

# Master Thesis

## Science & Innovation Management

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*The Role of Resilience in the Reconfiguration of Organisational Communities:  
An Explorative Case Study of the Recorded Music and Motion Picture industries*

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**Master Thesis Science & Innovation Management: 45 ECTS**

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### Abstract

This study investigates what determines the nature of reconfiguration in industries under changing environmental conditions. Analogous to recent results of empirical research and modelling in ecological literature, it postulates that regime change in industries is idiosyncratic and dependent on the resilience of that industry, in which resilience is defined as the capacity of a system to absorb shocks as to retain essentially the same function, structure, identity, and feedbacks. This resilience is determined by the interaction between environmental conditions and the particular characteristics of the industry. To analyse what industry characteristics influence resilience, industries are defined as organisational communities, which are networks of interacting organizational populations that are functionally integrated through interdependencies. Their reconfiguration is measured by change in its populations and the interdependencies between populations. To explore the relationship between these characteristics and resilience, this study constructs a historical narrative of two industries facing similar environmental conditions. The music and motion picture industry are organisational communities that both involve reproducible information goods with high uncertainty of market success. Both communities have a similar configuration in 1998. Both organisational communities have been reconfigured by the emergence of digital technologies with very different results. Based on the histories of these two communities it is proposed that community resilience is partially dependent on community structure. How dense and diverse a community's populations are and how they are interdependent determines subsequent reconfigurations of the community. This study manages to discern patterns in community configuration that signal a high or low propensity to change. This provides a first indication of how community characteristics influence resilience and provides warning signs of changing resilience. The focus of devising policy for organisational communities may not necessarily lie in the reinforcement of stability of these communities, but rather consider its resilience related to the desired configuration.

### Keywords

*Organisational communities, Community ecology, Resilience, Motion picture, Recorded music, Regime change, Basins of attraction*

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### Introduction

In innovation theory, it has become a common belief that organisational, industrial and national systems are subject to path dependency (Teece, et al., 1997; Nelson & Winter, 1977; Carlsson & Stankiewicz, 1991) where the system's configuration to a large extent is a reflection of its historical trajectory. At the same time, research shows that sudden shocks can set in motion radical change in such systems. Organisations are able to undertake revolutions (Miller & Friesen, 1980), industries transition into new cycles (Anderson & Tushman, 1990) and even nations can radically reorient their economies (Schienstock, 2007).

Two examples will help clarify such sudden systemic anomalies, which have attracted growing academic interest. At the turn of the previous century the emergence of reliable railroad infrastructure and communication technology in the United States led to expanding markets and falling prices. The population of manufacturing firms reacted by organizing into large multidivisional forms with central administration in order to maintain competitive effectiveness through economies of scale (Chandler, 1982). Another example of reconfiguration occurred in the typewriter industry, which was dominated by an oligopoly of large manufacturing firms using one technological standard (Utterback, 1994). The shock from the introduction of the electric typewriter allowed firms new to the industry to compete with existing manufacturers on different technological terms, eventually replacing the incumbents (Utterback & Suárez, 1993; Utterback, 1994). Both examples show a similar pattern. A community of firms is disturbed by a shock. Firms react to the shock, initiating a process of reconfiguration to fit changing economic and institutional conditions. When conditions stabilise, the community of firms is substantially reconfigured.

However, the direction and timing of such reconfigurations are by no means obvious from the outset. The multidivisional form emerged after specific shocks in the United States, but many of those shocks also occurred in various European countries. However, it failed to emerge there until after the second world war (Chandler, 1982). The replacement of the typewriter was set in motion by organisations new to the industry (Utterback, 1994) but the rate of technological change and the reconfiguration of the industry seem not directly related. Different industries follow technological cycles with highly unpredictable timing and duration not predictable by technological shocks alone (Andersen, 1999). This leads to the question of whether a single shock alone is sufficient for explaining the specifics of reconfiguration in industrial systems. The literature streams on system reconfiguration as a consequence of changes in technology (Anderson & Tushman, 1990), competition (Teece, 1986) and institutions (Hamilton & Biggart, 1988) trace reconfigurations from the initial shock via the processes of change towards a new configuration. However, these analyses fail to explain why the shock triggers the reconfiguration in the first place. As such, current knowledge of industry reconfigurations cannot fully account for the idiosyncrasy in systems' reactions to shocks. Attention should be drawn to the nature of the configuration, how the system reacts to shocks and whether it is able to persist without reconfiguration despite these shocks. A promising approach for this lies in the study of resilience in a community of firms.

A system's reaction to a shock or pressure is determined by its resilience (Holling, 1973; Scheffer, et al., 2001; Scheffer & Carpenter, 2003). Resilience is the "*ability [of a system] to absorb change and disturbance and still maintain the same relationships [within the system]*" (Holling, 1973, p. 14). The resilience of a system determines what thresholds need to be crossed in order to make the relationships in a system unstable (Scheffer, et al., 2001). A resilient system may survive large or

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frequent shocks whilst retaining the same configuration (Beisner, et al., 2003). By the same token, an industry's persistence is determined not only by the shocks it is exposed to – e.g. economical crises, technological innovation or shifts in power – but by its ability in coping with the fluctuations these shocks cause. Surprisingly, there have been no systematic studies towards uncovering what characteristics render an industrial system more impervious or more vulnerable to shocks, or in other words, what causes them to be more resilient. This research provides a first step in exploring the relationship between configuration and resilience. Defining an industry as an organisational community of multiple populations of firms that are interrelated enables a systemic view of its configuration (Hannan & Freeman, 1989). Recognizing resilience as a feature of the state of organisational communities leads to the question of what factors within the community influence its resilience and how this mediates between shocks and the subsequent dynamics of the community.

This research explores the history of structure and dynamics of two organisational communities to gain insights on how community configuration influences resilience against shocks. The organisational communities surrounding recorded music and motion pictures have had to cope with a similar shock: the rise of digitalisation and file-sharing. The widespread adoption of the mp3 compression format (Leyshon, 2001) combined with file-sharing technology enabled exchanging music data between internet users (Sifferd, 2002). World record sales consistently declined and value has halved as of 2012 compared to 2001 (Tschmuck, 2012). By contrast, despite increasing file-sharing of films, the motion picture industry's revenues are still increasing (Huygen, et al., 2009). Digitalisation of consumption and file-sharing do not seem to impact on the profitability of the movie industry as extremely as in the music industry. The impact of these technological conditions is different in severity and subsequent dynamics for each of the communities, which leads to the hypothesis that community resilience has had a profound impact on the nature of reconfiguration. This leads to the following research question:

***How did community characteristics influence the resilience of organisational communities surrounding recorded music and motion pictures during their reconfigurations since 1998?***

Taking a resilience perspective, this study discusses the nature and timing of reconfiguration, tracing an industry's propensity to change back to its characteristics. How this perspective will be wielded for organisational communities is the subject of the theory section. The methodology section outlines the demarcation of the case studies, data collection and the setup of the analysis. The analysis – a historical narrative – is achieved by charting the developments within each community paired with the shocks it has to endure since 1998, inducing a relationship between community configurations and resilience. Using both quantitative and qualitative data from primary and secondary sources, the results section describes the trends within both communities and substantiates this with interview data from community representatives. The discussion of this exploratory analysis provides a comparison of two organisational communities and their structural similarities and differences, tackling empirical limitations in this type of research. The conclusion summarises a first indication of what renders a community resilient towards its environment and provides suggestions for further research and policy implications.

### Theoretical framework

This section will define what will be understood by the notion of an organisational community in terms of its changing populations and interdependencies. By representing an organisational community on a landscape it is explained why communities gravitate towards certain optimal configurations, and how this landscape changes when environmental conditions shift. Finally, reviewing resilience defines the propensity towards change of organisational communities under shifting environmental conditions. For this, resilience will be split up into the dimensions latitude, resistance, precariousness and panarchy. This study will investigate how changing populations and interdependencies reconfigure a community towards a new basin of attraction by influencing the dimensions of resilience.

### Organisational communities

Community ecology was developed to do justice to the variety of organisational forms and their interdependencies in an industry (Astley, 1985). Within the parameters of community ecology, **communities** are networks of interacting organizational populations that are functionally integrated through interdependencies (Hawley, 1986; Singh & Lumsden, 1990; Baum & Rao, 2004).

Within a community framework, **populations** of organisations are *“local, co-evolving groupings of organisations that embody the same organisational form”* (Baum & Rao, 2004, p. 212). In this respect, **organisational forms** are defined as combinations of goals, authority relations, technologies and client markets (Baum & Rao, 2004, p. 212; paraphrased). The boundary between populations can be represented by the value chain position. The value chain is a representation of each of the steps that add value to a product or service (Porter, 1985), in which value is contributed by different firms of a unique organisational form. A firm can encompass only one step, or multiple steps in a value chain through vertical integration (Kogut, 1985). Firms with organisational forms comprising the same multiple steps are considered a single population, as their characteristics are fundamentally different from firms that represent only a single step in the chain (Küng, et al., 2008).

Reconfiguration in organisational communities is measured by change in its populations and the interdependencies between populations. Change in populations is measured by two characteristics. First is the **diversity** of the populations, which is defined as the number of distinctly different forms within the organisational community (Baum & Amburgey, 2000). Second is the **density** of the populations, defined as the number of firms in a bounded population (Hannan, et al., 1995). The **interdependencies** between populations are formed based on the populations' hierarchy and position in the value chain. These relationships can be categorized into several types. Symbiotic relationships are mutually beneficial relationships based on the differences between populations – such as supplier contracts – whilst commensalist relationships are based on supplementary similarities (Barnett & Carroll, 1987). The latter relationships may range from mutualistic, such as cooperative trade associations, to competitive, such as reliance on the same resources or markets (Monge, et al., 2008). On top of the type of relationship populations engage in, the intensity of their interdependency affects the configuration of the community (Baum & Amburgey, 2000).

Thus, the configuration of a community is defined by the diversity and density of populations coupled with the type and intensity of interdependencies between populations. In other words, *“Organisational communities (...) emerge as sets of populations [that] become interlinked by commensalism and symbiosis, and those linkages become increasingly important determinants of*

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*outcomes for members of the populations that comprise the community.*" (Baum & Rao, 2004, p. 235). An organisational community's configuration is not stationary. Rather, its constituent populations and their interdependencies are subject to constant fluctuations due to continuous variations within populations (Levinthal, 1997). However, these fluctuations in configuration typically remain within certain boundaries and surround an optimal equilibrium.

### Environmental conditions

In ecosystems, the collection of configurations that are naturally drawn to an equilibrium is referred to as a dynamic regime (Scheffer, et al., 2001; Scheffer & Carpenter, 2003). Without shocks, organisational communities persist in a dynamic regime. However, the community's environment shapes community configuration (Astley, 1985). Shocks in **environmental conditions** alter the criteria for optimal community configurations and thus shift the equilibrium of the dynamic regime. By moving the regime, environmental conditions induce selection within a community's populations by eliminating firms whilst enticing survivors to change their form attempting to increase their fit with the environment (Hannan & Freeman, 1977; Hannan & Freeman, 1989; Baum & Amburgey, 2000). Environmental conditions thus induce change in a community at the population level through selection and adaptation, resulting in reconfiguration towards the equilibrium of a new dynamic regime. Here, environmental conditions are defined as all the economic, technological and institutional conditions affecting the community's configuration (Armenakis & Bedeian, 1999).

Here, **economic conditions** are conditions that change the client market of one or more populations within the community. Markets can expand, shrink, or change their demand towards populations within the community, creating changes in financial resources (Turnheim & Geels, 2013). Resource availability impacts the populations of a community (Hannan & Freeman, 1977; Hannan & Freeman, 1989). Organisational ecology presumes that resources used by a population are finite and thus limit the density of that population (Hannan & Freeman, 1977). These changes can occur for populations across the value chain (Turnheim & Geels, 2012).

**Technological conditions** include all technologies used in the value chain. Technological conditions change when a new technology is introduced and adopted, either by firms in the community or by new entrants to the community (Haveman, 1992). This directly changes the forms of firms within a population (Hannan & Freeman, 1984). However, technological changes can also indirectly influence community configuration by affecting economic and institutional conditions such as markets and policy (Wade, 1995; Rosenkopf & Tushman, 1998).

Finally, **institutional conditions** are conditions that change the authority relations of populations within the community. These can be formal regulations and policies affecting the community's configuration by legitimizing certain organisational forms whilst excluding other options (Lee & Pennings, 2002). They can also be informal public expectations legitimizing or discrediting a community's configuration (Turnheim & Geels, 2013). Indirectly, institutions can guide technological standard setting by favouring lobby groups or influence market demand through public expectations (Rosenkopf & Tushman, 1998; Carney & Gedajlovic, 2002).

As a consequence of change in these environmental conditions, communities reconfigure through selection and adaptation in populations. For instance, technological, economic or institutional pressures may force organisations to adopt innovations after a first mover or be selected against (Abrahamson & Rosenkopf, 1993). Or, firms in a population may adopt a similar form based on a new

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technology, shifting consumer demand or a changed regulatory framework (Hannan & Freeman, 1977; Lee & Pennings, 2002). Although these processes explain reconfiguration of a community as populations accommodating to environmental conditions, it is not easily apparent how changes in these conditions leads a community to fluctuate around a particular configuration in a specific dynamic regime. To do this, the notion of a 'basin of attraction' is introduced.

### Basins of attraction

Within the ecological literature, the set of configurations that lead the community to fluctuate around the same optimal configuration – the dynamic regime – are said to belong to the same **basin of attraction** (Scheffer, et al., 2001; Walker, et al., 2004). The basin of attraction constitutes all initial environmental conditions that will direct the organizational community towards the same equilibrium. To illustrate this, the community is visualised in a basin located on a three dimensional **landscape** that depicts the set of all possible configurations (Figure 1, the black dot represents the community). The height of the landscape indicates the level of fitness with environmental conditions, with deeper points signifying locations of configurations with a higher fitness. Environmental conditions thus determine the boundaries of the basin of attraction. Placing the community at a random position will draw it to a nearby basin (Beisner, et al., 2003), as selection and adaptation processes change the composition of the community's populations. This reconfigures the community configuration towards a local optimum, increasing its fitness.

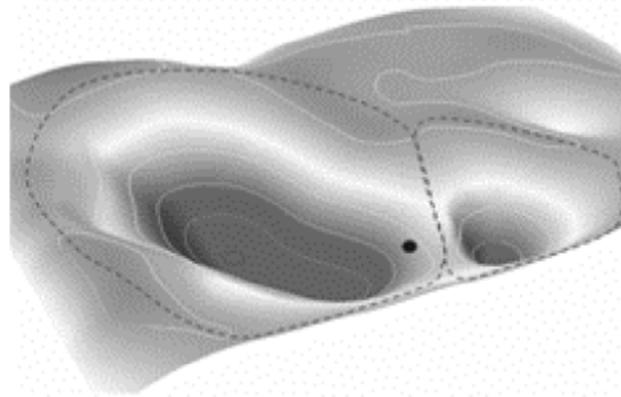


Figure 1: Visualization of multiple basins of attraction on a landscape (Walker, et al., 2004)

However, changes in the environmental conditions can alter the fitness levels of all possible configurations by changing the lay of the landscape. If these changes cause the organisational community to cross the boundaries of the basin of attraction, the community will not return to the previous dynamic regime but will instead be drawn to another optimum. As seen in ecosystems, shifts between these regimes do not necessarily occur gradually, but sometimes abruptly and irreversibly. These sudden shifts are not necessarily caused by large shocks, but can also be the result of incremental changes in the environmental conditions (Scheffer & Carpenter, 2003). The propensity to shift regimes and the nature of reconfiguration in an organisational community due to changing environmental conditions is determined by the resilience of the system.

### Resilience of organisational communities

In contemporary ecology **resilience** is defined “*the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.*” (Walker, et al., 2004, p. 2). Although technically purposed for ecological analysis, this definition contains essentially the same system components and dynamics relevant for organisational communities. A community’s function and identity can be determined by the set of populations present in a community, distinguished by their organisational form. A community’s structure and feedbacks can be found in the interdependencies between populations that mould the community into a certain configuration.

The idea of resilience is already in use for the analysis of social systems, as shown in the economic geography literature (Adger, 2000; Brand & Jax, 2007). However, there the attention lies with the adaptive capacity of a system to adjust itself to shocks, rather than the ability of the system to return to its original configuration (Simmie & Martin, 2010; Martin, 2012). Thus, the concept of resilience as a form of adaptive capacity gains an inherently positive and problem solving connotation. This study therefore restricts itself to an ecological definition of resilience, as it is neutrally formulated and based on a measurable property (Brand & Jax, 2007; Maru, 2010), namely a community configuration’s persistence.

### Dimensions of resilience

Since resilience is an intangible property of a system, several dimensions have been introduced to make the concept more measurable (Walker, et al., 2004) which will be redefined here to fit organisational communities. Visualising basins of attraction on a landscape (Beisner, et al., 2003) makes it possible to represent these dimensions of resilience as a feature of the basin and community (Figure 2).

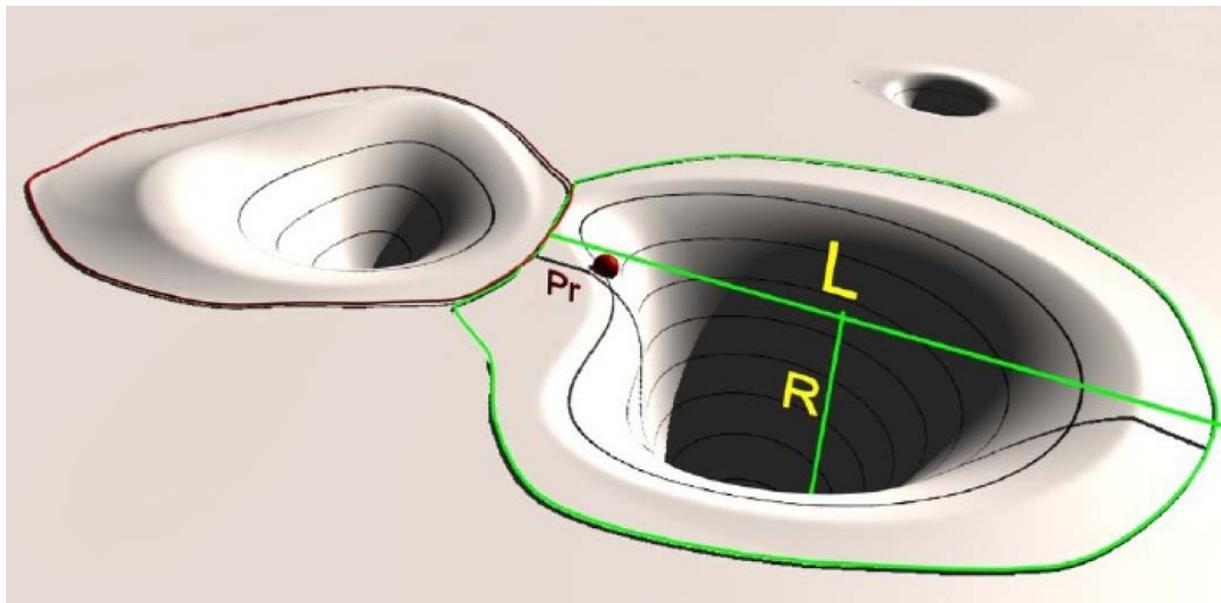


Figure 2: Dimensions of resilience represented in a basin of attraction (Leuteritz & Ekbia, 2008)

First of all, **latitude** is the degree to which an organizational community can change position in a basin of attraction without encountering its boundaries. It is represented in Figure 2 by *L* as the width of the basin of attraction. A wider basin of attraction reflects more possible community

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configurations that are drawn to the same equilibrium. Thus, the organisational community can withstand more or greater environmental change before being dislodged from the basin. Second, the **resistance** determines the degree to which the community can recover from environmental shocks. It is represented by  $R$  as the depth of the basin of attraction. In this sense, it means how much the community's fitness decreases as it naturally changes its configuration. A deep basin of attraction features high resistance, as fitness drastically decreases when the community changes configuration away from the basin's equilibrium. Selection and adaptation processes are then more likely to 'roll' the configuration back to the equilibrium of the basin of attraction. Third, **precariousness** provides the community's current proximity to the boundary of a basin of attraction. It is represented by  $Pr$ , reflecting the configuration's position relating to the latitude and equilibrium of the basin. The greater the precariousness, the more likely a reconfiguration of the community pushes it into a different basin of attraction. Finally, the basin of attraction interacts with environmental conditions. In ecology, this **panarchy** characteristic is used to show the dependencies of a regime on larger and smaller systems (Walker, et al., 2004). Panarchy is thus recognized as the degree to which the landscape changes its fitness levels as environmental conditions change. Communities that are more susceptible to a radical change in fitness due to changing environmental conditions, have a higher degree of panarchy.

Synthesizing the literature on resilience and organisational communities yields a conceptual framework that describes the propensity of an organisational community to switch basins of attraction on a changing landscape as a consequence of its own characteristics and environmental conditions. A community's persistence is ensured when its configuration is reinforcing its current position within the basin of attraction despite changing landscape fitness levels. A regime shift manifests when this configuration is disrupted through shocks and changing conditions due to insufficient resilience and moves out of the basin.

### Methodology

In order to investigate how the characteristics of an organisational community affect its resilience, two different organisational communities were used as case studies. Data from documented sources and interviews were collected to describe their history. This resulted in two comparative historical narratives analysing how the changing landscape conditions influenced the communities' reconfiguration to infer resilience dynamics.

### Case selection

Two organisational communities were selected to be the subject of this historical narrative. The music and motion picture industry are particularly well-suited for a comparison as both involve products of creativity that can be classified as information goods (Shapiro & Varian, 1999) that are reproducible but face high uncertainty in determining market success *ex ante* (Handke, 2010). Both industries have experienced the shock of illegal file-sharing enabled by increasing digitalisation. The effects on profitability of the industry however have differed greatly (Atkinson, 2011), despite very similar industry structures preceding the digital revolution (Scott, 1999; Hirsch, 2000; Scott, 2002). Strategically choosing similar structured communities that exhibit different dynamics helps in identifying common and differentiating characteristics (Bryman, 2008). Additionally, comparing two cases provides a more solid foundation for building the theoretical relationship between the characteristics of configuration and resilience (Eisenhardt, 1989).

To enable a comparison of these industries before, during and after the shock of file-sharing and compare the processes of community change, this study covers the time period from 1998 until 2012. The starting date is chosen a year before the launch of the technology that made widespread file-sharing possible (Sifferd, 2002). Because these organisational communities are highly globalized oligopolies (Negus, 1996; Scott, 2002) no geographical demarcations were used.

The populations within the communities under investigation in this study are only those that directly handle audio or video in physical or digital form as a core of their business. The music industry can be divided into three branches that deal with rights, performances and – the core element – recordings respectively (TNO - STB, 2000). This study focused exclusively on the music recording industry, as file-sharing has consequences for record sales. This excludes broadcasting or licensing of any kind (Meisel & Sullivan, 2002). The motion picture industry works with sequential release windows, as a product is distributed over different exhibition channels such as cinemas, video rental and television, one after the other (Zhu, 2001). In this study, the exhibition channels were limited to those that offer a specific film product chosen by the consumer, which excludes broadcasting business models.

### Data collection

Data on community change were primarily retrieved from documented sources published worldwide. These documents included reports and figures by international trade associations of the industries<sup>1</sup>, independent reports by consultancies and governmental organisations<sup>2</sup> and scientific literature that takes these industries as subject of analysis. The reports were collected through search engine searches by using industry specific keywords and scientific articles were collected through specialised

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<sup>1</sup> The International Federation of the Phonographic Industry and the Motion Picture Association of America for the recording and motion picture industry respectively.

<sup>2</sup> Such as the Organisation for Economic Co-operation and Development, PricewaterhouseCoopers and the European Audiovisual Observatory.

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scholarly search engines with similar keywords. The starting keywords were “value chain” or “supply chain” combined with the respective industry to find reports and articles that outlined the structure of the organisational community. Furthermore “file-sharing” combined with the respective industry provided the first data on the environment’s impact on the community. The resulting documents were selected on the basis of the relevance of the publisher and the of document’s overlap with the research topic by reading the executive summary or abstract. From there, further data collection was snowballed based on the claims made in the reports pertaining to for instance relevant environmental conditions to the industry. They were used as new keywords and sources cited for these claims were tracked down. All articles or reports had to be published in or after 1998, with an exemption made for those sources that were used to describe the status quo configuration. Since community configuration is considered path dependent, environmental conditions that helped shape community structure in 1998 were taken into account. As relevant data was highly fragmented and sometimes inconsistent, it was attempted to back up each relevant claim with multiple sources. A full list of data sources can be found in Appendix I.

Additional data were collected from five interviews with key representatives from the music industry were held in October 2013 (Table 1). Representatives from the motion picture industry were also approached, but no suitable interviewees were willing to respond. The interviews allowed the researcher to acquire detailed insights in the drivers of community reconfiguration as seen from within firms, but also served as an important form of data triangulation. This strengthens both the grounding of theoretical concepts and provides synergy in the evidence (Eisenhardt, 1989). These interviews were semi-structured, to allow for following up relevant answers (Bryman, 2008). The interview questions were constructed around preliminary analyses of relevant events and trends taken from the documented sources. The interview guides can be found in Appendix II.

No.	Company	Representative’s function
1	Streaming service	Economic Director
2	Record store	Store Owner
3	Major label	Sales Manager
4	Major label	Director Digital
5	NVPI (an IFPI member organization)	Representative/Editor

Table 1: Interviews

### Operationalisation

Below, the primary indicators and how they were measured are described for organisational communities and environmental conditions. For resilience a method of induction is formalised using the consequences of increasing and decreasing resilience.

### Organisational communities

The change in density of the community’s populations was measured by the yearly revenue of the population (Leblebici, et al., 1991) or by the yearly change in the amount of firms within a population (Hannan, et al., 1995). However, since this data was often either classified by firms or no comprehensive worldwide overviews were available, several replacement indicators were used to infer the density of the community’s populations. In such cases, sales figures sometimes combined with market shares of different populations would at least yield insight into the pattern of change within a population. To further substantiate this, figures from local markets and qualitative statements were used to infer these patterns of change.

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Changes in population diversity were measured as the amount of demarcated different populations on a yearly basis. Populations were separated by the function(s) they fulfil in the value chain (Küng, et al., 2008). Industry value chain analyses were integrated from various industry reports and scientific articles to position the populations. Different organisational forms in the same link(s) of the value chain were further separated into unique populations when value chains split in multiple paths or when new value chains emerged.

Interdependencies between populations were measured qualitatively. Since interdependencies manifest themselves at the level of organisations rather than populations, this had to be inferred from qualitative statements from reports and articles, substantiated with interview respondent answers. Relationships between populations were inferred from the value chain position between populations and the target markets that contained overlap between populations. Thus, symbiotic interdependencies could be recognized as formalised relationships between populations with different positions in the value chain (Monge, et al., 2008). Mutualistic interdependencies were measured as formalised cooperative relationships between different populations with the same target market (Barnett & Carroll, 1987). Competitive interdependencies were recognised as different populations addressing a similar target market (Hannan, et al., 1995). As the intensity of interdependencies is not quantifiable on a population level, this too was inferred from qualitative statements.

### **Environmental conditions**

Economic conditions were measured by tracking market dynamics (Turnheim & Geels, 2012). Changes in the market were taken from worldwide yearly sales figures of different formats of audio and video carriers and from the worldwide value of the industry. Where these figures were unavailable, yearly OECD or US market figures were used as a proxy. Qualitative information concerning consumer demand was used to clarify market trends.

Technological conditions were measured by tracking the diffusion of technological advancements in both the populations within the community and their client markets. This meant tracking new production, distribution and (for the film industry) exhibition methods and their use within the populations of the organisational community. Second, this meant tracking adoption of new consumer electronics devices and their capabilities with music and film. Quantitatively, this was measured as the percentage of consumers or households that used the new technology on a yearly basis worldwide. Once again, yearly OECD or US figures were used as proxy. Finally, since file-sharing and related innovations are enabled by internet connectivity, the diffusion of broadband internet was measured worldwide. Qualitative information concerning the capabilities and use of new technologies was used to clarify the adoption trends.

Institutional conditions were measured by gathering qualitative data on changes in regulations and interventions by governmental organisations that affected characteristics of the organisational community on a national or international level. Second, public expectations that affected consumer demand or adoption of technologies were taken into account. These indicators were both taken from earlier accounts of industry reconfiguration.

### **Resilience**

The use of an ecological definition of resilience required this study to focus on the persistence of the organisational community's configuration similar to its status quo. Deviation from the community

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configuration in the status quo rather than persistence in a similar form thus indicated a change in community resilience. Persistence is achieved by maintaining the components that make up the system and the relationship between these components – i.e. the populations and the interdependencies between them – and their ability to retain themselves continuously (Cumming, et al., 2005). To measure the persistence of a community configuration or deviation from its status quo configuration, the community configurations under study were compared to the 1998 situation. Setting this *a priori* standard configuration allowed comparison of all later states of the community to this one. From here it was possible to see the consequences of increasing or decreasing resilience, depending on the shocks and conditions the community had to endure and the configurations it passed through. In line with ecological literature it is possible to make qualitative assessments about each of the dimensions of resilience and “*considering these assessments collectively enables a more complete and better focused assessment of resilience (...) than would be achieved without them.*” (Walker, et al., 2004, p. 7). The dimensions of resilience are not measured directly but rather through surrogate indicators (Carpenter, et al., 2001), presented in Table 2. This lists consequences of changing dimensions of resilience which allowed to infer how community resilience has developed since 1998.

Resilience Dynamic	Consequence for the community and indicators with examples
Higher Latitude	<p><b>Consequence:</b> <i>More possibilities for configurations drawn to the same basin of attraction. Despite potentially destabilizing shocks, established populations are drawn to the old equilibrium.</i></p> <p><b>Indicators:</b> New populations fail to achieve significant density or adopt established population form. Technology/Markets/Institutions diversify available positions towards basin of attraction.</p> <p><b>Example:</b> Entrants do not manage to effectively compete with incumbent populations</p>
Lower Latitude	<p><b>Consequence:</b> <i>More possibilities for configurations crossing borders towards new basins of attraction, less favouring established populations.</i></p> <p><b>Indicator:</b> New populations actively damage incumbent populations’ density and interdependencies. Technology/Markets/Institutions limit positions in the basin of attraction.</p> <p><b>Example:</b> A new retailer population gains significant density by ignoring intermediate populations in the value chain.</p>
Resistance Increase	<p><b>Consequence:</b> <i>More loss of fitness for alternative configurations of existing populations compels the configuration to move back to equilibrium.</i></p> <p><b>Indicators:</b> Existing interdependencies between populations are tight and do not allow for alternatives. New populations cannot establish relationships with incumbent populations. Technology/Markets/Institutions do not favour positions alternative to the current configuration.</p> <p><b>Examples:</b> Producers cannot switch distributors without severe revenue decrease. New retailers cannot attain products from incumbents, as incumbents’ margins are insufficient.</p>
Resistance Decrease	<p><b>Consequence:</b> <i>Little difference in fitness of alternative configurations for existing populations. Shocks induce selection/adaptation in established populations and reconfigure the community.</i></p> <p><b>Indicators:</b> Existing interdependencies between populations are loose. New populations engage in interdependencies with incumbent populations. Technology/Markets/Institutions are indifferent towards positions further from equilibrium.</p> <p><b>Examples:</b> Mutualistic and symbiotic interdependencies form between a great diversity of populations and interchange often. Incumbent producers form symbiotic relations with new retailers, indicating little difference in fitness between old and new retailers.</p>
Precariousness Increase	<p><b>Consequence:</b> <i>The community comes close to basin thresholds.</i></p> <p><b>Indicators:</b> Incumbent populations decrease in density and come close to annihilation. New populations are to achieve significant density. Technology/Markets/Institutions decrease chances of survival for incumbent populations.</p> <p><b>Examples:</b> A retail population fail to attract sufficient revenue. A new distributor severs existing interdependencies and attracts revenue.</p>
Precariousness Decrease	<p><b>Consequence:</b> <i>The community moves closer to equilibrium.</i></p> <p><b>Indicators:</b> Incumbent populations increase in density. New populations are unable to achieve significant density. Technology/Markets/Institutions increase chances of survival for incumbent populations.</p> <p><b>Examples:</b> Retailers are in a growing market and see revenues increase. Alternative modes of production fail to take off.</p>

## The Role of Resilience in the Reconfiguration of Organisational Communities

**Table 2: Measuring changes in resilience**

It should be noted that the higher the effect of technology, markets and regulations in these indicators was witnessed, the higher the degree of panarchy for those communities was measured. For instance, technology can lower the latitude of the existing regime by rendering old organisational forms obsolete, thus providing less viable configurations. Markets can diversify but reinforce existing demand, providing more positions for populations and thus enhanced latitude. Regulations can allow a limited variation of organisational forms, thus heightening resistance to alternative configurations.

### Data analysis

Organisational structure is historically determined by both environmental conditions and the choices made by organisations. Also, over the long term the mechanisms that induce change in a community may themselves change (Kieser, 1994). Thus, a historical analysis is warranted as this highlights the dependence on past events and is able to detect changes in the processes of reconfiguration. With both documented data and interview data, analysis proceeded to construct a historical narrative in three steps based on the indicators outlined above. First of all, the environmental conditions in terms of the prevailing technological, economic and institutional pressures were charted to determine the shape of the landscape and its basins of attraction in 1998. The configuration of the organisational community was identified and related to these environmental conditions. Second, the changes in the landscape were determined by tracking the environmental conditions from 1998 to 2012. Subsequently, the reconfigurations of the organisational community were traced over the same time period. Thirdly, analysing the changes in fitness together with community reconfiguration determined the change in resilience in the organisational community. If a community persistently switched to a new basin of attraction, this was considered a separate time period.

The indicators were first extracted from documented sources. Qualitative statements and the interview data were coded based on the indicators formulated to measure the theoretical concepts using qualitative content analysis (Flick, 2009). Changes in the environmental conditions, organisational communities and resilience functioned as sensitizing concepts (Blumer, 1954) guiding the search for useful data. Codes labelled with these concepts were applied to statements that reflected a characteristic or change in the organisational community or its environment. Importantly, data collection and analysis were highly iterative (Corbin & Straus, 1990); whenever analyses indicated that certain concepts were important to the development of the organisational communities, these findings guided further data collection. Starting with the keywords on the value chain of the community and file-sharing led to a categorization of populations and an initial idea of environmental shocks. Using this categorization as a source for new keywords provided a history of population development, their interdependencies and the environmental conditions they were subject to. These findings were used to find keywords that enabled a deepening of the analysis.

## Results

Three periods of time are distinguished by distinctly different configurations of the music community. After 1998, the music community reconfigures twice and each reconfiguration will be explained from preceding community structure and interaction with environmental conditions. The initial configuration and subsequent reconfigurations are visualised in Figure 3.

### The recorded music community in 1998

#### Environmental conditions and related fitness landscape in 1998

The following environmental conditions shape the landscape and position the music community in a basin of attraction in 1998. **Economic conditions** maintain the configuration in this basin. The dominant audio carrier is the Compact Disc (CD) and the community has seen continuous growth of CD album sales up to 1998 (Tschmuck, 2012). The growth of sales is decelerating, but the community configuration remains profitable (Garofalo, 1999). The **institutional conditions** in terms of copyright have been maintained in the favour of large media conglomerates with record label subsidiaries (Bishop, 2005). Meanwhile, **technological conditions** emerge that enable digital music consumption. The mp3 encoding compresses audio files to enable transfer via the internet. Simultaneously, various audio playback software becomes available (Leyshon, 2001). Developments in hardware ensure that a majority of consumer electronics have capability playing mp3 audio by 1998 (Gordijn, et al., 2003). Despite this, no significantly dense populations using these conditions emerge (Garofalo, 1999). The fitness of this alternative configuration is not yet considered high enough to move the community to a new basin of attraction.

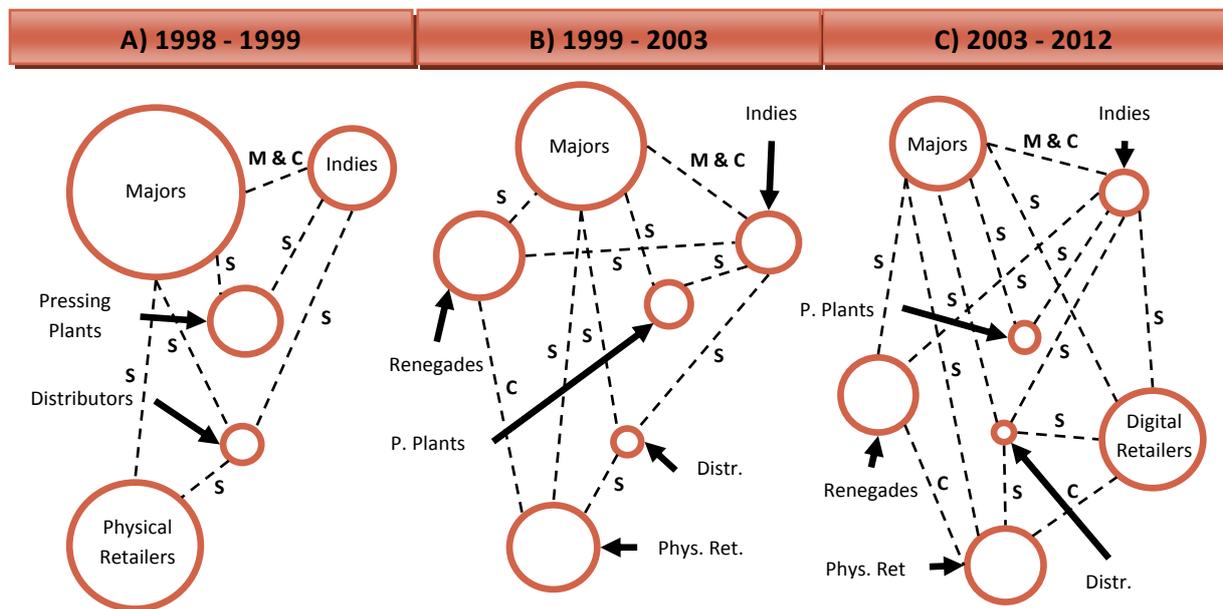


Figure 3: Reconfiguration of the recorded music community. Bubble size is a reflection of population density. S denotes symbiotic, M denotes mutualistic and C denotes competitive interdependencies.

#### Community structure in 1998

The value chain of the music community in 1998 comprises recording, manufacturing, distribution and retail (EMO, 1996; TNO - STB, 2000; Alexander, 2002). Two populations of record labels can be identified on the basis of their position in the value chain. Six record labels – the **majors** – integrate recording, manufacturing and distribution via worldwide networks (OECD, 2005; Leurdijk &

## The Role of Resilience in the Reconfiguration of Organisational Communities

Nieuwenhuis, 2012). The majors are the dominant population in terms of market share and economies of scale (Alexander, 1994; Garofalo, 1999) and have high density. Depending on geographic location, they integrate manufacturing and distribution or rely on symbiotic relationships with other populations (Huygens, et al., 2001; Mol, et al., 2005). The other population consists of independent labels – **indies** – which are small to medium enterprises concerned only with recording (KEA, 2006). Indies explore new artists, majors will contract successful acts from the indies to exploit them (Throsby, 2002). Indies are dependent on the majors to provide them with worldwide manufacturing capacity, distribution networks and promotion (Gander & Rieple, 2004; OECD, 2005; Leurdijk & Nieuwenhuis, 2012). Majors and indies are thus mutualistically interdependent. Simultaneously, indies are in competition with the majors for market share. Production and distribution is done by **pressing plants** and **distributors** respectively who are either subsidiary to a major or operate independently (TNO - STB, 2000). The independent pressing plants and distributors are symbiotically related to both majors and indies. Due to vertical integration only a small independent distributor population remains (Graham, et al., 2004). **Physical retailers** use their symbiotic interdependencies with distribution and the label populations to ensure a varied assortment of products (Gordijn, et al., 2003). Adaptation processes within the physical retail population see the emergence of internet based CD sellers and non specialised stores (Parikh, 1999; OECD, 2005) but this change retains community configuration up to 1999 (Figure 3 A).

### The recorded music community from 1999 to 2003

#### Changing environmental conditions

Emerging **technological conditions** enable digital music consumption. 1999 sees the invention of p2p file-sharing protocols by which users can freely share audio files. The small size of mp3 audio coupled with available software and hardware lowers the barrier for using file-sharing (Interview 5). This is reinforced by the rise in access to broadband connections to 7 in 100 inhabitants in 2003 (OECD, 2013). Hardware pushes the possibilities for music consumption with the invention and commercialization of the mp3 player in 1998 (Preiser & Vögel, 2002). Simultaneously, changing **economic conditions** cause a drop in the value of music sales attributable to increasing demand for singles and lowering demand for full albums (Elberse, 2009) (Interview 2 & 3). In 2004, single sales have more than quadrupled whilst album sales have more than halved since 1998 (Tschmuck, 2012). **Institutional conditions** in the form of copyright regulations are maintained inert by the record labels to combat file-sharing (Bishop, 2005). However, public opinion condones the use file-sharing even though it is illegal (Interview 2 & 4), driving music consumption up but value down (IFPI, 2000; Alexander, 2002). These technological and economical conditions combined create a fitness landscape that increasingly favours digital consumption of music at the cost of physical consumption.

#### Reconfiguration of community structure

The commercialisation of file-sharing with the entry of Napster in 1999 creates a second value chain (Dolfsma, 2000) in which manufacturing is no longer required (Parikh, 1999; May & Singer, 2001; Wallis & Kozul-Wright, 2001), visualised in Figure 4. This changes the diversity and density of populations within the recording community, shown in Figure 3 B. A new population based on p2p networks emerges referred to as the **renegades**; digital platforms that coordinate file-sharing and create revenue through advertising within their program or on their website (Vaccaro & Cohn, 2004). The population grows exponentially in density, illustrated by the 90 million users Napster garners in two years (Sifferd, 2002). Technological and economic conditions reinforce this, as file-sharing is well-

## The Role of Resilience in the Reconfiguration of Organisational Communities

suited for obtaining digital singles. The renegades are in competition with physical retailers and symbiotically related to majors and indies, from which they steal content (Interview 1 & 2). Statistics on the impact of renegades are ambiguous. Some attribute the slump in record sales to digital piracy (IFPI, 2006b; Liebowitz, 2008), whereas others claim only limited substitution of sales (Peitz & Waelbroeck, 2006; Tschmuck, 2012). The majors use the copyright conditions to shut down Napster in 2001, but the renegade population continues to grow in density with decentralised networks, making them harder to prosecute (Alexander, 2002; Sifferd, 2002).

The majors jointly attempt building digital services in 1998 and 2001 (Wallis & Kozul-Wright, 2001; Throsby, 2002) but fail due to a mismatch with consumer demand and lack of effective coordination (Pulverer, 2010; Dolata, 2011) (Interview 3, 4 & 5). The services are discontinued due to institutional conditions in 2001 by European Union anti-trust law (Interview 5). Due to changing economic conditions, the landscape becomes increasingly unfavourable for the established populations, reflected in a decline in CD sales after 2000 (Handke, 2010; Tschmuck, 2012). The density of the major and indie populations decreases proportionally after this peak. The tight symbiotic dependence between distributors and physical retailers negatively influences these populations' density. From 1998 to 2002, specialised CD retail in the US declines by 7% (Zentner, 2006). The pressing plant population grows (IIPA, 2007) and circumvents this lack of demand by diversifying (IFPI, 2005). Their importance for the music industry wanes and thus their density declines.

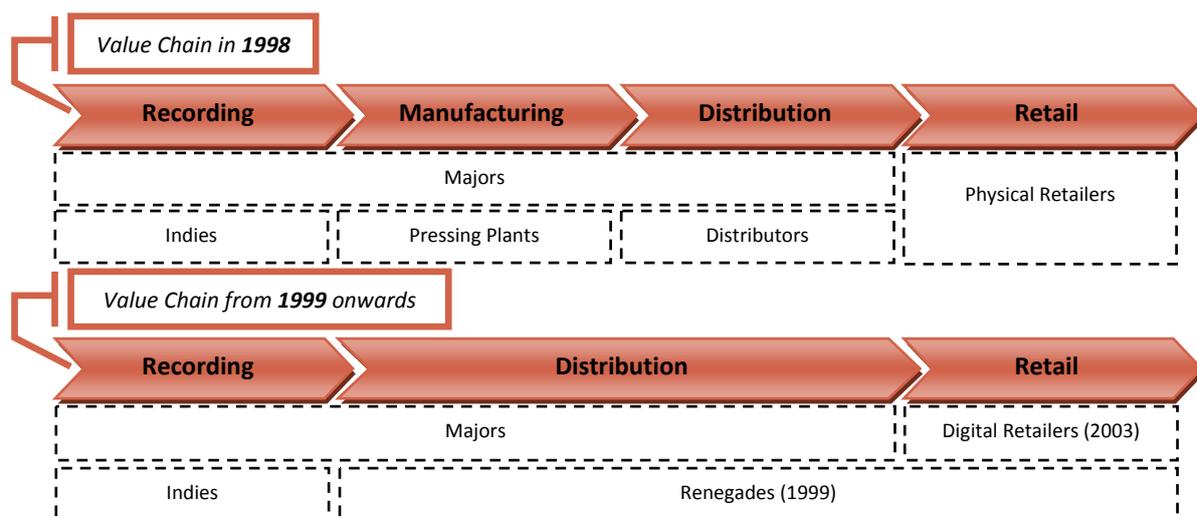


Figure 4: Developments in the value chain

### Derived community resilience dynamics

The renegades successfully enter the community as economic and technological conditions move the borders of the basin of attraction to include a new equilibrium. From the perspective of incumbent populations latitude decreases, as holding on to the old value chain limits favourable configurations in the basin. After 2000 this leads to increased precariousness as all established populations fall in density. The failed digital retail attempt by the majors is indicative of a high community resistance but makes them vulnerable to economic panarchy effects. Existing symbiotic interdependencies are too tight to deviate from by the incumbent populations. Alternative configurations involving digital channels are unviable due to the perceived loss of margins moving away from the album sales structure, despite changing economic conditions. Thus, a new basin of attraction is created in the landscape by the combination of changes in technology and consumer demand paired with the

## The Role of Resilience in the Reconfiguration of Organisational Communities

alternative value chain established by the renegades. For all incumbent populations, this basin is unfavourable to their current configuration.

### The recorded music community from 2003 to 2012

#### Changing environmental conditions

The fitness landscape increasingly favours digital music consumption resulting in the loss of incumbent populations' density. These developments are visualised in Figure 5. **Technological conditions** allow consumers to play digital music on a variety of devices. In 2003, the Apple iPod commoditises mp3 players (Tschmuck, 2012) and by 2005, 11% of US households owns an mp3 player (Baum, 2005) which rises to 45% by the end of 2012 (Consumer Electronics Association, 2013). Simultaneously, phones integrate mp3 players (OECD, 2005; IPTS, 2008) and mobile internet access allows for direct streaming (PWC & Wilkofsky Gruen Associates, 2010). Worldwide, 1 billion smartphones are in use by 2012 (Bicheno, 2012). The number of households with access to broadband rises to 26 in 100 in 2012 in developed countries (OECD, 2013). **Economic conditions** continue the trend, as consumer demand for (digital) singles increases at the cost of (physical) albums, driven by technological change. **Institutional conditions** continue similarly. Whilst copyright regulations remain inert, public opinion increasingly favours digital consumption (Interview 1 & 5).

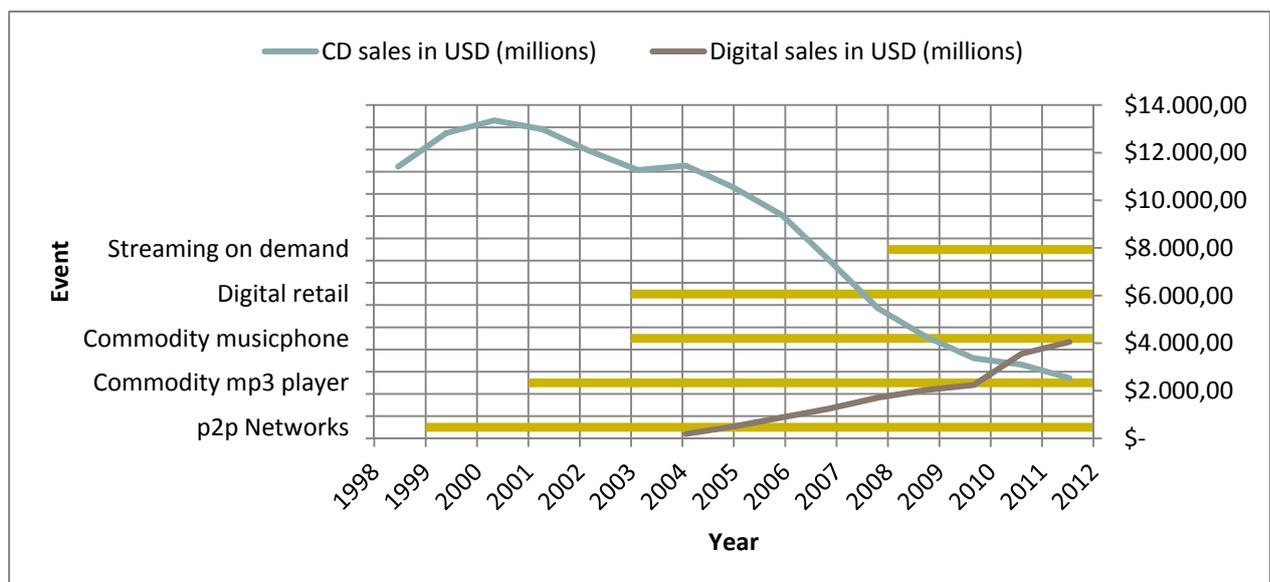


Figure 5: Technological conditions paired with US CD sales and US Digital sales<sup>3</sup>

#### Reconfiguration of community structure

In 2003 a legal alternative to file-sharing emerges with the entry of **digital retailers** (Gordijn, et al., 2003; Bockstedt, et al., 2006). Apple launches the iTunes Store and sells 2 million downloads in two weeks (Nguyen-Khac, 2003). Adoption of the mp3 player fuels digital sales growth (Klym, 2005). The density of digital retailers increases from 30 in 2003 (IFPI, 2004) to more than 500 globally in 2012 (IFPI, 2013). Increased broadband access allows music consumption by streaming (Throsby, 2002; Gordijn, et al., 2003) making music a service instead of a product (Interview 1). By 2008, streaming providers are becoming more important worldwide (IFPI, 2013). Different digital services occupy the

<sup>3</sup>All revenue data originates from the Recording Industry Association of America (RIAA, 2013) and from Tschmuck (2012).

## The Role of Resilience in the Reconfiguration of Organisational Communities

same step in the value chain and are considered a single population. This population is symbiotically dependent on majors and indies for content and in competition with physical retailers and renegades. Digital retailers target non-consumption as economic conditions increase demand for digital music (Interview 1). The renegade population continues the file-sharing model and rises in density (IFPI, 2006a; Tschmuck, 2012) (Interview 2 & 4). File-sharing traffic accounts for 17,9% of all internet traffic in 2010 (Envisional, 2011). However, recent reports estimate a downfall in piracy (Kantar Media, 2013) as the majors use institutional conditions to some success to shut the renegades down (Interview 4). These changes in community structure are visualised in Figure 3 C.

Total music sales shrink further and only in 2012 there are signs of stabilisation with combined physical and digital sales (IFPI, 2013). Both majors and indies proportionally decline in density (OECD, 2005). The number of entries of indies outpaces the number of exits, increasing the amount of organisations (Handke, 2010; Mol, et al., 2012) (Interview 5). The density of the majors is reduced and their collective market dominance is increasingly centralised<sup>4</sup> (Interview 4 & 5). All incumbent populations that are symbiotically dependent on the majors decline in density. Physical sales continue to decline worldwide from 2003 to 2012 (KEA, 2006; Leurdijk & Nieuwenhuis, 2012). This leads to consolidation and declining density among physical retailers (IPTS, 2008) (Interview 2). The record label populations adapt, accepting symbiotic dependency on digital retailers as part of their revenue streams (Interview 5). The majors implement Digital Rights Management (DRM) system onto music files that they distribute, limiting playback and duplication options. However, with these restrictions consumers are slower to switch to legal downloads (OECD, 2005; Hoffman, 2009). In 2009 the largest digital retailers become DRM free, as public opinion turns against its limitations (Hoffman, 2009) (Interview 3 & 4). DRM is retained as a method to track the sales and streams of audio to pay the rights holders (Interview 1 & 5).

### Derived community resilience dynamics

As the density of the population of majors decreases, the positive effect of their symbiotic relationships with other populations on the community's resistance begins to decrease. Economic and technological panarchy effects fragment music demand and as a result digital retailers emerge, increasing community diversity. In turn, the population of digital retailers begins to establish symbiotic interdependencies with the majors and indies. As such, the decreasing density of the centrally positioned majors leads to a self-reinforcing breakdown of community resistance. The landscape has formed a new basin of attraction that accommodates increasing digital consumption and the community gradually reconfigures towards its equilibrium. The community remains very precarious as established populations continue to decline, but stabilises around 2011 as digital sales surpass physical sales. Internal diversification within digital retailers towards streaming does not result in different community structure, indicating higher latitude. With physical retailers still declining, it is likely that the community has not yet reached a stable equilibrium.

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<sup>4</sup>Seagram acquires Polygram to form the Universal Music Group in 1998 (Garofalo, 1999). The EC twice prevents an EMI merger with Warner (Wallis & Kozul-Wright, 2001; OECD, 2005). Sony acquires BMG in 2004 without objections. Universal acquires EMI in 2012, leaving three of the original six majors standing.

### The motion picture community in 1998

Three periods of time are distinguished by distinctly different configurations of the movie community. After 1998, the movie community reconfigures twice and each reconfiguration will be explained from preceding community structure and interaction with environmental conditions. The initial configuration and subsequent reconfigurations are visualised in Figure 6.

### Environmental conditions and related fitness landscape in 1998

The following environmental conditions shape the landscape and position the motion picture community in a basin of attraction in 1998. The community relies on analogue formats, namely film reels and videocassettes (VHS) (Zhu, 2001). **Technological conditions** support this reliance as 90% of the US households owns a videocassette recorder (VCR) (Karaca-Mandic, 2003). The digital videodisk (DVD) is introduced in 1997 and is the result of a coalition of major consumer electronics producers and Hollywood studios (Dranove & Gandal, 2003). **Economic conditions** reflect the reliance on analogue formats. In the US, theatre admissions and revenues are consistently going up and demand for VHS and VCRs is still rising whilst DVD sales are negligible (Coplan, 2006). **Institutional conditions** limit possible configurations, as the outcome of a 1948 court case<sup>5</sup> excludes firms from doing both distribution and exhibition of a movie due to anti-trust law (McDonald, 2007).

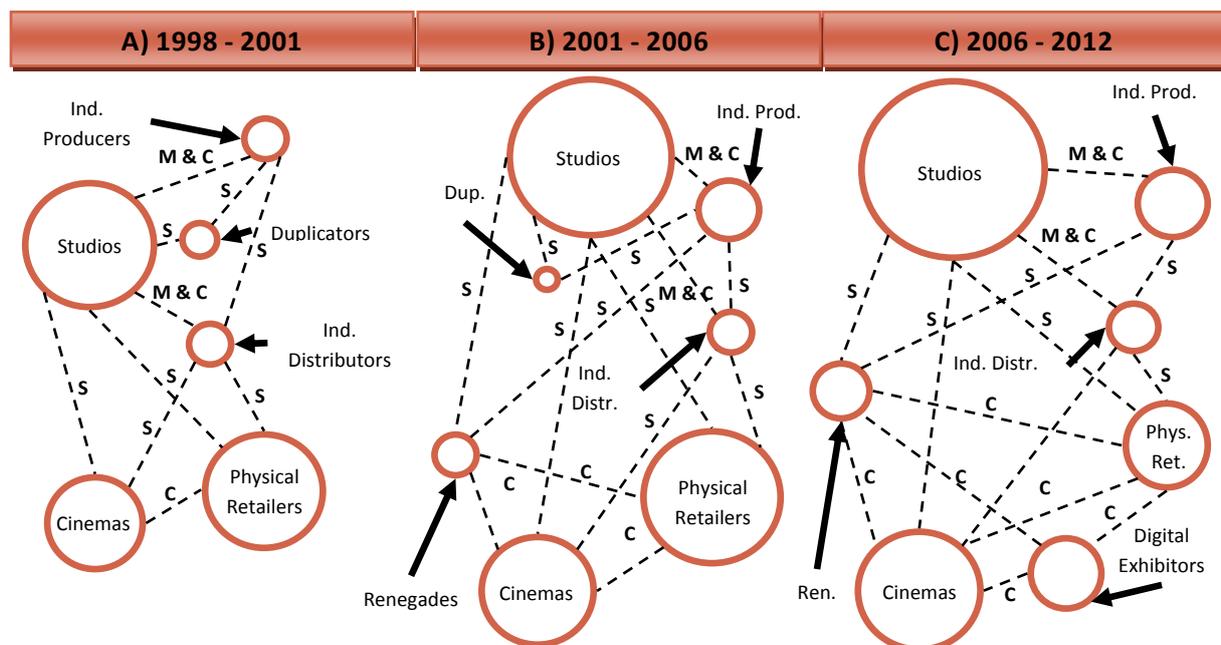


Figure 6: Reconfiguration of the motion picture community. Bubble size is a reflection of population density. *S* denotes symbiotic, *M* denotes mutualistic and *C* denotes competitive interdependencies.

### Community structure in 1998

The value chain of the motion picture community in 1998 comprises production, duplication, distribution and exhibition (Zhu, 2001; Eliashberg, et al., 2006). After production, this value chain is split into a cinema and home video branch (Zhu, 2001). Two types of producer forms can be distinguished. The **studios** – six Hollywood production companies – are vertically integrated with duplication and distribution and control the majority of the world market (Hancock, 1998; Epstein, 2005). The studio population operates with a high risk of investment and high production budgets

<sup>5</sup> United States v. Paramount Pictures, Inc., 334 US 131 (1948)

## The Role of Resilience in the Reconfiguration of Organisational Communities

(Hancock, 1998; Zhu, 2001). **Independent producers** focus only on production and often aim at niche markets (Scott, 2002). **Duplicators** copy the film for different release windows, contracted by a producer (Zhu, 2001). For distribution, independent producers can either engage in a symbiotic relationship with **independent distributors** (Scott, 2002; Finney, 2010) or with a studio, essentially making the producer a subsidiary of the studio (Hancock, 1998; Bloore, 2009). Meanwhile, the studios are mutualistically dependent on producers and distributors to co-invest in film projects (Hancock, 1998; Palia, et al., 2008). Distribution is done in sequential release windows, so studios control when exhibitors can sell content (Zhu, 2001). As a consequence of multiple formats and release windows, multiple populations can be distinguished in exhibition. The **cinemas** are given the first release window. This population increasingly consists of large multiplexes (multi-screened complexes) with 8 to 15 screens (Zhu, 2001; Davis, 2002). The US market is largely “overscreened”, with too many and too large theatres facing not enough demand, whilst other markets are “underscreened” (Elberse & Eliashberg, 2003). Revenues made here are split between the distributor and the theatre and are referred to as the “box office” (Gil, 2009), which makes distributors and cinemas symbiotically interdependent. After four or five months the second release window entails **physical retailers**, video retailers and rental stores (Waterman, et al., 2007). Distributors and physical retailers share the profit made from renting a video (Seim, 2001; Coplan, 2006), creating a symbiotic interdependency. The exhibitor populations compete with each other for market share within the same geographic area (Cleeren, et al., 2005). The majority of revenues for distributors stems not from the box office (22%) but from videos (55%) (Seim, 2001; Mortimer, 2002). This community structure is maintained up to 2001 (Figure 6 A).

### The motion picture community from 2001 to 2006

#### Changing environmental conditions

Environmental conditions move the landscape towards favouring a digital movie community, but simultaneously reinforce the existing basin. **Technological conditions** set up the requirements for digital distribution with the rise in broadband internet and film file compression (Zhu, 2001). By 2003, 7% of households in developed countries have access to broadband (OECD, 2013). File size and download speed are a major constraint for downloading films, so broadband is estimated essential for transmission (Guillou, 2004; KEA, 2006). The uptake of file-sharing for movies is slower than music (Bounie, et al., 2006). The p2p networks used for film files are primarily decentralized torrent networks available in 2001 (Ferri, 2012). **Economic conditions** meanwhile support the current community structure. DVD sales skyrocket to dominance over VHS after 1999, where DVD player sales see a growth of 400% on the US market. In 2003, DVD players penetrate 70% of the American Households (Coplan, 2006). However, after stalling growth in 2005 the peak of the sales volume occurs in 2006 (Currah, 2006). VHS sales peak in 2000 and virtually disappear in 2005 (Coplan, 2006). **Institutional conditions** remain similar, but public interest is fragmented by substitute entertainment products such as video games and social media, stalling cinema and DVD growth (Bakhshi, 2006).

#### Reconfiguration of community structure

The use of file-sharing directly circumvents existing distribution and exhibition channels (Currah, 2006) and creates a parallel value chain. Together with the adoption of digital production methods and digital distribution to cinemas, this eliminates the need for duplication (Zhu, 2001). The new value chain is visualised in Figure 7. The population of **renegades** starts facilitating film sharing. In

# The Role of Resilience in the Reconfiguration of Organisational Communities

2001 the impacts become visible as ripping<sup>6</sup> options become widespread (Rassool, 2003). Data on renegade density is scarce, but in 2005 these services attract 350.000 downloads a day (Yar, 2005), or 2 billion downloads a year<sup>7</sup> (Currah, 2006), suggesting high density. The renegades are in competition with physical exhibitors and symbiotically related to the producers from whom they steal content. Hollywood representatives state substitution effects damage all exhibitors (Waterman, et al., 2007; McDonald, 2007), whilst others point out it only damages physical retail (Bounie, et al., 2006). A third stream states the damage is marginal (Yar, 2005; Martikainen, 2013) and that change in consumer demand is far more explanatory (Smith & Telang, 2010). The studios litigate against the renegades, forcing several to close (Currah, 2006) but not significantly affecting density (Waterman, et al., 2007). The studios have an interest starting their own channels to bypass exhibitors (Epstein, 2005). In 1999 studios and independent producers both start a digital distribution initiative (Guillou, 2004). Both attempts remain unnoticed as they garner 0,2% of US revenue by 2005 (Currah, 2006). Supply through new digital legal services is inferior to physical retail and illegal services in terms of catalogue, digital rights compatibility issues and download speeds (Guillou, 2004; Currah, 2006). Another attempt of the studios is the start of Video On Demand (VOD), which allows cable TV users to watch movies on demand (Bakhshi, 2006). VOD in 2005 constitutes only 2% of studio revenues (Waterman, et al., 2007) but is used by 15% of American households (Coplan, 2006).

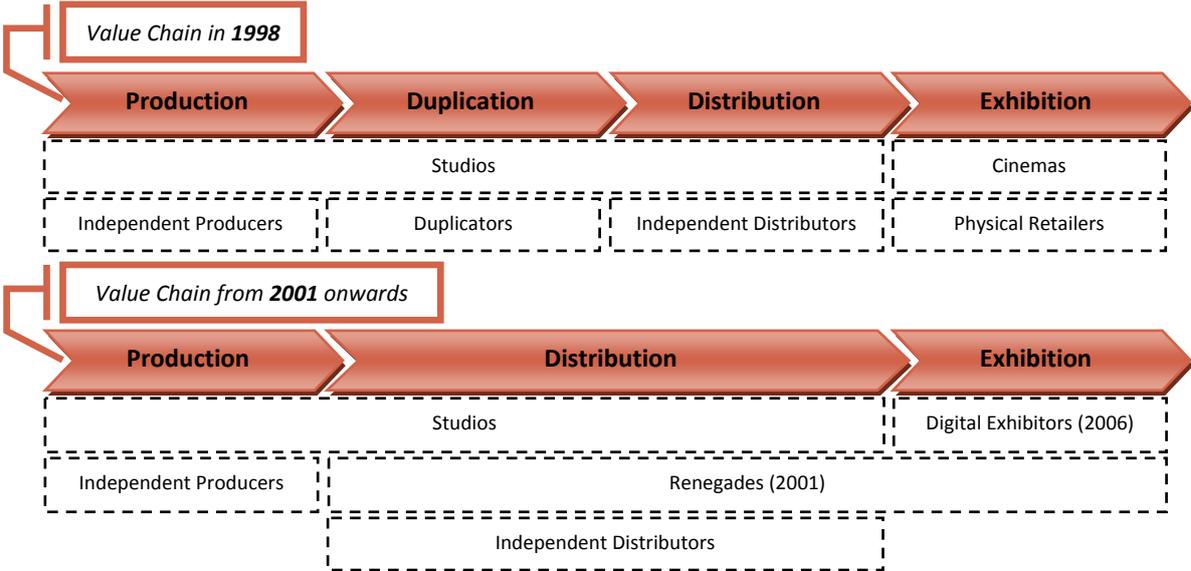


Figure 7: Developments in the value chain

The studios consolidate by acquiring successful independent producers<sup>8</sup>. The studio revenue breakdown is kept concealed but cinemas account for only 18% of studio revenue in 2003 (Epstein, 2005). By 2006, half of worldwide film production is digital (UNESCO Institute for Statistics, 2009). The rise in digital production technologies does not change the studios' interdependencies with populations down the value chain (Eliashberg, et al., 2006). The rising market share and output of films of independents shows worldwide growth (Scott, 2002; Eliashberg, et al., 2006; UNESCO Institute for Statistics, 2009). This is indicative of rising producer density. In the US, a shakeout of

<sup>6</sup> The process of taking a film from its physical carrier and converting it to a digital file.  
<sup>7</sup> Hollywood studio productions only, excluding independent productions and pornographic content.  
<sup>8</sup> PolyGram Filmed Entertainment is sold to Universal in 1998, Walt Disney acquires Pixar Animation in 2006 and Dreamworks SKG is sold to Paramount's parent company Viacom in 2006 (Currah, 2006; Finney, 2010).

## The Role of Resilience in the Reconfiguration of Organisational Communities

smaller theatres occurs around 2000 (Davis, 2002) as they are outcompeted by larger theatres with digital projectors (UNESCO Institute for Statistics, 2009). In 2005, there are 848 exhibitors with digital projectors, in 2006 already 2.996 (UNESCO Institute for Statistics, 2009). Together with rising revenues this indicates higher density for the cinema population. Through their parent companies, the studios own about 10% of the cinemas in the US due to relaxed institutional conditions (Holt, 2001). Meanwhile the rise in DVD revenues accounts for rising density in physical retailers, studios and independent producers and distributors. In 2001, a new “sell-through” model from distributors to retailers together with internet based DVD rental allows physical retailers to compete on price and scale, increasing overall sales (Guillou, 2004; Coplan, 2006). The changes in community configuration are visualised in Figure 6 B.

### Derived community resilience dynamics

The successful entrance of the renegades signifies the community moves to another basin of attraction, but its position remains close to the former equilibrium. Digital retail represents a suboptimal alternative set of configurations due to technological conditions. The failed attempt of the studios to set up digital retail is indicative of a high resistance towards this alternative. The renegades have no negative impact on the incumbents’ density growth, as economic conditions continue to favour cinema and DVD exhibition. Latitude of the basin of attraction is high, as adaptations in the physical retail population do not result in community reconfiguration. VOD initiatives succeed, but not at the cost of the existing community structure, as exhibitors do not decline in density. The plateau in DVD sales is the first signal that the community becomes more precarious as it moves to the border of another basin of attraction based on digital consumption.

## The motion picture community from 2006 to 2012

### Changing environmental conditions

The film community transitions into a new basin of attraction in which the possibility of digital release windows leads to community reconfiguration. **Technological conditions** drive these developments with broadband adoption. In 2012 a quarter of all developed country households has broadband (OECD, 2013). This enables film streaming which in turn requires digital encryption (Zhu, 2001; Rassool, 2003). Innovation in physical formats continues with two incompatible high definition (HD) formats in 2006, the Blu-Ray and HD-DVD (Christ & Slowak, 2009). The ensuing standard war comes to a conclusion in 2008 when studio Time Warner withdraws its support of HD-DVD (Hagiu & Yoffie, 2009). **Institutional conditions** have not changed significantly. **Economic conditions** increasingly favour digital release windows. The US DVD market halves in value in four years after 2006, reaching 4.47 billion USD in 2010 (SNL Kagan, 2010). Blu-Ray sales do not offset this decline (PwC & Wilkofsky Gruen Associates, 2010) as the standard war with HD-DVD results in uncertainty for consumers, barring growth (Daidj, et al., 2010). However, total spending on movies grows due to increasing box office results and digital retail (PwC & Wilkofsky Gruen Associates, 2012).

### Reconfiguration of community structure

New and existing populations start adapting to technological possibilities, leading to increased community diversity (Figure 6 C & Figure 7). Despite lawsuits directed against the renegades by the studios internet piracy continues (Lunardi, 2009). The density of the renegades grows. The population diversifies into streaming which becomes increasingly important (Lunardi, 2009; Ferri, 2012). New entrants prove the digital value chain also supports legal alternatives. Apple’s iTunes

# The Role of Resilience in the Reconfiguration of Organisational Communities

starts selling movies as download in 2006 (Sigismondi, 2012). Subscription services emerge, offering a catalogue of films to download or stream for a monthly fee (Guillou, 2004; Bakhshi, 2006; Currah, 2006). The successful pioneer is Netflix, garnering a large user base in the US in 2006 (Gandel, 2010; Seabrook, 2012). Broadband diffusion pushes the growth of the digital exhibition populations (IPTS, 2008). Digital exhibitors rely on symbiotic relationships with studios and independent distributors for an attractive catalogue, requiring a large initial investment (Sigismondi, 2012). They compete with both cinemas and physical retailers, cannibalising sales from the latter (Currah, 2006).

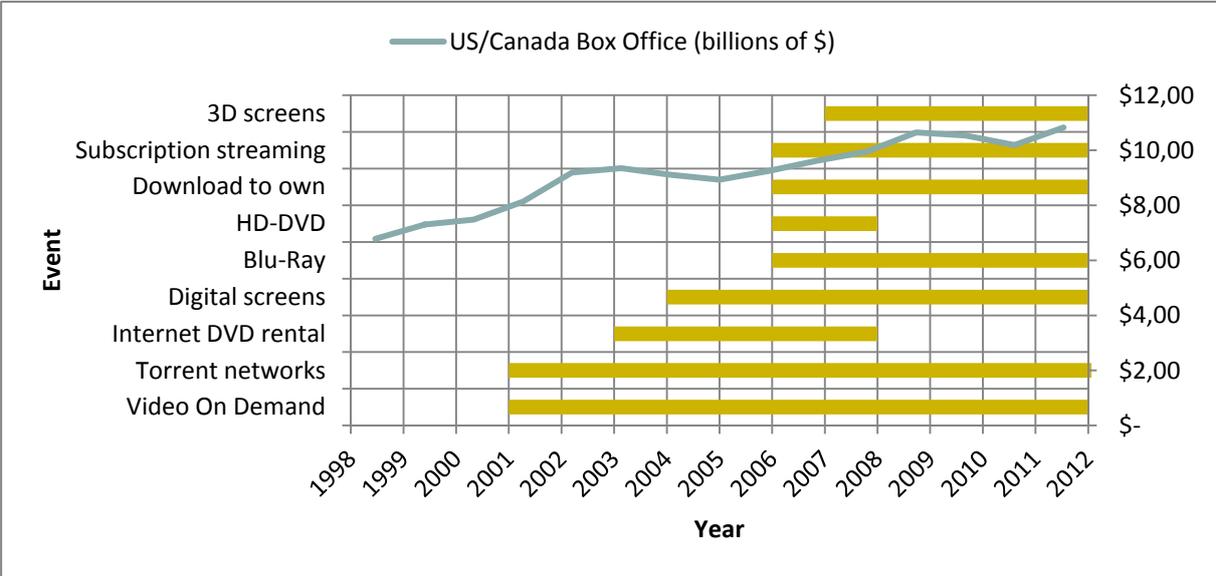


Figure 8: Technological conditions paired with US/Canada Box Office revenues<sup>9</sup>

Renegades and digital exhibitors force the studios and independent distributors to adapt. Studios face transaction costs in licensing to make a film available on services that go worldwide (Currah, 2006). The studios implement Digital Rights Management (DRM) systems on their films to localize consumer use and prevent copying (Sobel, 2003; Currah, 2006). This does not prevent the renegade’s content acquisition and slows down legal digital retail due to consumer dissatisfaction (IPTS, 2008). Digitalisation of production and distribution almost eliminates the population of duplicators (IPTS, 2008). Despite digital production and digital retail niches, smaller producers remain symbiotically dependent on studios and distributors (Lorenzen, 2007; Bloore, 2009). The studios bypass exhibitors with growing VOD, as by 2010 21% of Canadian consumers reported using VOD on their TV (Atkinson, 2011) and 48% of all US households has access to VOD by 2012 (Businesswire, 2013). Nevertheless, they remain symbiotically dependent on all the different forms of exhibitors. Box office sales increasingly determine later release window success (Eliashberg, et al., 2006), thus cinematic releases must be massively supported. Sales through physical retailers remain the bulk of studio revenues (Atkinson, 2011). From 2009, cinemas increasingly adopt 3D screens and IMAX screens to drive up box office prices, counting 45.545 digital 3D screens of a total of 130.000 screens worldwide in 2012 (MPAA, 2012). Studios support this shift, as margins on 3D films are higher (Sigismondi, 2012). Meanwhile, physical retailers decline in density after 2006 under competition of new digital channels (Amobi & Donald, 2007). Rental stores disappear almost entirely from the community due to a price war with digital exhibitors. The US firm Blockbuster goes from the largest rental company in the US in 2001 to bankrupt in 2010 (Gandel, 2010; Atkinson, 2011).

<sup>9</sup> All box office data from The Numbers (The Numbers, 2013)

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### **Derived community resilience dynamics**

The entrance of digital exhibitors signifies changes in the landscape forming a new basin of attraction. Economic conditions after 2006 make the established configuration less viable by putting pressure on physical retail revenues. Meanwhile, technological conditions push the possibilities for digital exhibitors. The studios and producers adapt to this as the prospect for physical sales decline whilst digital sales go up, decreasing the difference in fitness between these two configurations. The resistance of the established regime is lowering and precariousness increases when the physical retail population declines in density. The community moves to a configuration with higher population diversity. The latitude of the new basin is high, as in the variation of the new digital exhibitor population all business models that are selected reinforce the community structure. The streams of revenues and populations have diversified and changed in composition, but the studios remain firmly in a central position.

### Discussion

The recorded music and motion picture community provide two cases of industries that are faced with the shock of large scale digitalisation influencing their value chain. Whilst the shock is similar, community reconfiguration has been radically different for each case. Both organisational communities can be argued to have a comparable configuration at the starting point of the analysis in 1998. Both communities are characterised by a structure containing one central high density population that dictates community interdependencies. Several large firms – all part of larger media conglomerates – control large parts of the existing value chain, be it through vertical integration, the acquisition of subsidiaries or the maintenance of tight symbiotic relationships. These firms create value and revenue through sales of content products on a physical carrier in a growing market. What appears crucial in both cases is that the density of the dominant population of the community – the majors and studios respectively – is a very influential determinant of resilience. The adaptation and selection processes within this population have large consequences for the vulnerability to changing environmental conditions.

This study does not aim to isolate what community characteristic has which effect on which dimension of resilience. The characteristics of the populations are interwoven with their interdependencies and affect resilience in tandem. By determining a baseline configuration it is possible to compare it with later community structures, exploring what variables are affecting resilience (Beisner, 2012). The effects of population density and diversity vary across the two cases due to differing environmental conditions. In both cases, environmental conditions create feedbacks that are essential for the developments in density of populations. Higher density appears to signal higher resilience as growing density signifies reinforcement of current community structure, decreasing precariousness. Both communities move from a regime with low population diversity to a regime with higher population diversity, which in both cases is paired with lowering resistance. Equally, tight symbiotic interdependencies are indicative for high resistance in both cases, as it induces established populations of the community to adapt towards what they know as equilibrium. Resistance is lowered when these existing interdependencies become unviable, such as in the music community where population density starts declining rapidly due to demand changes. The motion picture industry has not experienced such a decline, but nevertheless resistance lowers as new entrants gain a footing based on changing economic conditions. Similarly, the effect of competitive interdependencies on resilience cannot be disentangled from the economic conditions in which the community forms these relationships.

Both recording and film are so-called rights industries, that rely wholly on the exploitation of rights on content (Shapiro & Varian, 1999). Instead, this study adopts a product focus, leading to an incomplete overview of the assets that different populations possess. The catalogues of film and music that content producing populations accumulate are licensed to third parties (Graham, et al., 2004; Eliashberg, et al., 2006), which provides a revenue stream that does not show in current analysis, affecting population density. This product focus also entails a delineation of content that is actively chosen by consumers. This excludes broadcast methods such as radio and TV, in which licensing is vital streams of revenue for both the majors in the music community (Tschmuck, 2012) and studios in the film community (Epstein, 2005). However, the product focus was retained for this study as analysis indicated the meaningful environmental conditions that interact with community

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structure were to a greater extent concerned with product change and product demand, and to a lesser extent with rights exchange.

Many of the dynamics that have been found in the two case studies of organisational communities can be and sometimes already have been explained with the use of other theories such as low end disruption, organisational legitimacy and forces of competition. Using resilience is an abstraction of a set of characteristics of the community and environment, aiming to explain the propensity of community change. However, it risks to be an unnecessary step away from the data, when community change can also be explained by the subset of characteristics that lie underneath. Such abstraction may obscure these alternative explanations (Portes, 2000). Despite this risk, this study manages to discern patterns in community configuration that signal a high or low propensity to change. Features of the music and film communities may be found in other industries and give insight on how resilient these industries might be against shocks.

### Conclusion

Throughout this thesis the characteristics of organisational communities have been subjected to historical analyses of two cases in an attempt to explore what structures and interdependencies influence the resilience of these communities. The question guiding this search was:

***How did community characteristics influence the resilience of organisational communities surrounding recorded music and motion pictures during their reconfigurations since 1998?***

The community characteristics of both the music and movie community influenced the latitude, resistance and precariousness of the community configuration in reaction to changing environmental conditions. Changes in community resilience that allowed the community configuration to move to another basin of attraction were evoked by panarchy responses in the community. Technological and economical conditions have driven the availability and increased fitness of alternative configurations, creating new basins of attraction. These technological and economical changes in turn drove selection and adaptation processes in the populations of the community. A basin of attraction with high latitude absorbed these changes, reinforcing the existing value chain. However, economic panarchy effects lowered the density of established populations and caused a shift in community configuration as new populations entered. This was met with high resistance from established populations in the old basin of attraction, which waned as symbiotic interdependencies weakened and economic conditions reshaped the basin of attraction to favour the new entrants. Community characteristics influence resilience through the response to panarchy effects. Depending on this response, a community's propensity to change varies. This is exemplified by the downturn in the music community by moving to a different basin versus the reinforcement of both central established populations and newcomers in the movie community when the landscape changed.

It may prove fruitful to compare empirical findings from organisational communities with studies in ecosystem resilience to guide the search for meaningful relationships. This study shows that organisational population density and diversity are very sensitive to feedback loops with the environment, just as in ecosystems (Holling, 1973; Scheffer, et al., 2001). Learning and self-organisation are affecting community resilience, just as with ecosystem resilience (Walker, et al., 2004) and closely related to the community interdependencies. This study provides a first indication of how community characteristics influence resilience, but further investigation is required to validate these claims. One of the first endeavours is to formulate quantitative indicators to guide data collection for a meta-comparison of more and different industries, in order to find certain ubiquitous characteristics influencing community resilience and patterns therein. The base for this may well be found within research in organisational ecology, which increasingly focuses on communities combining populations with networks (Singh & Lumsden, 1990). A second endeavour is to investigate how basins of attraction can be formalised into testable indicators. Ecological literature struggles with this very problem, and the insights from this research (Vandermeer & Yodzis, 1999; Brand & Jax, 2007) may assist in formulating an empirical definition of these boundaries of the basin of attraction.

In line with the conclusions of some authors in contemporary ecology<sup>10</sup>, the focus of devising policy for organisational communities may not necessarily lie in the reinforcement of stability of these communities. Rather, policy can consider the resilience of the community and match this to a

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<sup>10</sup> See for instance Sheffer, et al. (2001).

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predefined desirable state. If the current state is deemed the desirable optimum, this will redirect policy efforts from controlling disturbances towards sustaining the basin of attraction so that the community can withstand the shocks on its own. If another state is deemed a desirable optimum, a resilience analysis can provide an indication on which community characteristics can be influenced through institutional conditions to disturb the current basin.

### **Acknowledgements**

I imagine it is rare to find a supervisor who is willing to spend a several hours long session obsessing over a single theoretical concept together with a student, who is willing to sketch on piles of paper to get a structure or visualisation right, and who is willing to go to great lengths to make sense of an incoherent and messy piece. I am therefore very grateful to Allard van Mossel, who was my supervisor and was willing to do all of the above.

I would like to thank the interviewees at various music companies and organisations for making time for my questions and giving such useful and enhancing answers.

I am thankful for the commentaries and guidance of Frank van Rijnsoever. For theoretical insights and final editing respectively, I would like to thank Daniël Doorman and Gerben de Vries.

Finally, thanks to all friends and family that supported me despite my social isolation. A special thanks to my girlfriend for supporting me in this process that got way out of hand.

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### II. Interview topic list

These lists show the sample of questions with which the interview started in no particular order. On the basis of the responses, further questions were asked to extract more detailed data.

#### Topic list for interview with Spotify UK

- **Piracy:** To what extent has the use of file-sharing contributed to the emergence of digital business models in the music industry? What is the impact of digital music piracy on the streaming business model?
- **Reception:** What was the dominant reaction towards the emergence of digital streaming on demand (by Spotify) channels by majors? By independent labels? And by digital a la carte channels?
- **Relationships:** How were the relationships with the labels (both majors and independents) established with Spotify and how are they retained?
- **DRM:** What is the rationale behind using DRM on digital music streaming? What has been the impact of the use of DRM on legal music streaming?
- **Competition:** What is the consequence of an increased diversity of digital retail and streaming channels for the industry and for your company specifically?

#### Topic list for interview with Plato

- **Market:** What have been the most important changes in buying behaviour of your customers in the past decade? How does your company cope with the falling physical product sales?
- **Scale:** In what way have increase in scale and centralisation had an impact on the changes in your company? And in your competitors?
- **Relationships:** How much are physical retailers dependent on the actions of major labels? And distributors?
- **Competition:** What was the reaction of physical retailers on the rise of digital a la carte retail channels? And on streaming on demand channels?

#### Topic list for interview with Sony/Universal/NVPI

- **DRM:** What is the rationale behind using DRM on digital music streaming? What has been the impact of the use of DRM on the sales of digital music? How did the majors come to lift DRM from digital music?
- **Reception:** What was the dominant reaction towards the emergence of digital a la carte channels by the majors? And towards streaming on demand channels?
- **Piracy:** To what extent has the use of file-sharing contributed to the emergence of digital business models in the music industry?
- **Relationships:** How has the relation with independent labels changed since the rise of digital sales? How has it changed with manufacturers and distributors?
- **Market:** What role did economic and financial crises play in the change in demand for Music?