

Insert Table 4 about here

In the third stage of data analysis, using evidence from the interviews, archival data and observations, I identified that changes in practices were related to the mechanisms of institutional persistence, contestation and synthesis. This led me to organise the emerging interpretations into a dialectical process model accounting for dynamics of stability and change (see Figure 1).

Insert Figure 1 about here

PRELIMINARY FINDINGS

This section presents my findings, drawing on all data sources. I provide a comprehensive overview of how the affordances of different technological solutions (see Table 2), are instantiated in practice (see Table 4). Figure 1 unpacks this dialectical process. On the left hand side, the figure represents how the new technology challenges the existing institutions. Then, it shows how dynamics of persistence, contestation and synthesis are related with the interplay between the different variations of the new technology.

Insert Figure 1 about here

Disruption of the status quo

In 1971 books started to be digitalised when Michael Hart founded Project Gutenberg, a platform designed to digitally store the contents of libraries, in particular public domain books. However, it took until 1990 – with the impact of the dot.com bubble - for the electronic book to be prioritised by both publishers and venture capitalists. Companies like Accenture and PwC forecasted increases of 50% in electronic book revenues. Nevertheless, sales in books started to be significant in 2006, with the improvement of reading devices (see Figure 2).

Insert Figure 2 about here

Although the affordances of the electronic book allowed quick and easy possibilities of file sharing, interoperability between devices and non-restricted geographic boundaries for purchasing, publishers were quick to criticise the risk of piracy that these affordances allowed.

Thus, the greatest challenge of the electronic book concerned the risk of eBooks being freely circulated and becoming a public good – a good that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others (Gravelle and Rees, 1992; Mas-Colell and Whinston, 1995; Varian, 1992).

In response to the electronic book representing a disruption for the status quo of the book publishers, the major publishers adopted Hard DRM to protect the digitised books from piracy. While we do not have access to sales data regarding the proportion of eBooks sold with Hard DRM over the eBooks sold with other DRM related options, one way to gauge the degree of diffusion of Hard DRM is by assessing how many of the largest publishers implement this technology. With 34% of the digital market share in electronic books, the big publishing groups dominate traditional publishing in the UK (see Figure 3). All these publishers and their imprints refuse to publish books without Hard DRM. The spread of this technology for copy protection indicates that the initial disruption of the status quo – caused by the arrival of a technological shock in the field – caused a response oriented towards the maintenance of existing institutions. In the next section, we further illustrate the efforts to keep the taken-for-granted role of the book publishers as gatekeepers of knowledge.

Insert Figure 3 about here

Re-asserting the roles of institutional interaction

The role of the publishers Our findings show that established actors in the field – supported by the new legal framework⁶ – focused their efforts in instituting Hard DRM as a device to face the risk of the books becoming a public good. Thus, the electronic book was

⁶ In 2000, the UK implemented the European Copyright directive which prohibits the importation, development, and distribution of tools to circumvent Hard DRM illegal.

framed not as a revolutionary digital innovation (as the conventional wisdom claimed) but as an attack to the established forms of producing content supported by a tangible device. A statement by one of the big publishers illustrates the perceived need of protecting the digital file:

“The central point is that we are in favour of [Hard] DRM because it inhibits file-sharing between the mainstream readers who are so valuable to us and our authors”. (Manager at Hachette, 2003).

Similarly, a chief digital officer of one of the major publishers emphasised the importance of Hard DRM for safeguarding authors’ rights: “part of the value publishers provide is protecting the livelihoods of our authors and ensuring that they're being properly compensated for their work”. Hard DRM also causes changes in practices that result being more restrictive than copyright. The “fair use” clause of the copyright allows copying copyrighted material for a limited and “transformative” purpose, such as to comment upon, criticise, or parody a copyrighted work. Such uses can be done without permission from the copyright owner. This allows using the content of the book in a transformative way without this being considered an illegal infringement. Thereafter, the major change in practice originated on the side of the publisher and consisted of adding restrictions to the copyright law by encrypting the digital file to prohibit sharing, copying, re-mixing and re-selling to the final user.

The role of the Hard DRM distributors Reaching a market share of 78% over the total sales of digital books in the United Kingdom in 2006, Amazon was the strongest Hard DRM advocate. Apple (with a market share of 12%) also applies Hard DRM to the files purchased from the iBookstore. The third most popular Hard DRM provider is Adobe. Adobe’s Hard DRM is currently used by a variety of eBooks distributors of electronic books, including Kobo (with a market share of 5%), Barnes and Noble, and Overdrive (with market shares of less than 5%). Adobe also markets a program to manage Hard DRM of eBook files, which offers the

opportunity for publishers to sell Hard DRM-protected eBooks through their own eBook stores (See Figure 4).

Insert Figure 4 about here

The Hard DRM distributors did not simply distribute the Hard DRM but further fostered changes in practices related with a concrete instantiation of the electronic book. One of the major changes in practices was related to the modification of the ownership of the book. As Amazon's terms of conditions for eBook state: "Kindle Content is licensed, not sold, to you by the Content Provider". Given that users purchase a license to use the electronic book as opposed to owning it, eBook distributors have the capacity to exert mechanisms of control over the license if they find it necessary. For instance, in 2009, Amazon erased George Orwell books from Kindle. In 2011, Amazon wiped a customer's Kindle and deleted her account because of geographical incompatibilities.

A further change implies that the book goes from being used in a single support –the physical book- to being locked into the provider's platform. Thus, new practices consequence of Hard DRM bring along the non-interoperability between devices. Consequentially, the relationship between the publisher and Hard DRM-provider can become conflictive in case of re-negotiation of contractual agreements. For example, in 2014, Hachette refused to give Amazon pricing control over its books, in response to Amazon's practice of discounting most of its digital titles at less than £10 per book. The negotiations between Amazon and Hachette lasted for months and re-ignited the debate about the restrictions of Hard DRM for publishers. Hachette's eBooks are encrypted with Amazon's Hard DRM. Thereafter, the impossibility of transferring Hard DRM-ed books purchased in Amazon to other distributors of electronic books restricted the possibilities of Hachette leaving Amazon for another distributor.

As a result of the capacity of Hard DRM providers to lock the digital file in their specific device (for example, the Amazon Kindle), they can make decisions about the content published. For example, in 2005 the licensing terms of an early Adobe electronic edition of *Alice in Wonderland* stipulated, “this book cannot be read aloud”. Further restrictions pertain to the future storage of the books when, after 70 years, the copyright expires and the book enters the public domain.

Institutional maintenance. The combination of resistance to change by the publishers together with the proactive role of Hard DRM distributors in further restricting the use of the digital file proved to be successful. Changes in practices from the physical book to the electronic book show that institutional interactions were reasserted. The findings reported so far illustrate how publishers and Hard DRM distributors worked to repair the process of change. A technological change that, as Table 3 shows, could have offered affordances related with sharing, exchange and “peer-to-peer”, but Hard DRM associates the digital file with a restricted use. Using this variation of the technology, scarcity is artificially created. Moreover, the emergence of the role of Hard DRM provider enhances the control of the final destiny of the book by both the publisher and the distributor. As a consequence, the publisher maintains its position of gatekeeper in the process of book publishing. In addition, the new role of the Hard DRM distributor further reinforces the role of the publisher.

Forces of institutional change: the Anti-DRM movement

In the late 90s an explicit movement to counteract the consequences of the implementation of the Hard DRM emerged in response to the changes in practices caused by the Hard DRM in the field of book publishing. The movement was driven by free-software activists, who argued that DRM represents a threat to the freedom of the internet as it jeopardises fair use, impedes competition and innovation, chills free expression and interferes with computer intrusion laws (Electronic Frontier Foundation, 2012).

The role of activists. Debates surrounding the protection and enhancement of rights linked to the growth of the use of digital technology incited the creation of different grassroots activist platforms around the globe. Platforms such as “Defective by Design” launched in the UK in 2006 to specifically address anti-Hard DRM initiatives. Its actions include the creation of an “international day against DRM” on the 6th of May. The emergence of anti-DRM platforms provided an important infrastructural element that enabled the diffusion of anti-DRM positions to authors, booksellers, publishers, industry experts and readers.

Activists, authors and consumers, used different arguments to motivate the adoption of practices directed to oppose the use of Hard DRM. For example, the following quote vividly illustrates the anger and disagreement with Hard DRM:

“This malicious device designed to attack the traditional freedoms of readers: There's the freedom to acquire a book anonymously, paying cash — impossible with the Kindle for all well-known recent books. There's the freedom to give, lend, or sell a book to anyone you wish — blocked by [Hard] DRM and unjust licenses. Then there's the freedom to keep a book — denied by a back door for remote deletion of books.” (President of the Free Software Foundation, 2002).

This argument highlights the constraints that Hard DRM places upon the traditional freedoms of the readers. They emphasise how Hard DRM not only replicates scarcity from the physical file to the electronic one but, also, imposes additional restrictions.

The role of Authors. Supporters of the anti-DRM movement argue that piracy can be beneficial to authors by granting them visibility in the context of the attention economy⁷. Best selling authors such as Paulo Coelho or Neil Gaiman have adopted the anti-DRM arguments and campaign publicly against the use of Hard DRM: “Piracy, or even the publisher giving away free copies of a book, should be seen as promotional and will ultimately lead to increased sales” (Paulo Coelho, 2006). Other authors, such as Cory Doctorow, became actively involved in the

⁷ Attention economics is an approach to management information that treats human attention as a scarce commodity (Matthew, 2015).

anti-DRM movement and also enacted in practice the principles of the movement. For example, by negotiating with the publishers agreements to distribute books free of DRM via own distribution channels (i.e. personal webpage).

The role of consumers

“Hard DRM is a solution to a particular problem that itself creates other problems, it kills the net. The unintended consequence of that is that you can’t remix that content. We are killing piracy but we are destroying the ecology that digital technologies invite us to embrace. I would much prefer that we begin to develop ways to make sure that others get compensated without fucking their content down and other creative uses are allowed too. It is important that people make a difference between a read-only internet and a re-write internet” (Activist, 2007).

This quote exemplifies the resistance to the invalidation of the “fair use” clause of copyright. Consumer communities played a crucial role in the process of resistance. In addition, resistance against Hard DRM positions mounted when in 2011 Amazon wiped the account of a customer. A wave of consumer-led anti-digital rights management discussions demanded that Hard DRM to be stripped from Kindle files in case Amazon decided to wipe further accounts. Despite the illegality of stripping DRM, this was regarded as an act of “digital civil disobedience”. It was also held up as a symbolic act in reclaiming the ownership of the digital books. Thus some consumers further interpreted piracy as a legitimate option:

“Hard DRM has made the pirated versions more valuable due to their usability over specifications, even if the quality was slightly degraded” (Consumer, 2009).

This quote expresses how one recurrent practice on the consumer side reveals the inconvenience of Hard DRM. Whilst with the physical book piracy was a practice enacted with commercial purposes, with Hard DRM piracy consists on the circumvention of Hard DRM by a final user that seeks to avoid the affordances that Hard DRM enacts.

Institutional bricolage: the emergence of a hybrid alternative

The genesis of an alternative. The anti-DRM debate induced publishers in the field to re-consider practices related to Hard DRM. The process of contestation to the established technology of Hard DRM fostered Social DRM as an effective alternative. Social DRM has

gathered enough attention to generate a legal response. In 2010, the Digital Economy Act (an Act of Parliament in the United Kingdom), declared circumventing Social DRM illegal. After Pottermore established Social DRM in 2012, further publishers followed. As the manager of the main Social DRM provider – BooXtream – indicated:

“There is no 'hard' data available, but hundreds of thousands (if not millions) of ebooks are sold with Social DRM in the UK each year. We now have 29 publishers using BooXtream in the UK, and our partner Firsty is also providing a respectable number of publishers with our technology”.

The crystallisation of the resulting practices of Social DRM illustrates how further changes in practices exposed contradictions and dissent around the practices resulting from Hard DRM. It also incorporated elements that show a path-dependence process. Thus, the needs of the publishers to maintain their own institutions – standards, roles, and contracts – combined with influences of institutional change.

Elements of institutional maintenance. The actual implementation of Social DRM revealed persistence in the interest of protecting against piracy. The core change in practices that Social DRM brings is watermarking the digital file to identify the purchaser (instead of encrypting the digital file to prohibit sharing as the Hard DRM does). Similarly as with Hard DRM, the core resulting affordance focuses on protecting the book from piracy – as pirated copies can be tracked thanks to the watermark. Moreover, although the technology affords interoperability, some publishers restrict this option. For example, the publisher Pottermore restricts the number of times a Harry Potter book can be downloaded into multiple formats to eight. A similar vein occurs with the issue of ownership. Whilst Social DRM allows users to own the book as opposed to merely purchase a license, the final decision is in the hands of the publisher. As the manager of the Social DRM provider argued “with Social DRM ownership depends on the publisher. With Social DRM the eBooks cannot be deleted remotely. However, some publishers prefer to license the eBook instead of offering ownership”.

Incorporation of elements of contestation. Although path preconditions allow institutionalised practices related to Hard DRM to persist, changes in practices also denote embeddedness in dynamics of contestation generated by the anti-DRM movement. For example, although Social DRM affords tracking users, some publishers do not enact this option:

“In Verso books we do not track the watermark. We understand that a certain degree of piracy is necessary to increase our visibility. By not tracking the file, we also show to our buyers that we trust them” (Rights Manager of Verso, 2014).

Further changes in practices also resonate with the efforts towards institutional change by the Hard DRM opponents. For example, other publishers do not restrict the possibilities of interoperability that Social DRM affords. Tor emphasised the importance of “having a DRM-free digital space for the sci-fi/fantasy community that allows for experimentation with format, such as the TV-season-esque serialisation of the Human Division, the latest novel in John Scalzi’s Old Man’s War universe”. Thereafter, for Tor, Social DRM is a tool to experiment with the reading experience of the users:

“Keep a reader or a bookseller or an author or a semi-pro excited about a story by publishing an easily accessible novella in between novels. Then, you can more easily build a more diverse publishing program, and you can do it without locking those stories into devices that may or may not become obsolete” (Tor’s manager, 2013).

Drawing from the idea of “publishing as a community”, Tor acknowledged the need to implement Social DRM to foster interaction: “Publishing, has always been a community of support and conversation, driven and refreshed by the excitement generated by the authors and their stories”. Tor’s CEO argues that Hard DRM hinders the “connections” that “occur naturally” within the community.

Further elements of institutional change, are related with the fact that Social DRM providers are a web service at the point of sale. Thus, whilst distribution with Hard DRM locked the digital book into a specific device, as the manager of BooXtream relates, “in a technical sense are DRM-free”.

DISCUSSION AND CONCLUSIONS

My study of technology adoption from an institutional perspective helped me produce a fine-grained account of the effect of existing institutions as well as the proto-institutions involved in the dialectical process of institutional bricolage. By unpacking the mechanisms of *persistence*, *contestation* and *synthesis* that the process rests upon, my study improves understanding of the mechanisms of institutional bricolage that allow new technology adoption. In the remainder of this section, I discuss the implications of our observations for the theories of technology from an institutional perspective and institutional bricolage.

Extending theories of technology and institutions

My study suggests how extant models provide only a partial account of technology adoption from an institutional perspective, as they tend to overlook the emergence of proto-institutions resulting of the new technology during the era of ferment. By doing so, my study answers a call for overcoming the “two stage process” in which the adoption of a new technology is driven by technical efficiency and subsequent diffusion happens by an isomorphic process of institutionalisation (Lounsbury, 2007). Current representations of technology adoption from an institutional perspective either reflect that existing institutions provide a framework to benefit or challenge technology adoption or the role of socially constructed cognitive processes to foster the legitimacy and, thus, adoption of a new technology in an institutional field. The circumstances that trigger technology adoption from an institutional perspective do not consider that, alongside the period of technology adoption, emergent institutions originated from the new technology interplay with existing ones. My model begins to unpack this fundamental face of technology adoption, by shifting attention to the interplay between old and emerging proto-institutions.

Institutional bricolage and dialectical change

Although previous research acknowledges that several alternative arrangements unfold during processes of institutional bricolage (e.g. Boxenbaum, 2014; Christiansen, Lounsbury, 2013), the mechanisms whereby the arrangements are selected remain less explored. My findings highlight three selection mechanisms: *persistence*, *contestation* and *synthesis*. *Persistence* involves work oriented towards maintaining the existing taken-for-granted roles and meanings prior to the arrival of the new technology. *Contestation* occurs as actors in the field resist the efforts of persistence. And, *synthesis* becomes possible after both dynamics for institutional change and persistence are recognised as an opportunity by some actors. As this dialectic model highlights, internal forces in the institutionalisation process itself related to efforts of both institutional maintenance and change, created a platform for evolutionary change.

Table 1: Data Sources

Data Source	Type of Data	Use in the Analysis
Archival data	<i>Field-specific publications:</i> independent sources of analysis for the book trade (i.e. The Bookseller and Publishers Weekly), blogs from legitimated authors in the field.	Produce a chronology of the events and actors related to implementation or changes of the DRM-related practices (Table 2). Track of changes in practices related to DRM (Table 3).
	<i>Field configuring events:</i> videos and articles from fairs, workshops and professional conferences.	Support, integrate, and triangulate evidence from observations and interviews.
Observations	<i>Field notes from field configuring events:</i> detailed record of social interaction, conversations, and specific references to field evolution in relation to the electronic book.	Support the reconstruction of the map of events and actors from archival data. “Triangulate” interpretations emerging from archival data as well as from interviews.
Interviews	<i>Preliminary interviews:</i> with journalists and industry experts to explore the main actors and motivations of DRM related practices.	Identify the interests and roles of actors fostering changes in practices and the meanings ascribed to the DRM related practices by actors (Table 4).
	<i>Focused interviews:</i> with publishers, authors and DRM providers on how DRM related practices are enacted in the field.	Integrate archival data and observations with informant’s accounts, to improve our understanding of DRM related changes in practices linked to institutional struggles.

Table 2: Chronology of Events

Year	Exogenous Event	Endogenous Event
1971	Books gradually started being digitalized, especially after 1971 when Michael Hart founded Project Gutenberg, a platform designed to digitally store the contents of libraries, in particular public domain books.	
1988	The Digital Millennium Copyright Act (US) section 1201(a) declares the importation, development, and distribution of tools to circumvent DRM illegal.	Free Software activist platforms start getting involved in campaigning against DRM (i.e. electronic frontier foundation, free software foundation, DRM.info).
1990	By the late 1990s, digitising book content and making it available in a variety of formats was being prioritised by both publishers and venture capitalists.	
1999		The UK implements the European

	Copyright Directive which prohibits circumvention of the DRM.
2004	Google's mass book digitisation programme.
2004-2005	Development of the Web 2.0 phenomena.
2006	Booxstream, The very first start with digital watermarks was in 2006, when Icontact developed a custom digital distribution and fulfilment platform for audio books to be used by a Dutch audio book web shop and distributor.
2007-2008	E-books gained relevant market shares.
2008	The Digital Economy Act (an Act of the parliament of the United Kingdom), further reinforces DRM protection. Circumventing social digital rights management becomes illegal. (opposers: digital rights campaigners - Open Rights Group, 38 Degrees, Pirate Party, Green Party, industry lobbying- Lord Mandelson and the music and film industry).
2009	Amazon announces an aggressive strategy pricing bestsellers at 9.99\$ by which Kindle The Kindle is widely assumed to be the world's most popular ereading device.
2012	BooXstream started in the Netherlands, e-book watermarking really took off when UK based Pottermore decided to use it for the Harry Potter e-books in 2012.

Table 3: Affordances of the different technologies

New Technology	
Affordances	
Quick and easy possibilities of file-sharing\	
Non restricted geographic boundaries for purchasing	
Interoperability between devices	
Variations of the new technology	
Hard DRM	Social DRM
Affordances	
Restriction of file-copying, file-sharing and file-modification	Interoperability between devices: possibility of file-sharing and interaction with a community of readers
Territorial license restrictions	Possibilities of enhanced reading experiences
Single purpose devices and file formats block users to specific platforms	Identification of the buyer on the digital file (watermark) in order to track the file in case of piracy.
Rather than actual ownership, the user buys a limited license to use the product	

Table 4: Changes in practices and Institutional Outcomes

		Change in Practices	Institutional Outcome
New Aggregated practice			
	Micro-Practices with the physical Book	Micro-Practice with the E-book with Hard DRM	
Producers and Distributors			
	Copy protection is restricted by copyright law and prevents copying and adaptation of work intended to the general public.	Copy protection is restricted by copyright law and also by the encryption of the digital file that prevents sharing, copying, re-mixing and re-selling at the individual level.	Naturalization of the replication of the scarcity of the physical world into the digital sphere.
Copy protection			
	The book is distributed in a physical device.	The digital file is locked into a specific device.	
	The copyright owners establish the contractual conditions	Both the copyright owners and the Hard DRM providers establish the contractual conditions	
	Publishers made the final decision about the content of the book.	Distributors made the final decision about the content to distribute.	Enhancement of the control of the final destiny of the book by the publisher and the distributor.
	The final user owns the book.	The final user licenses the book.	
	After 70 years, the copyright expires and the book enters the public domain.	The Hard DRM does not unlock after 70 years, the book does not enter the public domain.	
Consumers			
	Piracy requires copying the files intended to a wide audience.	Piracy involves circumventing Hard DRM by the end user.	Criminalisation of the consumer as a potential pirate
Piracy			

Practices with the E-book with Hard DRM

Practices with the E-book without DRM

Institutional Outcome

Producers

Hard DRM contracts tie authors to the Hard DRM distributors
Hard DRM distributors

Authors distribute books without DRM (and are only tied to copyright)

Author's rights

Practices with the E-book with Hard DRM

DRM

Practices with the E-book with Social DRM

Practices with the E-book with Institutional Outcome

Producers

copy
Encryption of the digital file so that it can't be shared, copied, re-mixed or re-sold.

A digital watermark in the digital file identifies the purchaser.

The new variation of the technological shock keeps elements from the old one

The digital file is locked to a specific device.
The possibilities of sharing and inter-operability between devices depend on the decisions of the publisher.

The new variation of the technological shock permits rather democratic uses of the technology (i.e. sharing, lending, inter-operability of devices).

Flexible tracking
Experimentation with different formats.

Figure 1 : Dialectical process model

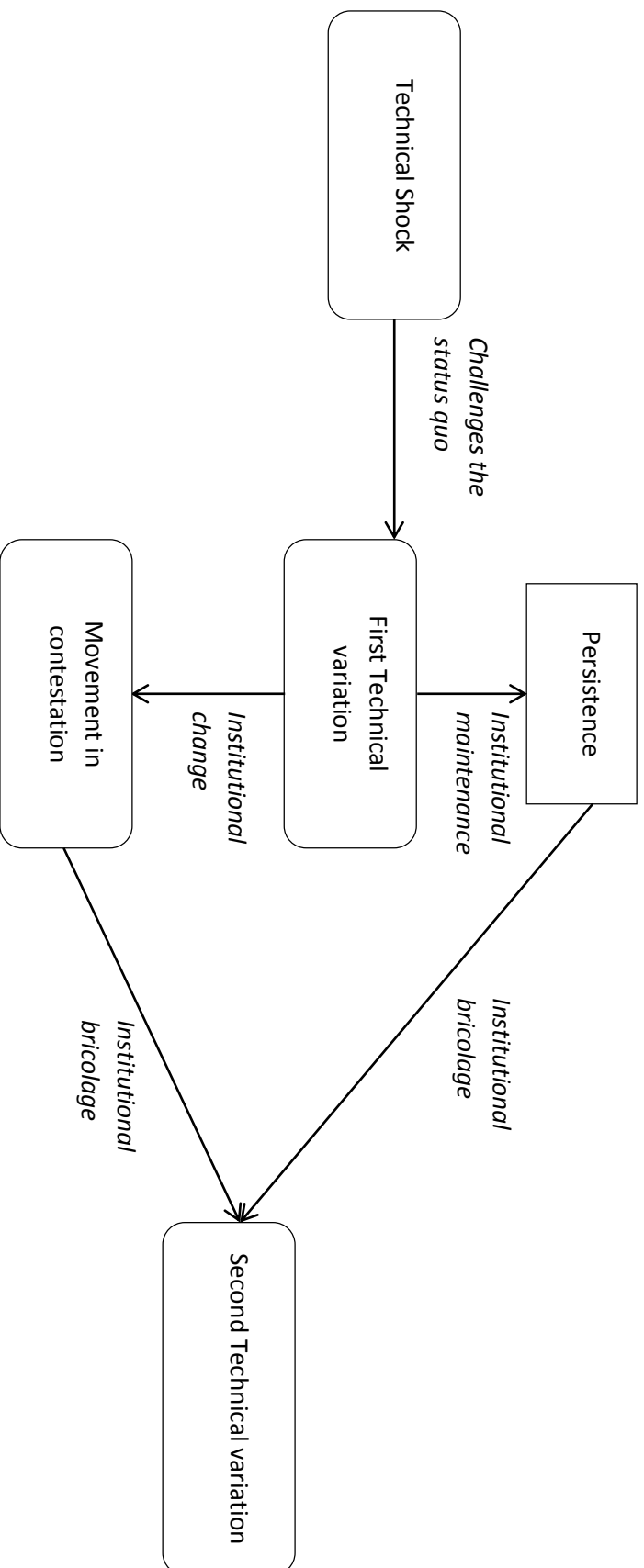
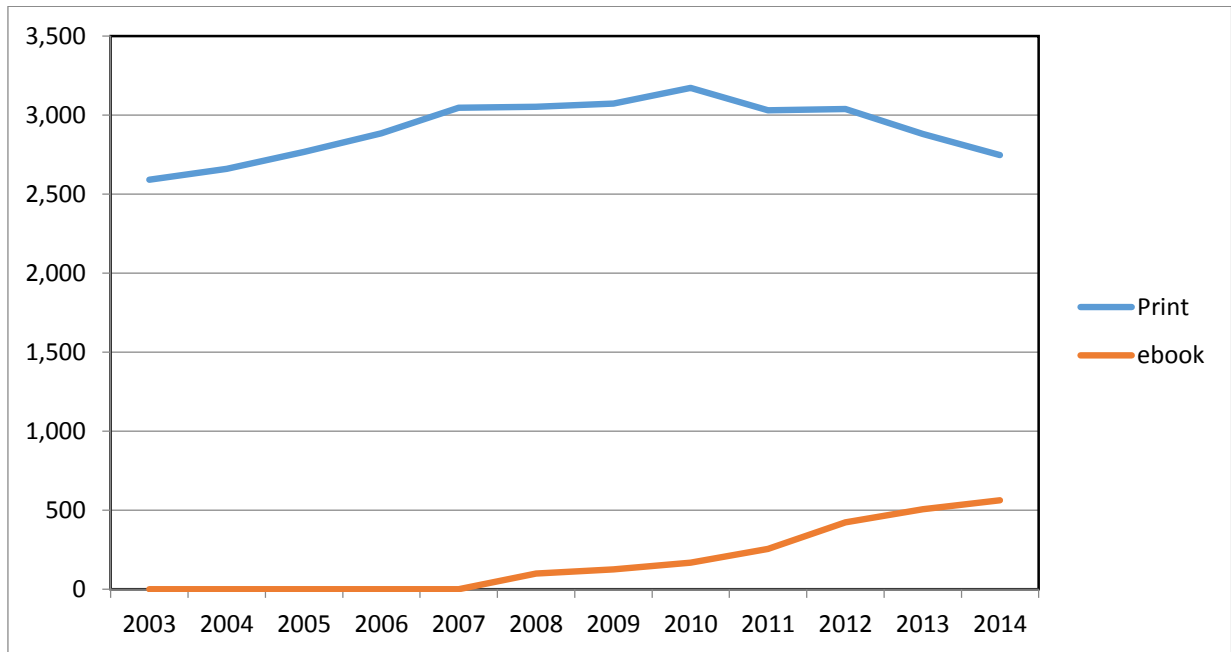
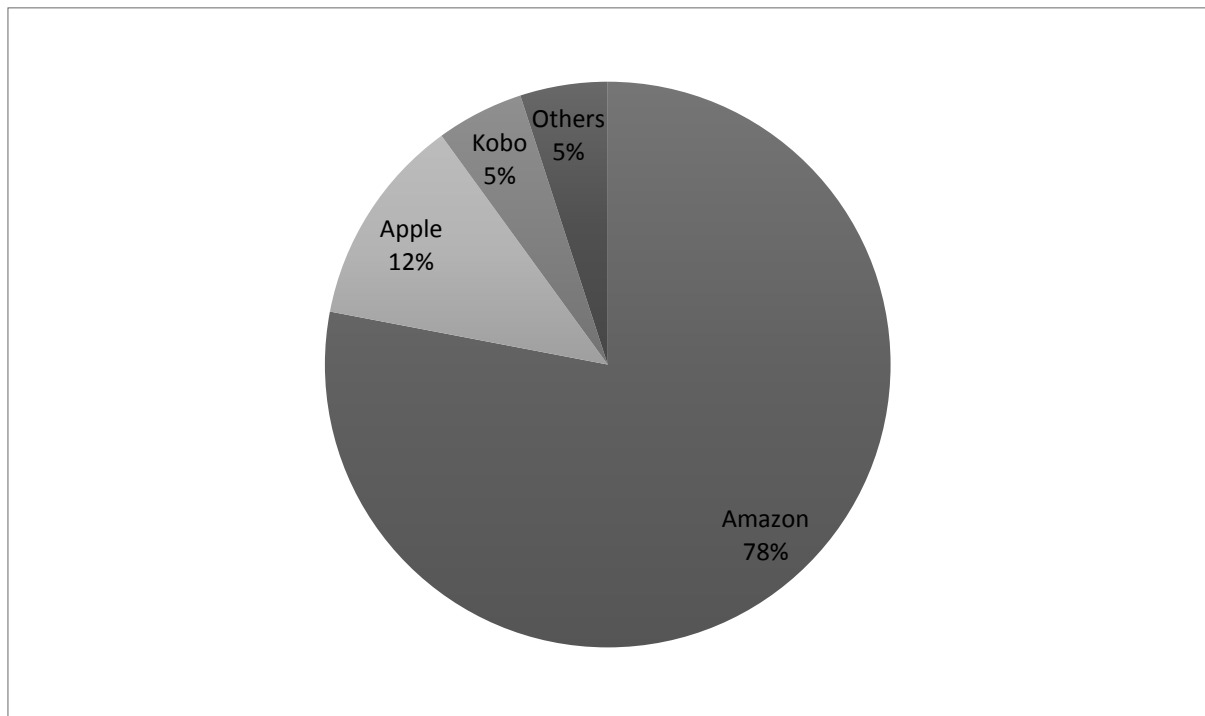


Figure 2: Evolution of sales (in m £) in electronic book in the UK



Source: British Publishers Association (2015).

Figure 3: Market share of sales of electronic book per intermediary in 2013



Source:

Investor

presentation

Hachette

References

- Abernathy, Utterback, 1978. Patterns of industrial innovation. *Technology Review* 7:40–47
- Abrahamson, E. (1991). Managerial fads and fashions: The diffusion and rejection of innovations. *Academy of Management Review*, 16, 586–612.
- Anderson, Tushman, 1991. Managing through cycles of technological change. *Research Techno Management* 34:26–31
- Ang and Cummings. 1997. Strategic Response to Institutional Influences on Information Systems Outsourcing. *Organization Science*, 8:3.
- Benson, 1977. Organizations: A dialectic view. *Administrative Science Quarterly*. 22: 1-21.
- Cartel, Boxenbaum, Aggeri, 2014. Experimentation and bricolage on institutions: understanding the selection of new arrangements. AIMS, Rennes, France. <hal-01089472>
- Casper. 2000. Institutional adaptiveness, technology policy and the diffusion of new business models: the case of German biotechnology. *Organization Studies*, 21:5.
- DiMaggio. 1988. Interest and agency in institutional theory'. In *Institutional patterns and culture*, L. Zucker (ed.), Cambridge, MA: Ballinger Publishing Company, 3:22.
- DiVito, 2012, Institutional entrepreneurship in constructing alternative paths: A comparison of biotech hybrids. *Research Policy* 41 (2012) 884–896
- Dosi, 1982. Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change. *Research Policy*, 11:3.
- Douglas, 1986. *How institutions think*. Syracuse, NY: Syracuse University Press.
- Eisenhardt and Graebner, 2007. Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50: 25-32.
- Eisenhardt, 1989, Building Theories from Case Study Research. *The Academy of Management Review*. 14(4).
- Garud and Rappa, 1994. A Socio-Cognitive Model of Technology Evolution: the Case of Cochlear Implants. *Organization Science*. 5(3).
- Garud, Jain and Kumaraswamy, 2002. Institutional Entrepreneurship in the Sponsorship of Common Technological Standards: The Case of Sun Microsystems and Java. 45(1).
- Giddens. 1979. *Central problems in social theory*. University of California Press. Berkeley.
- Glaser and Strauss, 1967. *The discovery of grounded theory*. New York: Aldine.
- Hansen and Prescott, 1993. Did Technology Shocks Cause the 1990-1991 Recession? *The American Economic Review*, 83: 280-6.

- Hargadon, Andrew and Douglas. 2001. When innovations meet institutions: Edison and the design of the electric light. *Administrative Science Quarterly* 46 (3): 476-501.
- Henderson and Clark 1990, Architectural innovation: The Reconfiguration of Existing. *Administrative Science Quarterly*. 35 (1): 9.
- Christiansen, Lounsbury. 2013. Strange brew: Bridging logics via institutional bricolage and the reconstitution of organizational identity. In Michael Lounsbury and Eva Boxenbaum (Eds.), *Institutional Logics in Action* (pp. 199-232). Bingley : Emerald Group Publishing (*Research in the Sociology of Organizations, Vol. 39 Part B*)
- Lawrence, Hardy, Phillips, 2002. Institutional effects of interorganizational collaboration: The emergence of proto-institutions. *Academy of Management Journal*, 45: 281–290.
- Leblebici, Salanick and Copay, 1991. Institutional change and the transformation of interorganizational fields: an organizational history of the U.S Radio Broadcasting Industry, 36:3.
- Leonardi, Barley, 2008; Materiality and change: Challenges to building better theory about technology and organizing. *Information and Organization* 18 (2008) 159–176
- Lévi-Strauss, Claude. 1962. *La pensée sauvage*. Paris: Plon. ———. 1966. *The savage mind*. Chicago: University of Chicago Press.
- Locke, 2001. Grounded theory in management research. London: Sage.
- Mas-Colell and Whinston, 1995. *Microeconomic Theory*, Oxford University Press. Oxford.
- Meyer, Rowan. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83.
- Munir and Jones, 2004. Discontinuity and after: the social dynamics of technology evolution and dominance. *Organization Studies*. 24 (4).
- Munir and Phillpis, 2005. The birth of the ‘Kodak Moment’: Institutional entrepreneurship and the adoption of new technologies. 26(11).
- Pattit, Raj and Wilemon, 2012. An institutional investigation of U.S technology development trends since the mid-19th century. *Research Policy* (41).
- Pinch, T., and Bijker. W., 1987. The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. In *The social construction of technological systems: New directions in the sociology and history of technology*, edited by Wiebe Bijker, Thomas Hughes, and Trevor Pinch, 17-50. Cambridge, MA: MIT Press.
- Pinch, Trocco, 2002. *Analog Days: the invention and impact of the Moog Synthesizer*. Harvard University Press.
- Rao, Hayagreeva, Philippe Monin, and Rodolphe Durand. 2005. Border crossing: Bricolage and the erosion of categorical boundaries in French gastronomy. *American Sociological Review* 70 (6): 968-991.

Reinstaller, 2005. Policy entrepreneurship in the co-evolution of institutions, preferences, and technology. Comparing the diffusion of totally chlorine free pulp bleaching technologies in the US and Sweden. *Research Policy* (34).

Scott. 1995/2008. *Institutions and Organizations*, Thousand Oaks, CA: Sage.

Slager, Rieneke, Jean-Pascal Gond, and Jeremy Moon. 2012. Standardization as institutional work: The regulatory power of a responsible investment standard. *Organization Studies* 33 (5-6): 763-790.

Strauss and Corbin, 1990. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Newbury Park, CA: Sage.

Swidler Culture in Action: Symbols and Strategies *American Sociological Review*, Vol. 51, No. 2. (Apr., 1986), pp. 273-286.

Tushman and Anderson, 1986. Technological discontinuities and organizational environments. *Administrative Science Quarterly* 31:439–465

Utterback, 1994. *Mastering the dynamics of innovation*. Boston, MA: Harvard Business School Press.

Weber, 1990. *Basic Content Analysis*. Newbury Park, CA: Sage Publications.

Yin, 2003. *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Zietsma, Lawrence, 2010; Institutional Work in the Transformation of an Organizational Field: The Interplay of Boundary Work and Practice Work. *Administrative Science Quarterly* June 2010 vol. 55 no. 2 189-221

Zucker and Lynne, 1988. 'Where do institutional patterns come from? Organizations as actors in social systems', in Lynne G. Zucker (ed.), *Institutional patterns and organizations: Culture and environment*. Cambridge, MA: Ballinger. pp. 23-49.

