



HAL
open science

Facing disruption: the cinema value chain in the digital age

Elisa Salvador, Jean-Paul Simon, Pierre-Jean Benghozi

► **To cite this version:**

Elisa Salvador, Jean-Paul Simon, Pierre-Jean Benghozi. Facing disruption: the cinema value chain in the digital age. International Journal of Arts Management, In press. hal-02300929

HAL Id: hal-02300929

<https://hal.science/hal-02300929>

Submitted on 30 Sep 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

This article has been accepted for publication by *the International Journal of Arts Management*. It can be cited as follows:

Salvador E., Simon J.-P, Benghozi P.-J. (2019), “Facing disruption: the cinema value chain in the digital age”, *International Journal of Arts Management*, *forthcoming*.

Facing Disruption: The Cinema Value Chain in the Digital Age

Elisa Salvador, Jean-Paul Simon, Pierre-Jean Benghozi

Introduction¹

Cultural and Creative Industries (CCIs) have attracted growing attention in the grey and scientific literatures since the turn of the millennium (Flew and Cunningham 2010; Ó Cinnéide 2005; UNCTAD 2010). Government reports on strategy are appearing² and academics are focusing on various aspects of CCI growth and development from different perspectives (see, e.g., Benghozi and Lyubareva 2014; Benghozi and Salvador 2015, 2016; Caves 2000; Crane et al. 2016; Flew 2012; Florida 2002; Lazzeretti 2013; Moreau and Sagot-Duvaurox 2012; Poettschacher 2005; Scott 2006; Taylor and Littleton 2016). Also, special issues of scientific journals are appearing regularly,³ attesting to the increased importance of these industries.

One of the main issues of CCIs in the digital age is their ambiguous status (industrial, technical and cultural), which makes them difficult to define and classify.⁴ One aspect not yet fully investigated is the consequences of the growing influence of innovation and technology, especially following the digital revolution (Granados et al. 2017; Karimi and Walter 2015; Protogerou et al. 2017). This is surprising given the clear link between creativity and innovation (Sarooghi et al. 2015). It is of pivotal importance because the competition has accelerated since the mainstream adoption of the Internet, thus highlighting a strengthening of the link between technology and competition since the mid-1990s (McAfee and Brynjolfsson 2008). According to Abbasi et al. (2017), “innovation and creativity have become broadly used terms in many national development strategies that can lead to growth” (p. 41). Nevertheless, CCI companies are known for their limited investment in innovation and research and development (R&D).⁵ Academics and consultants tend to agree that most R&D and technological innovation takes place outside CCIs and is supported by outsiders, mainly industries in the information and communication technology (ICT) sector.

The present article is aimed at portraying the new kind of interaction between technology, technology players, and content creation and production. Digitization has ushered in a new role for technology and R&D that has led to a shift in the centre of gravity of the value chain. More specifically, our study investigates the way that disruptive technologies are challenging the traditional equilibrium and the value chain of a specific industry historically impacted by technological evolution, namely cinema. Technological innovation, once limited to a subsegment of the “technical industries”⁶ of cinema, has gained traction vis-à-vis the traditional creation of content. The massive global effects of technology are usually examined with no consideration given to how technologies transform the cinema value chain and organization and play a disruptive role (Christensen 1997). The aim of our study is to highlight this aspect, which is of pivotal importance in a technology-oriented industry such as cinema and in CCIs in general, where technology is not included in the management

literature. Looking at specific technological impacts at the micro level instead of focusing on massive macro effects helps to fill a gap in the literature and foster improvements in public policies for the cinema industry in particular and CCI in general.

The case of cinema may shed some light on these issues. From the start, cinema has had an important technological component and has relied on a number of crucial technological breakthroughs. Neal et al. (2012) argue that a series of technological inventions, combined to bring about the projection of moving pictures, created the film industry. New players, usually specialized technological suppliers (STSs), are building their position by using their technological expertise to serve the creative dimension of cultural works. Shedding light on one of the most technology-based CCIs is a first step in extending the analysis to other CCIs that are more or less close to the cinema.

The specific focus on the cinema industry is also justified by the fact that ICT companies have brought about a differentiated evolution: the shooting modalities are reduced, but the fixed costs of infrastructure, postproduction and distribution are increased. Hence, the economic balance in the value chain is potentially shifting to players controlling infrastructure such as “over the top” services (e.g., Netflix), telecommunication companies and cable operators.

This article reports on an in-depth investigation of the cinema industry using different sources: desk research, a review of the grey and scientific literature in this field, and meetings with experts and industry participants.⁷ Data were collected over the period March to November 2014 and updated through interviews conducted in March and April 2018. The analysis is grounded in several case studies (see Table 1). The evidence collected is used to call attention to the role of new actors and the way that technological innovation disrupts the ecosystem and legacy value chain, thus introducing a balance between legacy actors and new technological players. These features have brought about a reconfiguration of the traditional business ecosystem. By the same token, they call into question the current role of public intervention in a digital environment.

[Table 1 about here]

The article is structured as follows. First we present an overview of the cinema industry and the specificities of its disruption. Then we identify the technological innovation models at work, from those incrementally enhanced by technology to full-scale disruptive models, with particular attention to the case of Netflix. In the next section we focus on the changing structure of the cinema industry, from project-based to business-based, and then illustrate the reconfiguration of the business ecosystem resulting from the active role played by new intermediaries. In the concluding section we ask whether there is a need for a new set of policies to grapple with these major changes.

1. The Consequences of “Disruption” in Cinema: Redesigning the Industry?

One of the features of the cinema industry is that each creative project turns out to be an innovative and prototype project. Companies consider R&D more as related to investments in projects and content than as related directly to the design and innovation of processes, infrastructure and devices. Therefore, innovative activity is usually hidden within the project’s production budget. However, the growing role of some of the technological elements

(shooting, visual effects) combined with the (relative) significance of some of a film's budget opens up an opportunity for funding development. This promotes the growing role of new players from the information technology (IT) sector accompanied by new forms of organization of the entire value chain. Intermediaries (Simon et al. 2015) and industrial partnerships are emerging in the cinema industry in the wake of the digital revolution. These new forms of relationship are not solely linked to economic dynamics; they are also the result of the evolution of technological infrastructure in the digital age (Henfridsson and Bygstad 2013). These developments are reflected in original new models of innovation, poorly documented in the literature⁸ but well worth highlighting because they seem to include all types of innovation. Furthermore, the issue of the appropriation of digital technologies is all the more important as, in the digital age, most of the observed changes seem to be driven by new actors emerging outside the traditional sectors, while the traditional players in these industries are investing less in R&D and technology.

1.1 The Cinema Industry and Innovation in the Academic Literature

Among CCIs, cinema was one of the first to emerge (its seminal economic model was established early, at the very beginning of the 20th century). Additionally, it is far from being only a market supported by movie theatres that release films on large, wide screens (Silver and McDonnell 2007) or exhibiting the “quintessential creative process” (Gil and Spiller 2007, 248). The success of cinema depends on its ability to use technology to organize itself as a service, on a rental basis, for copies to be released in theatres and for viewers to pay an admission fee (“renting their seats”). As a consequence, historically, the cinema industry was structured around three very different poles in terms of investment and business models: production (developing feature films), distribution (supporting logistics for circulating copies and providing financial intermediation to collect revenues from tickets) and exhibition (using a network of screens). Notwithstanding this seminal role, few studies have focused on the evolution strategy of the cinema and – as is the case for CCIs in general (Granados et al. 2017; Protopogerou et al. 2017) – even less on its technological and innovative aspects, even though “technology had been the source of competitive advantage” (Ghertman and Hadida 2005, 59). Rather, the literature has focused on such issues as the implications of market signalling for the cinema industry in terms of box-office performance (Akdeniz and Talay 2013), the comparative influence of institutional assets in the French and US industries (Ghertman and Hadida 2005), historical evolution at the country level (for France, see Benghozi 1989; Benghozi and Delage 2000), the distribution networks of Hollywood firms in the international film industry (Shin and Chiu 2016) or cultural diversity⁹ in the film industry (Moreau and Peltier 2004). In general, the cinema industry has been investigated from the perspective of supply and demand more than that of technological impact. For instance, Cartier and Liarte (2012) investigate the different periods used to release Hollywood films and the appropriateness of release dates in terms of the underlying demand.

In one of the few contributions examining the issue of innovation in the cinema industry, Silver and McDonnell (2007) analyze the impact of new technologies on film attendance, in particular that of the substitutes to film attendance in US theatres subsequent to the diffusion of radical innovations such as radio and television. These authors also highlight some impacts that might now appear secondary, such as the threat to movie theatres posed by the home cinema industry through large-screen televisions and the availability of broadband and video on demand. In the 1950s, the introduction of the innovative wide-screen Cinerama was the main response to the competition brought by television. The more cost-effective CinemaScope appeared a little later as one of the industry's responses to the growing success

of television, differentiating itself through the offer of an alternative consumer experience. The catch-up model of Bollywood combines the new distribution technologies with improvements in quality. UFO Moviez, a pioneer in digital cinema distribution, exemplifies the revitalization of the Indian film industry. This film technology company has developed a 3D-compliant technology that has been deployed across India (see Table 1). Silver and McDonnell (2007) also argue that the cinema industry has avoided differentiation strategies and has opted for a one-size-fits-all approach to customers. This industry now faces the disruptive consequences of the digital revolution.

1.2 Differentiated Reactions to Disruptions in the Cinema Industry

The ability to innovate and mobilize new technologies in complex and dynamic environments is an important strategic resource in all cultural sectors, as Bhansing et al. (2017) claim in their analysis of the performing arts sector. Yet it is well known that the music industry was one of the CCIs most destabilized by the Internet revolution (Montoro-Pons and Cuadrado-García 2016). Moreau (2013) analyzes the disruptive nature of digitization with respect to the recorded music industry and demonstrates the confrontational reaction of the major players, which exemplifies the behaviour of companies facing disruptive innovation. The economic disruption caused by digital innovation was supported by the non-rivalry and non-excludability characteristics of digital content. The challenge that digitization posed to the traditional music industry business model was perceived more as a threat than as an opportunity, requiring the overcoming of inertia and a radical rethinking of existing business models. This explains the delay, on the part of major companies, in adapting to digitization and in facing the threat by radical business models to decimate the revenues of incumbents by exploiting the advantages of new technologies. Streaming, consumption on demand, new actors such as Netflix, the internationalization of content and services: all these factors helped to move value along the chain to ride up towards production and ownership and video content. This movement has led to talk about a “strategy of convergence,” namely “the complementary design linking the content and access industries” (Curien and Moreau 2007, 162), as access providers are increasingly interested in content.

Since the seminal contribution of Christensen (1997) regarding the theory of disruptive technologies, many studies have examined aspects linked to this theory and that of disruptive innovation, in order to determine the disruptive impact on incumbents of the business model arising from the new technologies (Hopp et al. 2018). The concept can be defined as follows: “the term ‘disruption’ delineates a process in which new entrants with generally fewer resources challenge incumbent firms” (Hopp et al. 2018, 446). Moreau (2013) provides a detailed review of the theory of disruption by applying it to the music industry, where digitization has challenged the CCI business model. Furthermore, the *Journal of Product Innovation Management* published a special issue in 2006 titled Dialogue on the Effects of Disruptive Technology on Firms and Industries (Danneels 2006) and a virtual special issue in 2018¹⁰ tracking the evolution and transformation of the concept. Markides (2006) focuses on two specific types of disruption: business-model innovation and radical product innovation. The former is defined as a new and different business model in an existing business, one that can enlarge the market by capturing new customers or encouraging existing ones to consume more. Markides (2006) argues that “business model innovators do not discover new products or services; they simply redefine what an existing product or service is and how it is provided to the customer” (p. 20). This aligns with the strategy of Netflix: redefining how content is provided to customers, which implies a new value chain structure. Disruptive business-model innovations do not completely overtake and replace the

traditional way of doing business; in other words, the cinema industry will not disappear, but it has to reinvent itself.

2. From Fringe to Core: IT-Supported Models and the Case of Netflix

The example of Gaumont Pathé¹¹ in France illustrates how difficult it is for incumbents to develop a coherent and proactive strategy vis-à-vis the new opportunities brought by online services. The initiatives of this chain of movie theatres include both exploration strategies (e.g., digital projection, automated ticketing) and the dynamics of slowing down new offers appearing online (e.g., intellectual property rights tariffs, media chronology). The main thrust of the reaction of movie theatres facing the Internet challenge has been incremental innovations such as significantly improving the quality of screenings and audience comfort while maintaining the distribution structure and value chain. The strategy of the industry is, in this case, parallel to that adopted in the 1950s, with little success, by developing Cinemascope and colour to counter the equally disruptive emergence of television.

Today, the high-quality strategy adopted by Gaumont Pathé builds on client relationships, theatre armchairs, new projection techniques, and staff training. The goal is to provide a new and memorable experience (Pine and Gilmore 1998) through larger screens, immersive and more powerful sound, armchairs that move and are more comfortable – in short, an “immersive cinema experience” using the latest innovative technologies.

Implementation of this strategy calls for partnerships with external actors. Unforgettable effects, non-reproducible at home, and very large screens linked to very high-quality sound and images are the main objectives of supplying movies in theatres. Also, the range of services offered in theatres extends beyond the simple film-viewing experience; theatres are becoming places where people can meet before and after seeing the film for complementary activities, with impacts on the value chain. The dematerialization of ticket buying (e-ticketing) and fidelity cards with subscription formulas are part of the strategy. Targeting is thus improved for promotional offers, because this system enables firms to collect data on movie consumers, just as Netflix does through its algorithmic formula (see below).

Over and above marginalist responses such as that of Gaumont Pathé, CCIs have to reinvent themselves in response to the transformations brought about by digital technologies (Mangematin et al. 2014). A cross-comparison of several CCIs¹² shows that tech-supported newcomers are challenging legacy players through disruptive proposals such as original products, online and mobile channels of distribution, experimental business models, social media, and data analytics. These young companies have the capacity to use technology to create value by accessing a massive global audience. They offer unprecedented solutions for aggregating and distributing content, designing original ways of marketing and new types of transaction – for example, free subscriptions, micro-payments and premium services. One part of the value is based on the monetization of consumption forms. Another part is based on the ability to reduce the costs of production and distribution structures using crowdsourcing, 3D, virtualization or digital distribution. The issue is that these new forms of value creation and competitive positioning actually compete with older modes based essentially on the creation of content with new aesthetics.

2.1 Integrating Production and Distribution Offerings: The Disruptive Revolution Brought About by Netflix in the Legacy Value Chain

Netflix (see Table 1) is a good example of the digitization revolution. The company has extended its relationship with customers by instrumenting its apps to detect consumers’

preferences. Netflix was established in 1997 as an online alternative to DVD movie rentals. The success of this niche business was supported by an innovative business model to address the problem of late fees for rentals and by an innovative algorithm to enhance customer experience through recommendation processes. The innovation brought about by Netflix involves the role of new segments of the value chain compared to a legacy value chain of just four segments: creation/production rights, aggregator/publisher, distribution, and consumption (see Figure 1). Netflix is making the most of the new segments brought about by digitization: it has introduced enabling technology services (new ways of billing and paying are important components as well) and connectivity (core network, interchange, retail Internet access). Partnerships with consumer electronics companies are also an important feature, as devices are proliferating. This case study also illustrates jumping from an upstream segment of the value chain when building a delivery network to a downstream one, with involvement not only in aggregation but also in content production. This feature illustrates the potential role of digital platforms in setting up a new balance between available brand content and original content.

[Figure 1 about here]

Netflix was the first company to recognize that consumers like to view content when and where they want. Hence, its streaming format represented a threat to the traditional television business model. Netflix captures revenues directly through owning end users (Thompson 2017). Its video-on-demand platform has overwhelmed traditional television players: it offers television products to consumers directly, and these products are personalized using the data collected, which allows Netflix to target programs and advertising because it knows what consumers have been watching, where they are, and when they stop watching a movie. Netflix uses this information to offer recommendations and content to its target customers (Wessel et al. 2016). Predicting what customers will want to watch next is the primary goal of Netflix's data collection strategy.

Govindarajan and Kopalle (2006) argue that the development of disruptive innovations is linked to a high level of risk and requires experimentation: lack of knowledge about new customer needs could be one of the main reasons for failure. In the case of a new actor like Netflix, this potential failure has been avoided due to the algorithm originally developed by the company to collect data on consumers and then offer them ad hoc programs in accordance with their preferences. Govindarajan and Kopalle (2006) even suggest that "an adhocracy culture promotes the development of disruptive innovations in an organization" (p. 17). The adhocracy culture (Waterman 1993) of flexibility, creativity, openness, risk-taking and dynamism fits well with the strategy adopted by Netflix.

However, this network activity of transforming customer relationships brings about changes in the value chain (Wessel et al. 2016). Software alone is not enough. In the broader telecom, media and IT ecosystem perspective, technological intermediaries and economic actors supporting and supported by technologies, such as Google, Amazon, Apple and other Internet service providers (ISPs), dominate. This observation may signify that innovation is largely left to these challengers, who may radically disrupt the traditional industry orientations. These new players display specific value networks, including numerous technical intermediaries, in contrast with previous linear value chains. Thus, the value chain has been dramatically altered and is becoming increasingly more complex.

2.2 Challenging the Boundaries: The Emergence of Specialized Technological Suppliers

Investigating the cinema industry sheds some additional light on the revolution brought about by digitization. In addition to the disruptive changes at the distribution level that are observed in most content industries, incremental technological innovation in the cinema industry has been facilitated by original models of innovation at the production level. These models are based on particular forms of collaboration that are formalized through the decisive role of new intermediaries.¹³ These new players, usually STSs, establish their position by using their expertise to serve the creative dimension of cultural works. New mediations are emerging, as revealed by the explicit responsibilities of a new role, that of supervising technical director who liaises between the core filmmaking team and the technical IT crews. In the case of Dreamworks, for instance (see Table 1), the core filmmaking team for specific endeavours includes directors, producers, production designers and visual effects (VFX) supervisors. The supervising technical director manages all the technology (software and hardware) for a feature film and defines the workflow and the process itself. This middleperson reports to the core team.

Several case studies¹⁴ demonstrate the growing role played by these specialized IT companies (see Table 1). Analysis of some of these companies and “iconic” clusters illustrates their place and their role in the economy of the sector: the nature of the collaboration at different levels of the value chain (from the production stage to the exhibition stage), the strategy for capitalizing on competitive resources from mastering technologies (equipment, patents and know-how), the investment economy (risk-sharing and allocation of the created value), the convergence with nearby sectors, such as videogames, using multimedia developments and online distribution. From this point of view, the case of videogames, one of the CCIIs born as digital, is an interesting counterpoint to prefigure some of the changes that threaten to reach the cinema. Game studios are constantly developing technological innovations and updating their business model to deal with the consequences of the digital revolution (Parmentier and Picq 2016). Le et al. (2013) show that in industries such as cinema and videogames, technology is central to the creative process, while Gandia (2013) details the similarity of the innovation processes of these two industries.

In the field of cinema, therefore, many high-tech companies have emerged and survived, which entails, to some extent, a renewal of the technical cinema industries of the past. These new STSs are medium-sized companies. They have mastered ICT skills overall but are active in only a small number of technical areas. Their growth model places an emphasis on specific operations – rather unusual in the cinema industry – such as the management of assets, patenting and innovative technological spillover to other industries.

3. The Changing Structure of the Industry: From Project-Based to Business- Based

Innovation models, brought in by these industrial technology intermediaries, offer an opportunity for change in the culture of the cinema sector. Cinema is a prototype industry based on the production of films. Due to the uncertainty and risk of the film industry, production used to be highly organized by intermediaries according to filming activities, producer choices, staff status and compensation terms through short-term contracts for single films (Faulkner and Anderson 1987).¹⁵ However, the cinema industry model is currently evolving from this project-based organization (Faulkner and Anderson 1987; Foster et al. 2015; Granados et al. 2017), its core model since the 1940s (i.e., focusing on film production through a temporary team that is disbanded once production is finished), to a business-based

model in which R&D, technological accumulation and firms organized in an industrial ecosystem operate via technology companies, though these are financed mainly by the film production budget.

3.1 Two Complementary Structuring Formats

Technological innovation in the production stage in a business-based model rebalances internal relations within the sector. It redefines the competitive conditions, reorganizes value chains, and challenges the domination (mainly by large IT companies) of the distribution networks for the benefit of stakeholders at the production stage (the content producers). What may be of significance is that both the upstream and the downstream stages are actively transforming themselves rather than submitting to the unilateral dominance of one or the other. In addition, this technology-oriented shift may offer a move away from stranded investments in tailor-made but non-reusable technologies.

Finally, because of the rapidly changing technological environment, the balance between the two complementary conceptions of the industry – technological innovation and artistic creation – is evolving towards a more technological orientation, both in production and in distribution. Historically, the weight of the creative dimension and the absence of fixed production costs gave the market power to producers: they had the ability to raise funds for films by mobilizing several contributors and co-producers. Conversely, the weight of the technological dimension presupposes investment of another kind, taking place upstream and independently of the production of a given project. Hence, the technological dimension shifts the centre of gravity of the value chain by giving leadership and market power to the actors controlling this dimension, even if, like Netflix or Amazon, they are then compelled to invest in production.

Netflix, as a business-oriented service provider, can manage film projects like an innovation flow in traditional companies, giving freedom and autonomy to the teams (McCord 2014). Greater artistic freedom is left to creators, and the teams are empowered to give the green light to projects. Conversely, with a project orientation, the studio is very dependent upon each film and is partly organized around it, which induces stronger directivity on the part of studio managers but also a lack of coherence related to the addition of projects.

3.2 Incremental or Disruptive Patterns?

Several tensions, therefore, structure the new organization of the cinema value chain. On the one hand, newcomers are introducing and mandating their own standards and business culture; in terms of film distribution, they are replacing the incumbents and imposing their rules on content producers. These IT companies are using technological resources in original ways – completely differently from traditional content industries. Instead of merely enhancing the legacy content production process, user interfaces or distribution channels, they are building their strategy around their activities and ICT-enabled services, where content may not be the prime focus. This phenomenon is illustrated by the case of Apple, where revenues from devices dominate (Simon 2016) although the company clearly benefits from the attractiveness of content to sell its products (the network effect).

On the other hand, an incremental innovation model has emerged. Specialized ICT industry suppliers are building mutually beneficial collaborative relationships with the cinema industry at the production stage, promoting a relationship based on an “art meets science” model. In addition, the relationship between production and distribution is challenged by the

growing value given by the organization of demand and the structuring of consumer contributions. These new configurations are also grounded in the algorithmic economy (Hopp et al. 2018). On the one hand, it transforms customer relations management through prescription and recommendation processes. On the other hand, it encourages customer commitment and therefore acts as a driver for crowdsourcing. The new tools thus interact with the three historical streams of the cinema industry: production, distribution and exhibition.

3.3 Redesigning the Structure of the Industry

New relationships between new players and legacy actors are enacted through these different trends, which are contradictory but also mutually reinforcing. First, new forms of dominance have been brought in by the new players at the distribution/exhibition stage (downstream domination). Second, technological innovation has been generated by new forms of collaboration between the cinema industry and specialized technology providers at the production stage (upstream domination). Third, there has been a shift in media consumption from push to pull, which creates tension between the logic of prototype (a film) firmly rooted in this industry and the growing momentum for a logic of demand.

We observe a simultaneous modification of the economic centre of gravity (technology leadership, economic weight, investments) and of the hierarchy of the various layers in the value chain (initiative, exclusion, choice of distribution channels). Because of the fast-changing technological environment, the balance between the two complementary conceptions of the industry – technological innovation and artistic creation – is evolving towards a more technology-oriented vision, both in production and in distribution. These tensions and the reorganization of the value chain lead to sidestepping the issue of the place of innovation or R&D in order to examine the role played by the technological infrastructure.

4. Technology: From Externalization to Intermediation and Embeddedness in Creation Processes and New Relations Between Players

Each film is a prototype and its production is project-driven; different players in the value chain need to be brought in for collaboration. In this project-driven prototype industry, the focus of production is usually at the creation stage during a single, non-reproducible experience, tilted towards the artistic dimension. Yet the various kinds of technology-based innovation in the movie industry support alternative development models for film production, giving a wider space to R&D by reducing the part of the artistic dimension. Digitization, combined with the growing related role of software and computer science during pre-production (previsualization), production (comprehensive computer-based film editing systems), and post-production (visual effects-VFX), has induced relationships within the various contributors of “art worlds” (Becker 1982) to evolve in a twofold perspective. First, new members and contributors are given space due to their control of and leadership role in technology; second, the relations and market power of the incumbents and usual contributors are rebalanced and transformed. Developing movies is a structured and managed activity, bringing different kinds of resources together and taking a project management approach. There are specific opportunities for innovation, but these are difficult to capitalize on due to the lack of financial resources and the continuity of an industrial process that only large companies can monitor.

A comparative analysis of different film technology companies shows an interesting variety of situations regarding the types of technical skills and investment structures and the nature of their service offer and their positioning in the value chain (see Table 1). R&D expenditures are unevenly distributed within the three different layers of technology, the media and the telecom ecosystem. R&D is conducted primarily by equipment and service providers and IT companies; technology providers such as Akamai¹⁶ and Avid¹⁷ are the most R&D-intensive players. In sharp contrast, the level of expenditure in the content sector, at least by the large firms,¹⁸ remains very low.

4.1 Technology Structuring New Spaces for Interchange and Relations

According to Camors et al. (2006), the decrease in the cost of hardware and software has triggered the creation of small companies operating in the special effects subsector.¹⁹ Livingstone and Hope (2011) forecast growth in the United Kingdom, led by the videogame and visual effects industries, “where creativity meets high-tech,” as they put it, or, to quote Dreamworks, “where arts meet technology” (p. 18). These “Encounters of the Third Kind” create new spaces of cooperation and coordination in the film production stream and introduce new intermediaries, such as the supervisory technical director. In other words, the development of “proprietary” software tools is a process of constant collaboration and remains under artistic guidance. At the same time, this symbiosis seems to reveal ways to move beyond one of the weaknesses of film as a prototype, namely an inability to capitalize on some of the technical achievements of film. It would seem that new technologies contribute to reconciling the two visions of cinema, one technical and one artistic, or to widening the gulf between them.

These highly specialized high-tech firms undertake product development and product innovation on behalf of clients, which resembles formalized R&D. The growing importance of R&D may bring the cinema industry closer to more standard forms of innovation, built on the accumulation of R&D and the ability to reuse/reproduce the same innovation for other projects. This new perspective leads companies to file patents in ever more distant fields, such as optical imagery for Image Metrics (see Table 1).

Digitization has enabled the technical segment of the cinema industry, previously seen as the weak link in the value chain, to flourish anew, and new start-ups have proliferated due to the decreasing cost of complex production tools (special effects). In the United Kingdom and in New Zealand, this technical element has become the research branch of the film industry, guided by the artistic brief but going beyond the part it used to play in the project management of a film and beyond the film as a single but ephemeral laboratory. This new approach involves significant R&D expenditure. This pivotal role of technology was anticipated in the 1970s by pioneers such as Trumbull, who founded their own companies with the financial support of large studios (e.g., Paramount and MGM). Zoetrope (see Table 1) created its own enabling ecosystem, just as Netflix did around its connected device. Wessel et al. (2016) show that Netflix looked for new ecosystem partners in order to monitor everything its customers do; BBC, Amazon, Apple and Google are some examples.

However, the technical industries have also been described, in the case of France, as a stagnating link in an expanding value chain (Imaginove 2014). The lack of symbiosis between filmmakers and technical industries may offer an explanation for the difficulties the subsector is facing, as leading firms such as Éclair and Technicolor (see Table 1) are on the verge of bankruptcy. The issue may turn out to be a horizontal linkage weakness, as investing in a new technology for a film without monitoring the potential technology spinoff or by-products may create stranded assets. The leading firms in the United Kingdom and New Zealand appear to

have been able to overcome this hindrance. The rebirth of this segment in Britain is especially noteworthy since the British cinema almost disappeared in the 1950s, when the leading film company, Rank, decided to exit the film business and enter the IT business (at that time, largely concerned with copying machines) to become Rank Xerox. Digitization is bringing this industry back to life, and the cases reviewed in Table 1 suggest that growth is based on a market approach rather than on public subsidies or public management of the funds.

4.2 Reconfiguration of the Business Ecosystem and Value Chain and the Growing Role of Demand

In the cinema industry, as in all other CCIs, legacy players seem reluctant to embrace the changes, a reaction often linked to the weight of their legacy business models even though their revenues are declining, as in newspaper publishing (Benghozi and Lyubareva 2014), book publishing (Benghozi and Salvador 2016) and music recording (Blanc and Huault 2014; Moyon and Lecocq 2015). Despite the fact that, historically, each new technology did bring new streams or revenues (e.g., broadcasting, cable, pay TV, DVD), legacy players often fail to recognize the opportunities that are opening up.

Meanwhile, the cinema industry is witnessing the emergence of a new digital ecosystem and a new allocation of tasks, centred on the important role played by the computing and software activities of the new intermediaries. Smaller or independent sector players are seizing the opportunity to achieve more competitive positions in the value chain network. They are developing new forms of cooperation. Such specific industrial partnerships may be conceived of not in the traditional sense but, rather, as a set of industrial relations of “networked collaborators” within an ecosystem. As Benghozi and Salvador (2014) put it, “a new vision of partnerships and innovative forms of contract need to be conceived in order to support a process involving research-based firms, with specific characteristics and needs, and where partners emerge usually ex-post” (p. 49). Yet, considering the creative specificity of CCIs, technological strategic partnerships are not simply traditional relations with identified industrial partners but are also influenced and shaped by artistic cooperation, thereby contributing specifically to the rearrangement of the business ecosystem.

The successful cases of Akamai (United States), Avid (United States), Weta Digital (New Zealand), Double Negative (United Kingdom), UFO Moviez (India) and Ymagis (France) (see Table 1) have also been characterized by their global approach from the inception stage. At the turn of the 19th century, the leading cinema companies were French (Éclair, Gaumont, Lumière), before Hollywood took over. Now, India is the world’s largest film producer, with innovative ICT companies (Prime Focus, Reliance, UFO Moviez). Digitization is clearly modifying the scope and pace of the globalization process. Today’s intermediaries indicate some potential routes to that end that may make it possible to mix short-term projects and long-term sustainability.

The case of book publishing (Benghozi and Salvador 2016) indicates that adapting to the digital age may require legacy players to develop more proactive investment strategies to deal with the challenge from their powerful new competitors. Going beyond the limitations of the “film as a laboratory” model brings benefits and enables third parties to add their experience and technical achievements. Nonetheless, the newcomers – new intermediaries (including new distributors) – are less susceptible to the “command and control” mode once exerted by the production segment. The investments required to produce legacy media products must include investment in software solutions and in qualified staff for the digital age.

The new configurations require new strategies and new ways to build competitive

positions. Media consumption is shifting from push to pull. A larger number of distribution channels, combined with the potential to directly address the public, have reinforced the need to pay attention to audience reach/demand/distribution. In this new environment, demand is crucial. According to Gubbins (2014), “demand has become much more demanding” (p. 10), while the “film industry remains wedded to a ‘push’ model” (p. 35). Gubbins (2014) also argues that “progress depends on audiences, and the current value chain and industry practices create a barrier, where [they] should provide a gate” (p. 126). IT companies can meet the needs of consumers by offering more options for audiences to view content. IT companies use technological resources in ways that are original, completely different from those used by most CCIs. Instead of merely enhancing the legacy production process of content, user interfaces or distribution channels, they build their strategy around their activities and ICT-enabled services.

5. Discussion and Conclusions: New Models Disrupting Legacy Policies

Though the digitization of CCIs has been the subject of renewed interest in recent years, the way that these industries appropriate digital technologies and the consequences for value chain organization remain under-investigated. To our knowledge, no studies have investigated the micro-level transformations induced by the digital revolution on the value chain and organization of a specific CCI. The present article is one of the first attempts at filling this gap in terms of one of the strongest technology-based CCIs, namely the cinema industry.

Historically, cinema has undergone successive waves of technical innovation, such as the introduction of sound and colour (Benghozi and Delage 2000). Emblematically and illustratively for CCIs, the cinema industry remains an intensive user of technology, incorporating a variety of innovations, with the support of a creative organizational meeting of “soft” and “hard” components, and therefore developing strong relations with R&D-intensive technology suppliers. Furthermore, the cinema industry, like other CCIs, is characterized by the ability (and the necessity) to continuously offer consumers new “creative” products; to this end, networks and alliances with external actors are necessary. Markides (2006) has even suggested the need to import the work organization of creative industries to other industries.

In this fundamentally global context, the legacy media industries in the European Union, regardless of their relative strengths, are fragmented and in no position to make the best of their own strengths. They are followers, not trendsetters. Tellis (2006) claims that incumbents are disrupted not because of emergent technological innovation but because of their lack of vision in terms of the mass market and their unwillingness to revolutionize their organization to comply with a changed context. Developing the competencies required to deal with the arrival of disruptive innovation calls for ambidexterity and an ability to overcome the competency traps (Danneels 2006) and myopia of the incumbents (Hopp et al. 2018).

To take into account the new parameters of the digital environment, policy-makers need to move beyond simply supporting supply and production. One consequence of the competing distribution models of movies on digital platforms and in theatres is that the traditional media chronology (successive release according to channels) is questioned. Films produced by Netflix should, for instance, be expected to be available online only after 30 months instead of being simultaneously released in movie theatres and on Internet platforms; this is why the industry lobbied the Cannes film festival to prevent their selection and presentation at the 2018 festival.

A departure from “silo thinking” is thus required to move away from partitioning

industrial policies and from any automatic funding mechanism. At the same time, the new parameters make it more difficult to identify the level at which any appropriate policy should be implemented. Should public intervention target the layer level within the ecosystem? Or should direct support be given to the sector level or a blend of sectors, to economic players or to specific players (i.e., SMEs, start-ups, middle-range film production, independent producers)?

We need to rethink the traditional frameworks of the economic analysis of culture, because the digital world is free from many constraints of the standard economic theory of culture. The digital economy is a fixed-cost industry (importance of network effects, low marginal costs) for infrastructures and digital services. It gives pivotal economic power to the leaders, it generates “natural” monopolies of actors and platforms controlling technology and infrastructures, it calls for massive investment because only the leaders survive, and it causes competitive problems because of the acquisition of dominant positions in global ecosystems of associated markets or neighbours.

A simple lesson can be drawn from the case studies listed in Table 1: the field is now swarming with STSs that are likely to have escaped any policy radar. Therefore, the real question is whether there is a need for policy. In any case, maintaining a vertical approach, “per industry,” is bound to miss the point: STSs are providing services across the layers of the ecosystem and across the boundaries of established industries. The emergence of newcomers or intermediaries suggests an irreversible structural change where incumbents in the cinema industry (or other CCIs) will have to learn to live together with the new players in an ecosystem where all actors can find their place and capture customers using ad hoc competitive strategies.

Notes

1. This article is a follow-up to Benghozi et al. (2015).
2. For example, Confederation of British Industry 2014; Davy 2007; Foundation for Research, Science and Technology 2003; HKU 2010; KEA 2006; Roxane 2014; Santagata 2009; SGS Economics and Planning 2013; UNCTAD 2010.
3. See, for example, *International Journal of Entrepreneurship and Innovation – Entrepreneurship in the Creative Industries: An International Perspective* (2005); *Technological Forecasting and Social Change – Digital Technology and the Creative Industries: Disassembly and Reassembly* (2014); *International Journal of Arts Management: Financing Creativity: New Issues and New Approaches* (2014); *Technological Forecasting and Social Change: The Creative Economy in Global Competition* (2015); *Regional Studies: Intermediaries and the Creative Economy* (2015); *Journal of Education and Work: Creative Graduate Pathways Within and Beyond the Creative Industries* (2015); *International Journal of Cultural and Creative Industries: Creative Industries Policy in Asia: Innovating Within Constraints* (2017); *Journal of Arts Management, Law and Society: Digital Cultural Policies in Comparison* (2017).
4. See the attempt of the ESSnet-Culture framework. The concept of CCIs, used in various documents, is not standardized. See Eurostat:
<http://circa.europa.eu/irc/dsis/nfaccount/info/data/esa95/en/een00126.htm>
5. For a review of the literature on “hidden” innovation and R&D activities in CCIs, see Benghozi and Salvador (2016).
6. The segment includes the following: shooting (manufacturers’ equipment and film, shooting rentals, shooting studios/sets, mobile production units); post-production (photochemical/digital/video labs, post-production image and sound, dubbing and subtitling);

distribution (screening and broadcasting, duplications, prints/KDM, DVD); archiving; storage; and restoration.

7. For instance, two workshops were specifically set up to advance and validate the first hypotheses: (1) IPTS International Experts Validation Workshop, “Models of innovation in the Creative and Content Industries: Inspiring Insights From the Cinema Industry. Results of the CRG Ecole Polytechnique Study and Policy Implications,” Seville, 7 November 2014:

<http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/NRDICCIWorkshop.htm>; (2)

CEPS/IPTS NRD Workshop, Brussels, 23 March 2015. For details, see Benghozi et al. (2015).

8. For example, De Bruin (2005) examines the film industry in New Zealand.

9. “Cultural diversity represents the possibility that consumers have . . . access to a large supply of cultural products (in terms of quantity), comprised of diversified segments (in terms of genres and geographical origins) of relatively well-balanced sizes. It also represents the effective consumption of these numerous and diversified cultural products” (Moreau and Peltier 2004, 127).

10. *Journal of Product Innovation Management* 35(3).

11. Pathé 2017 annual report, *L’année du Coq* (The Year of the Rooster):

<http://www.pathe.com/rapport-annuel>.

12. For book publishing, see Benghozi and Salvador (2016); for videogames and cinema, see Gandia (2013) and Le et al. (2013); for the music and newspaper industries, see Benghozi and Lyubareva (2014).

13. For a focus on selected case studies of new intermediaries in the cinema industry through a description of their role and position in the IT and media ecosystem, see Simon et al. (2015).

14. See Benghozi et al. (2015) for a detailed description of these case studies.

15. This model is similar to the intensive short-term collaborations characterizing the organization of festivals (Abfalter et al. 2012).

16. A content delivery network (CDN): www.akamai.com/html/about/index.html

17. A digital content-creation solutions provider: www.avid.com/US/about-avid

18. See Table 1 and Benghozi et al.’s (2015) report on cinema for a comprehensive sample of the firms tracked.

19. The British Film Institute (2013) defines this subsector as follows: “Visual effects activity includes, but is not limited to: Pre-visualisation, Concept Design, Data Acquisition (motion capture, cyber scans, lidar scanning, set surveys, photogrammetry shoots), Computer Generated Images (CGI), Character/Creature Animation, Colour Correction, 2D Compositing, 3D Animation, 3D Modelling, Digital Intermediate, Virtual Sets/Studios, Digital Matte Painting, Lighting and Rendering” (p. 3).

References

- Abbasi, M., P. Vassilopouloub and L. Stergioulas. 2017. Technology roadmap for the creative industries. *Creative Industries Journal* 10(1), 40–58.
- Abfalter, D., R. Stadler and J. Muller. 2012. The organization of knowledge sharing at the Colorado Music Festival. *International Journal of Arts Management* 14(3), 4–15.
- Akdeniz, M.B., and M.B. Talay. 2013. Cultural variations in the use of marketing signals: A multilevel analysis of the motion picture industry. *Journal of the Academy of Marketing Science* 41(5), 601–24.
- Avid. 2014. *Avid everywhere. A vision for the future of the media industry*: www.avid.com/static/resources/common/documents/whitepapers/Avid_Everywhere.pdf
- Becker, H.S. 1982. *Art worlds*. Berkeley and Los Angeles: University of California Press.
- Benghozi, P.-J. 1989. *Le cinéma, entre l'art et l'argent*. Paris: L'Harmattan.
- Benghozi, P.-J., and C. Delage. 2000. *Histoire économique du cinéma français (1895–1995)*. Paris: L'Harmattan.
- Benghozi, P.-J., and I. Lyubareva. 2014. When organizations in the cultural industries seek new business models: A case study of the French online press. *International Journal of Arts Management* 16(3), 6–19.
- Benghozi, P.-J., and E. Salvador. 2014. Are traditional industrial partnerships so strategic for research spinoff development? Some evidence from the Italian case. *Entrepreneurship and Regional Development: An International Journal* 26(1/2), 47–79.
- Benghozi, P.-J., and E. Salvador. 2015. Technological competition: A path towards commoditization or differentiation? Some evidence from a comparison of e-book readers. *Systèmes d'Information et Management* 20(3), 97–135.
- Benghozi, P.-J., and E. Salvador. 2016. Investment strategies in the value chain of the book publishing sector: How and where the R&D somehow matter in creative industries? *Technology Analysis and Strategic Management* 28(5), 568–82.
- Benghozi, P.-J., E. Salvador and J.-P. Simon. 2015. *Models of ICT innovation: A focus on the cinema sector*. JRC Science and Policy Report JRC95536, European Commission. doi:10.2791/041301. <http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/documents/JRC95536.pdf>
- Bhansing, P.V., M.A.A.M. Leenders and N.M. Wijnberg. 2017. Scheduled audience capacity for performing arts productions: The role of product innovativeness and organizational legitimacy. *International Journal of Arts Management* 20(1), 63–77.
- Blanc, A., and I. Huault. 2014. Against the digital revolution? Institutional maintenance and artefacts within the French recorded music industry. *Technological Forecasting and Social Change* 83(1), 10–23.
- British Film Institute. 2013. *BFI response to HM Treasury Visual Effects Consultations*, 1–12. London: Author. www.bfi.org.uk/...uk/.../bfi-response-to-hm-treasury
- Camors, C., O. Soulard and P. Guery. 2006. *Les industries culturelles en Ile-de-France*. Paris: Conseil Régional d'Ile-de-France.
- Cartier, M., and S. Liarte. 2012. Impact of underlying demand and agglomeration of supply on seasonality: The case of the Hollywood film industry. *International Journal of Arts Management* 14(2), 17–30.
- Caves, R. 2000. *Creative industries: Contracts between art and commerce*. Cambridge, MA: Harvard University Press.
- Christensen, C.M. 1997. The innovator's dilemma: *When new technologies cause great firms to fail*. Boston, Harvard Business School Press.
- Confederation of British Industry. 2014. *The creative nation: A growth strategy for the UK's creative industries*. London: Author.

- Crane, D., N. Kawashima and K. Kawasaki, eds. 2016. *Global culture: Media, arts, policy, and globalization*. New York: Routledge.
- Curien, N., and F. Moreau. 2007. The convergence between content and access: Internalizing the market complementarity. *Review of Network Economics* 6(2), 161–74.
- Danneels, E. 2006. From the guest editor: Dialogue on the effects of disruptive technology on firms and industries. *Journal of Product Innovation Management* 23(1), 2–4.
- Davy, D. 2007. *The impact of digitization on the book industry*. Toronto: Association of Canadian Publishers.
- De Bruin, A. 2005. Multi-level entrepreneurship in the creative industries: New Zealand's screen production industry. *International Journal of Entrepreneurship and Innovation* 6(3), 143–50.
- Faulkner, R.R., and A.B. Anderson. 1987. Short-term projects and emergent careers: Evidence from Hollywood. *American Journal of Sociology* 92(4), 879–909.
- Flew, T. 2012. *The creative industries: Culture and policy*. London: Sage.
- Flew, T., and S. Cunningham. 2010. Creative industries after the first decade of debate. *Information Society* 26(2), 113–23.
- Florida, R. 2002. *The rise of the creative class, and how it is transforming work, leisure and everyday life*. New York: Basic.
- Foster, P., S. Manning and D. Terkla. 2015. The rise of Hollywood East: Regional film offices as intermediaries in film and television production clusters. *Regional Studies* 49(3), 433–50.
- Foundation for Research, Science and Technology. 2003. *R&D strategy for creative industries: A discussion paper*. Wellington, NZ: Author.
- Gandia, R. 2013. The digital revolution and convergence in the videogame and animation industries: Effects on the strategic organization of the innovation process. *International Journal of Arts Management* 15(2), 32–44.
- Ghertman, M., and A.L. Hadida. 2005. Institutional assets and competitive advantages of French over U.S. cinema, 1895–1914. *International Studies of Management and Organization* 35(3), 50–81.
- Gil, R., and P.T. Spiller. 2007. The organizational dimensions of creativity: Motion picture production. *California Management Review* 50(1), 243–60.
- Govindarajan, V., and P.K. Kopalle. 2006. The usefulness of measuring disruptiveness of innovations ex post in making ex ante predictions. *Journal of Product, Innovation, Management* 23(1), 12–18.
- Granados, C., M. Bernardo and M. Pareja. 2017. How do creative industries innovate? A model proposal. *Creative Industries Journal* 10(3), 211–25.
- Gubbins, M. 2014. *Audience in the mind*. CineRegio: <https://www.filmfonds-wien.at/j3183647-2gww-23e4-945r-0833200i9w78.php>
- Henfridsson, O., and B. Bygstad. 2013. The generative mechanisms of digital infrastructure evolution. *MIS Quarterly* 37(3), 907–31.
- HKU. 2010. *The entrepreneurial dimension of the cultural and creative industries*. Utrecht: Author.
- Hopp, C., D. Antons, J. Kaminski and T.O. Salge. 2018. Disruptive innovation: Conceptual foundations, empirical evidence, and research opportunities in the digital age. *Journal of Product, Innovation, Management* 35(3), 446–57.
- Imaginove. 2014. *New screens* 8.
- Karimi, J., and Z. Walter. 2015. The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry. *Journal of Management Information Systems* 32(1), 39–81.
- KEA. 2006. *The economy of culture in Europe*. Directorate-General for Education and

- Culture, European Commission. http://www.keanet.eu/ecoculture/executive_summary_en.pdf
- Lazzeretti, L., ed. 2013. *Creative industries and innovation in Europe: Concepts, measures and comparative case studies*. Abingdon, UK, and New York: Routledge.
- Le, P.L., D. Massé and T. Paris. 2013. Technological change at the heart of the creative process: Insights from the videogame industry. *International Journal of Arts Management* 15(2), 45–59.
- Livingstone, I., and A. Hope. 2011. *Next gen: Transforming the UK into the world's leading talent hub for the video games and visual effects industries*. London: Nesta.
- Mangematin, V., J. Sapsed and E. Schubler. 2014. Disassembly and reassembly: An introduction to the special issue on Digital Technology and Creative Industries. *Technological Forecasting and Social Change* 83(1), 1–9.
- Markides, C. 2006. Disruptive innovation: In need of better theory. *Journal of Product, Innovation, Management* 23(1), 19–25.
- McAfee, A., and E. Brynjolfsson. 2008. Investing in the IT that makes a competitive difference. *Harvard Business Review* 86(7), 98–107.
- McCord, P. 2014. How Netflix reinvented HR. *Harvard Business Review* 91(1/2), 70.
- Montoro-Pons, J.D., and M. Cuadrado-García. 2016. Unveiling latent demand in the cultural industries: An application to live music participation. *International Journal of Arts Management* 18(3), 5–24.
- Moreau, F. 2013. The disruptive nature of digitization: The case of the recorded music industry. *International Journal of Arts Management* 15(2), 18–31.
- Moreau, F., and S. Peltier. 2004. Cultural diversity in the movie industry: A cross-national study. *Journal of Media Economics* 17(2), 123–43.
- Moreau, N., and D. Sagot-Duvaouroux. 2012. Four business models in contemporary art. *International Journal of Arts Management* 14(3), 44–56.
- Moyon, E., and X. Lecocq. 2015. Rethinking business models in creative industries: The case of the French record industry. *International Studies of Management and Organization* 44(4), 83–101.
- Neal, J., S. Warren and N. Whitling. 2012. Cinema technologies. In *Communication technology update and fundamentals* (12th ed.), A.E. Grant and J.H. Meadows, eds. (pp. 168–82). New York: Taylor & Francis.
- Ó Cinnéide, B. 2005. Creative entrepreneurship in the arts: Transforming ‘old’ into ‘new’ – Irish dance and music test cases such as Riverdance and Lord of the Dance. *International Journal of Entrepreneurship and Innovation* 6(3), 151–58.
- Parmentier, G., and T. Picq. 2016. Managing creative teams in small ambidextrous organizations: The case of videogames. *International Journal of Arts Management* 19(1), 16–30.
- Pine, B.J., and J.H. Gilmore. 1998. Welcome to the experience economy. *Harvard Business Review* July/August 76(4), 97–105.
- Poetttschacher, E. 2005. Strategic creativity: How values, beliefs and assumptions drive entrepreneurs in the creative industries. *International Journal of Entrepreneurship and Innovation* 6(3), 177–83.
- Protogerou A., A. Kontolaimou and Y. Caloghirou. 2017. Innovation in the European creative industries: A firm-level empirical approach. *Industry and Innovation* 24(6), 587–612.
- Roxane, L. 2014. *The cultural industries in France and in Europe: Points of reference and comparison*. Paris: Cairn International.
- Santagata, W, ed. 2009. *White paper on creativity: Towards an Italian model of development*. Turin: Fondazione Santagata.
- Saroghi, H., D. Libaers and A. Burkemper. 2015. Examining the relationship between creativity and innovation: A meta-analysis of organizational, cultural, and environmental

factors. *Journal of Business Venturing* 30(5), 714–31.

Scott, A.J. 2006. Creative cities: Conceptual issues and policy questions. *Journal of Urban Affairs* 28(1), 1–17.

SGS Economics and Planning. 2013. *Valuing Australia's creative industries*.
<https://www.sgsep.com.au/projects/valuing-australias-creative-industries>

Shin, V.K.W., and S.W.K. Chiu. 2016. Global distribution networks, local exhibition alliances: Hollywood's new map in Hong Kong. *Regional Studies* 50(5), 835–47.

Silver, J., and J. McDonnell. 2007. Are movie theaters doomed? Do exhibitors see the big picture as theaters lose their competitive advantage? *Business Horizons* 50(6), 491–501.

Simon, J.P. 2016. *40 ans d'Apple : au-delà du mythe*.
<http://www.inaglobal.fr/numerique/article/40-ans-d-apple-au-dela-du-mythe-8897>

Simon J.-P., P.-J. Benghozi and E. Salvador. 2015. The new middlemen of the digital age: The case of cinema. *Info* 17(6), 97–115.

Taylor, S., and K. Littleton. 2016. *Contemporary identities of creativity and creative work*. New York: Routledge.

Tellis, G.J. 2006. Disruptive technology or visionary leadership? *Journal of Product, Innovation, Management* 23(1), 34–38.

Thompson, B. 2017. The great unbundling. *Stratechery*, 18 January.

UNCTAD. 2010. *Creative economy report 2010. Creative economy: A feasible development option*. Geneva: Author.

Waterman, R.H. 1993. *Adhocracy: The power to change*. New York and London: Norton.

Wessel, M., A. Levie and R. Siegel. 2016. The problem with legacy ecosystems: They separate you from your customer. *Harvard Business Review*, November 68–74.

Abstract

Cultural and creative industries (CCIs) are based on a capacity for innovation. Yet recent technological dynamics support disruptive ways to devise, deploy and create value from innovation. Whereas most of the literature addresses the disruptive changes in consumer practices and the business models of CCIs, this study investigates how disruptive technologies are challenging the organization and value chain of the cinema industry. Such transformations are supported by a multilayered evolution driven by technological middlemen, industrial partnerships and information technology infrastructure. First, most of the observed changes are driven by actors emerging outside CCIs, while the traditional players in these industries are investing less in R&D and technology. Second, these new players, usually specialized technological suppliers (STSs), are building their position by using their technological expertise to serve the creative dimension of cultural works. The authors make several observations about the role of these STSs and that of new industrial partnerships. Last, the growing importance of information and communication technologies and of online networks ascribes a key role to technological infrastructure and platform leadership. This multilayered influence leads to a reconfiguration of the traditional business ecosystem and value chain of the cinema industry. It also questions the current role of public intervention. In particular, one wonders whether this new environment calls for an alternative policy to the traditional silo financing (i.e., partitioning the regulation and financial support for each subsector of CCIs) that has thus far dominated.

Keywords

Creative and cultural industries, cinema industry, intermediaries, disruptive innovation, value chain

Elisa Salvador holds an international PhD in Institutions, Economics and Law from the University of Turin, Italy. She is a professor in the ESSCA School of Management, where she is in charge of the course Managing Creativity and Innovation and the research group focused on Entrepreneurship and Innovation. She has served as a researcher at Ecole Polytechnique, Paris (2012–15), focusing on a project in R&D and innovation in cultural and creative industries.

Jean-Paul Simon is the founder of JPS Public Policy Consulting, a firm specializing in media/telecom regulation and strategy. He has held various positions in the telecom industry and has worked as a senior scientist at the Institute for Prospective Technological Studies (IPTS), the European Commission and the Directorate-General JRC. He is the author of several books and articles on communication and public policy and serves on the boards of academic journals. He is a frequent speaker on telecommunications and media in Asia, Europe and the United States.

Pierre-Jean Benghozi is Research Director at the National Centre for Scientific Research (CNRS) and is a professor at École Polytechnique (Paris) and at GSEM (Geneva University). Since the early 1980s he has been developing pioneering research on information technology, telecommunications, media and culture. His most recent book deals with videogames as a cultural industry. He is a co-chair of AIMAC and serves on the boards of various international editorial and scientific committees.

Acknowledgements

A preliminary version of this article (under the title “Technological Innovation as a Disruptor: The Case of the Cinema Value Chain in the Digital Age”) was presented at CONCORDi 2017, 6th European Conference on Corporate R&D and Innovation, “Innovation and Industrial Dynamics: Challenges for the Next Decade,” European Commission, Joint Research Centre, Directorate for Growth and Innovation, in collaboration with OECD, Directorate for Science, Technology and Innovation, Seville, 27–29 September 2017.

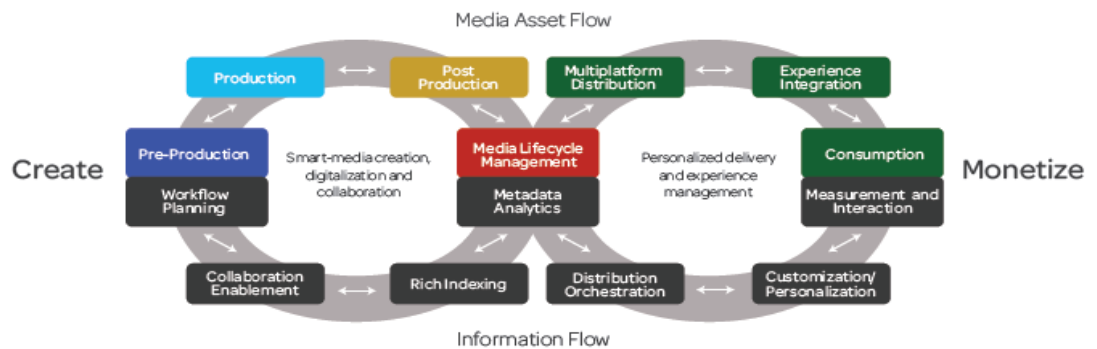
TABLE 1 THE CINEMA INDUSTRY IN THE DIGITAL AGE: A SNAPSHOT OF COMPANIES

Company and year founded	Sector	Country	Key characteristics
Akamai 1998	Content distribution	United States	Provides services to content providers that brings their content closer to the customer; leading provider of cloud services for delivering, optimizing, and securing online content and business applications
Avid 1987	Cinema technical industries	United States	Specialist in video and audio production technology: digital nonlinear editing systems, management and distribution services
Double Negative 1997	Cinema technical industries	United Kingdom	One of the world's largest providers of visual effects for film, with facilities in London, Mumbai and Vancouver
Dreamworks 1994	Cinema producers and studios	United States	Producer of "high-quality entertainment," including computer-generated animated feature films, TV specials and series, and live entertainment properties; example of a firm that combines technology and an "artistic" dimension to create animated feature films; acquired by Reliance in 2009
Image Metrics 2000	Cinema technical industries and videogames	United Kingdom	A company that focuses on advancing consumer applications based on computer vision, facial analysis and recognition technologies
Éclair 1907	Cinema technical industries	France	Pioneer in digital post-production; went bankrupt in 2015 and was bought by Ymagis
Netflix 1997	Home entertainment distribution company	United States	Niche provider, initially using an antiquated distribution channel (e-mail) to send VHS tapes, then DVDs, later morphing into a global company; is world's leading online TV network
Prime Focus 1999	Cinema technical industries	India	Commercial post-production facility providing top-tier technology solutions (visual effects, 3D conversion and animation), with offices in London, Los Angeles, Vancouver and New York
Reliance Entertainment (Reliance BIG Entertainment Pvt. Ltd.) 2005	Entertainment services (Internet, new media, film, TV)	India	Producer of animated films; also operates movie studios, a social networking platform for Web and mobile, FM radio, online gaming, mobile gaming, home video and theme parks; provides music, sports, and Internet and mobile portals as well as user-generated content
Technicolor (formerly Thomson) 2010	Cinema technical industries	France	A former equipment manufacturer and provider of audiovisual services, refocused on core service activities after being renamed Technicolor

Company and year founded	Sector	Country	Key characteristics
UFO Moviez 2005	Cinema, digital film distribution	India	Delivers films to theatres through satellite transmission; is world's largest satellite-based digital cinema network
Ymagis 2007	Cinema technical industries; digital distribution	France	Provides funding to help cinema exhibitors make the transition from 35mm to digital projection; provides assistance to producers, distributors, and exhibitors (encryption, valuation, duplication and transport)
Zoetrope 1969	Cinema producers and studios	United States	A "deviant studio" founded by film directors Francis Ford Coppola and George Lucas to design and implement creative, "unconventional approaches to filmmaking"
Weta Digital 1993	Cinema technical industries (VFX)	New Zealand	Provides a suite of digital production services for feature films and high-end commercials, from concept design to cutting-edge 3D animation

Source: company Web sites

FIGURE 1 NEW MEDIA VALUE CHAIN



Source: Avid (2014)