

**Can a high-tech breakthrough approach deliver novel
supply and demand solutions?**

A study of digital cinema rollout

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Abstract

Digitalization is the process of making digital everything that can be digitised to change a business model and provide new revenue and value-producing opportunities. However, difficulties exist in evaluating the value created by digital technology investments in organisations, industry structures, economies and society, at large.

My dissertation illustrates how the distinct characteristics of digital technologies are implicit in an evolution from stable to fragile product innovation; while highlighting the need for a dynamic approach to entrepreneurial innovation within national innovation systems. The foundations for my work are bound up in the digitalization of value networks, and the context for this research is digital cinema – a process that began in 2000.

Digital cinema offered a new value proposition to distributors and significant cost reductions for the US studios. With a reliance on a highly developed value chain to protect intellectual property, these studios sought to learn from the disruption digitalization caused to the music industry, by cultivating digital technology as an, incremental innovation, in replacing celluloid with bytes to project content to cinema audiences.

Global digital cinema penetration in 2014 stood at 90 per cent of the total screen footprint. The dissertation assesses features of this digital rollout that have been under-explored; including the role digital technology has assumed in process and product innovation; and, the behavioural responses of both incumbents and new entrants during the diffusion and adoption phase.

My dissertation is supported by eight published papers, which highlight the need for domestic policymakers to focus their attention on emerging entrepreneurial innovations; the utilisation of current knowledge and strategies for novel solutions in order to strengthen their respective national innovation systems. Taken together they help explain the creation, diffusion and adoption of digital cinema, explore the new content creation opportunities they support, and explain how three nations in particular

have sought to innovate and reorientate themselves in relation to these novel phenomena.

The wider implications of the findings of the project build on the innovation literature in examining the diffusion, adoption and knowledge acquisition during the rollout of digital cinema technology. These findings suggest a radically different reading of both disruptive innovations and national innovation systems than has been offered in previous accounts, viewing the digital cinema rollout as a case study of an increasingly mobile sector, in which technological factors retreat in importance behind entrepreneurial innovation as a key driving force in reaching audiences.

Finally, in exploring the phenomenon of the digitalization of value networks I have made a significant contribution to knowledge in the design of an innovative mixed method; specifically in the area of field research - a qualitative data collection method designed for considering, observing, and interacting with individuals in their natural environments. Over time, I have established that digital cinema was capable of delivering novel supply and demand solutions - starting with a few unrelated scraps of data, through the establishment of personal networks with communities of practice (in the UK, US & Norway) to building rich, and complex quantitative data sets capable of measuring the entire diffusion and adoption phase of the digital cinema rollout, right across Europe.

Acknowledgements

Woody Allen once said: “Life is full of misery, loneliness, and suffering - and it's all over much too soon.”

I doubt if he was making a direct comparison to the process of writing a dissertation, but then you never know with Woody Allen.

What I do know is that we each arrive at complex problems from different starting points and with that in mind, I thank my supervisors, Professor Keith Randle and Dr. Frank Currie. They have been gracious with their time and support throughout this meandering voyage of discovery; they also helped reduce the misery along the way.

My children, Alexander and Nathalie, joined a little later and helped to take away the loneliness, especially when I found myself jumping onto the Island of Conclusions, wandering up the Mountain of Ignorance and falling in the Doldrums.

Last, but certainly not least, my partner Harriet, who kindly put up with all sorts of suffering and foolishly thought that it would be over soon. Well, it is now.

Nigel Culkin

St Albans, December 2016

Preface

This dissertation is based on outputs described across the following eight papers. When they are referred to in the text, for convenience I use the corresponding alphanumeric system from P1 to P8, in addition to the author surnames and dates.

P1: Culkin, N. (2008) 'Digital Cinema: No Country for Old Entrepreneurs?' *Journal of Retail Marketing Management Research* 1(2) pp 44-58.

P2: Culkin, N. & Randle, K. R. (2003) 'Digital Cinema: Opportunities and Challenges'. *Convergence: The Journal of Research into New Media Technologies* 9(4) Winter pp 79-98.

P3: Culkin, N. Morawetz, N. & Randle, K. R. (2006) 'Digital Cinema as Disruptive Technology'. In Van Der Graaf, S. and Washida, Y. (eds.) (2006) *Information Communication Technologies and Emerging Business Strategies*. Hershey: Idea Group.

P4: Randle, K. R. & Culkin, N. (2009) Getting in and getting on in Hollywood: Freelance careers in an uncertain industry. In Smith, C. and McKinlay, A. (eds.) *Creative Labour and the Labour Process*. London: Palgrave.

P5: Culkin, N. & Morawetz, N. (2004; 2005; 2007) *Facing the digital future: Digital Technology and the Film Industry*, [A series of three industry reports commissioned by the East of England Development Agency. Histon: EEDA.]

P6: Culkin, N. & Smith, D. V. L. S. (2000) 'An Emotional Business: A Guide to Understanding the Motivations of Small Business Decision Makers'. *Qualitative Market Research: An International Journal* 3(4) pp 145-157.

P7: Culkin, N. (2016a) 'Anchor Institutions and Regional Innovation Systems for supporting micro and small businesses'. *e-O&P, The Journal of the Association of Management Education and Development (AMED)*. Summer pp 22-32.

P8: Culkin, N. (2016b) 'Entrepreneurial universities in the region: the force awakens?' *International Journal of Entrepreneurial Behavior & Research* 22(1) pp 4-16.

Prologue

Two events took place in 1997, which on reflection acted as a catalyst for the production of this dissertation. First, the Rt. Hon. Chris Smith was appointed to the post of Minister of State for the Department for Culture, Media and Sport (DCMS). Second, I completed the first draft of a research degree imaginatively entitled ‘The State of Government Intervention in the SME Sector 1979-1997: A Market Perspective’.

The election of Tony Blair’s Labour government was viewed by some as young, equable and very appealing; the term ‘Cool Britannia’ was, for a time, seen as the main driving force behind a feeling of euphoria and optimism in Britain. In an interview for the *Independent* newspaper, Smith acknowledged that Cool Britannia was the Spice Girls, *The Full Monty* and London’s Soho on a Saturday night; but it could also be a form of post-industrial capitalism that combined hard-nosed profits with a fuller recognition of the human creativity on which they hinged. He was of the opinion that, “The creative industries are where the growth is, where the jobs are... and... new accommodation between those industries and the markets could boost the economy” (Smith cited in *The Independent*, 1998). Such ambition was a far cry from the Department’s origins as the Department of National Heritage, or as it was known by its epithet, the ‘Ministry of Fun (and free tickets)’ during the time of its first Minister, the Rt. Hon. David Mellor.

Such a novel idea that the UK creative industries might evolve from a fragmented and somewhat peripheral *ensemble* to a major force for economic growth prompted my colleague (Professor Keith Randle) and I to create the Film Industry Research Group (FiRG) to explore the issue in greater depth.

We agreed our initial focus would be - work organisation in the US film industry - as a mechanism with which to inform policy and practice in the UK. During our first project, we studied the experiences of freelance workers in the film industry as they sought to gain access to a heavily project-based market and develop their skills. This was operationalised via a four-year longitudinal research programme. During the second wave of fieldwork in 2001, we noted that interviewees began to reference the increasing

use on set of high definition cameras; the frequencies of such anecdotes grew and made us realise that something was changing and that it was beginning to have an impact on the creative workforce. Two interviewees even mentioned they had just bought their first book on the subject, *Digital Moviemaking*, by Scott Billups (2000). We were fortunate enough to meet Billups at his home on Mulholland Drive as part of our fieldwork. Among some fascinating insights during our time with him was his suggestion that because of digitalization theaters would no longer be part of the film business; instead, they would be a mere bargaining chip in the real estate developer business.

While Professor Randle continued to lead our research on the work organisation project, the entrepreneurial innovation opportunities afforded by what would become known as 'digital cinema' aroused my interest; I decided to establish a separate strand of work to explore the phenomenon further. Professor Randle has gone on to develop a significant body of work around working practices in the creative industries to which I continue to contribute, and we have benefited greatly over the past ten years from the diversity and overlap between our interests in this field (see Randle & Culkin, 2009 [P4]).

The potential discontinuity suggested by digitalization soon emerged and this new project – situated at the heart of an evolving disruption – saw my outputs contribute to the furtherance of knowledge around the business, technological and cultural impact of digital cinema (Culkin & Randle, 2003 [P2]). The formulation of these outputs was informed by the conclusions drawn in my research degree and a subsequent article on entrepreneurial innovation, which has been cited continuously since its publication (Culkin & Smith, 2000 [P6]). Soon after, the East of England Development Agency (EEDA) commissioned me to examine the role UK universities might play in the creative industries – a loose collection of 13 sectors consisting of entrepreneurs, micro-firms and a small number of international conglomerates. Based on the results from entrepreneurs and industry opinion leaders in both the public and private sector, the findings generated the first in a series of *thought leadership* reports (2004); disseminated widely and well received (Culkin & Morawetz, 2004, 2005 & 2007 [P5]). During this time the FiRG website became one of the main depositories for the business of film and cinema; a subject that I have returned to most recently, examining the role of anchor institutions

and their contribution to regional and national innovation systems (Culkin, 2016a [P7], 2016b [P8]).

As the digital rollout moved into its second phase, Kodak made its entrance at the Los Angeles Consumer Electronics Show in 2004. But, at about the same time, Boeing closed its d-cinema business, which was once projected to bring US\$1 billion a year in revenue, and Technicolor scaled down its ambitions, before its sale to the French Company, Thomson. The incumbents, for long entrusted with physically transporting a film-maker's story to cinemas around the world had finally woken to the threat posed by digitally stored data in a computerised file; an entirely original way of doing the same job and not one all new entrants had yet worked out where the market was heading. Such a scenario provided me with an opportunity for my next research outputs. This article focused on current dilemmas in the evolution of digital cinema, examined potential new business models, considered the strategies of incumbents and entrepreneurial entrants at the forefront of the technology implementation phase, and, for the first time, explored how different territories might adapt to accommodate this transition. I also speculated, as markets converged (and notwithstanding the potential revenue streams from high-end digital cinema market installations), as to whether the real market to be contested was the evolving home-cinema market. For technology companies, the market for digital cinema was merely a branding exercise for reaping the rewards in the consumer electronics market (Culkin *et al.*, 2006 [P3]).

The twin problems brought about by a lack of clarity around global standards, and a full-blown global economic crisis led to a temporary slowdown in the digital cinema rollout. However, some countries continued to move ahead through a mixture of private and public entrepreneurial innovations, which suggested a change in the basis of competition to create new markets was possible. In a paper entitled 'Digital Cinema: No Country for Old Entrepreneurs?' (Culkin, 2008 [P1]) I explored the latest developments in the exhibition sector, to explain why the adoption of an innovation (digital cinema) - capable of revolutionising the film industry - had stumbled in its attempts to cross Geoffrey Moore's "chasm" (Moore, 1991). Despite the effort of the Digital Cinema Initiative (DCI), one standard remained 'aspirational' rather than 'anticipated' when it

came to the adoption phase and different countries were recognising the opportunities afforded by this technology (Culkin, 2008 [P1]).

I found myself following Schumpeter that, every social environment has its own way of filling the entrepreneurial function as opposed to a path-*independent* process with a set of predictable outcomes. The change would happen, but it might not be just what the studios were hoping for or expecting. Consequently, the purpose of this dissertation is to investigate whether digital cinema rollout did contribute towards Chris Smith's assessment that the creative industries are where the growth is, where the jobs are and with public intervention, these industries, and the markets they serve could boost the economy.

The body of this dissertation explores the phenomenon of the digitalization of value networks in the context of digital cinema. It does so by focusing on the contribution of the distribution and exhibition of creative content to national innovation systems in the United Kingdom, Norway and the United States – three countries that exhibit marked differences in their approach to entrepreneurial innovation.

Chapter 1: Introduction

1.0 Overview

A wave of digital change pervades the conditions in which our organisations, industry structures, and economies operate. Digitalisation has lapped at the edges of government establishments, with new disruptive changes from social media, ‘the Internet of things’, open-book governance and many other elements (Margetts & Dunleavy, 2013). In under 20 years incumbents in the content-based industries, with names as synonymous as the industries themselves, have watched their revenue-generating business models – the product of highly developed supply chains – be disrupted by lower cost digital solutions, in some cases to the point of extinction.

In the US media industry, in 2015 the newspaper sector observed its worst year since the 2008 global recession. Average weekday newspaper circulation, print and digital combined, fell by 7 per cent and while digital circulation increased slightly, it only accounted for 22 per cent of total circulation. According to Mitchell & Holcomb (2016), the newspaper workforce has contracted by almost 20,000 positions, or 39 per cent of staff, in the last 20 years.

The impact on the photographic imaging industry is equally well documented. Eastman Kodak developed the first megapixel sensor in 1986, while Polaroid’s investment in digital imaging technology meant it had a prototype ready in 1992. From a strictly evolutionary perspective, one might assume that Polaroid would have faced many problems in developing new, disparate products for new and emerging markets when in fact, it had little difficulty overcoming the path dependencies normally associated with knowledge evolution. Indeed, with its position as a first mover in new technologies, Polaroid was able to advance solutions across a broad range of markets related to digital imaging. Despite this, Polaroid remained wedded to the primacy of technology, an approach founded on major research projects generating commercial success. There was little doubt that Polaroid's early exploration of the electronic domain was reinforced by this worldview. However, despite such investments, Polaroid had not advanced in developing the capabilities required to find a way to leverage upon its business model.

Consequently, the twin demands of the digital and analogue businesses paralysed Polaroid and by the mid-1990s it had sold off all digital capabilities and instead invested more in service marketing. While the strategy appeared positive in the short term the company was forced into bankruptcy within a few years (Tripsas & Gavetti, 2000).

The recent demise of Kodak – a brand synonymous with photography, filmmaking, and cinema – was also by and large associated with the transition to consumer and commercial digital photography. On one level, Kodak might be considered the latest victim of the conversion to all things digital, which often provides market solutions faster or more cheaply than the incumbent's current offerings. However, on closer inspection, its failure is more to do with the nature of creative destruction, which is different. George Eastman established the Eastman Kodak Company in 1888, five years after the birth of the Austrian economist Joseph A. Schumpeter. In 1954, Schumpeter, with one eye on the successes of Eastman and other US entrepreneurs, wrote that creative destruction was the driving force of capitalism and the entrepreneur was the pivot on which everything turns. By contrast with many of his peers, Schumpeter argued that, "those who failed to realize that the phrase 'combining factors,' when applied to a going concern, denoted little more than routine management; and the task of combining factors becomes a distinctive one only when applied not to the current administration of a going concern but to the organization of a new one" (1954/1986:530).

When Kodak announced in February 2015 that it had signed an agreement to continue supplying film stock to all six major Hollywood studios,¹ it appeared the company was making a stance against the gales of creative destruction. However, as the *Hollywood Reporter* (2015) countered, if Kodak is going to make film, we also need laboratories to process the film. The New York Film Lab (a partnership between Deluxe and Technicolor that was created to respond to film's shrinking footprint) closed later that same year (Giardina, 2015). So, while celluloid hasn't disappeared, there is little doubt that it will remain at best, on the periphery of filmmaking in the future.

¹ Walt Disney Company, Paramount Pictures, NBC Universal, 20th Century Fox, Warner Bros. and Sony Pictures.

In parallel with Polaroid, Kodak was well aware of the threat of digital imaging. It too had invested in large-scale R&D projects, but management was unable to break its reliance on silver halide, arguing that professional photographers could not do without it and neither could Hollywood. Kodak was cognisant of developments in Japan, where photographic contemporaries (e.g. Fuji and Olympus) with their direct links to the consumer market had already started along a digital road. It did attempt to radically reorganise itself, developing new capabilities in-house through acquisitions and investments. However, despite positioning itself as having a digital presence in consumer, commercial and healthcare markets, Kodak did not attend the annual Las Vegas Consumer Electronics Show until 2004 (Financial Times, 2011). It had relied on a razor-blade strategy – selling cameras at a low cost, and film to fuel growth and profits. Kodak's *modus operandi* was heavily dependent on the highly profitable margins generated from celluloid and paid progressively less attention to equipment until it was too late to ask the right questions of its relationship with evolving markets (Gavetti, *et al.*, 2005).

Taking contextual stories of incumbent inertia from the wider media entertainment domain into account now is a good time to explore the role and impact of digital technology as an instrument to stimulate entrepreneurial behaviour and concomitant innovation dynamics in cinema – as the last link to turn digital in the global film supply chain. My interest in entrepreneurial innovation grew out of a research study in Hollywood on project work in the film and audiovisual (AV) industry (Culkin & Randle, 2009 [P4]). The project became the springboard for a second venture on the impact of technology on distribution and exhibition (Culkin & Morawetz, 2004; 2005; 2007 [P5]). This second project coincided with the US studios declaration that a digital cinema rollout and adoption would lead to: an increase in the films on offer (e.g. due to product diversity); cinema owners being able to programme more flexibly and creatively, in line with cinema-goer demand; encouragement of entrepreneurs to enter this space; and finally, to the protection of the cinema-going experience because digital transportation of creative content would lead to the eradication of film piracy (MPAA, 2003). I was motivated to understand how the US studios would a) apply the dynamics of learning from Polaroid, Kodak, Deluxe, Technicolor *et al.*, given that 35mm film had been the *de*

facto platform for carrying film since the very beginnings of their business; and, b) manage to learn and then cultivate new process innovations following a period of incumbent inertia in the music industry, brought about by disruptive technologies. Was it really time – or even possible – to say so-long to celluloid and hello to digital?

1.1 Background

John Wesley Hyatt was 32 years old when in 1869 he patented celluloid, later to become the universal platform for delivering feature film across the world, unrivalled for the next 130 years. Shawn Fanning was just 19 when he wrote a peer-to-peer (P2P) software program in 1999 called Napster, which single-handedly triggered a chain of events that changed the operating business models in the music industry in the space of three years. Of all the media and content industries, music industry incumbents had been hit first and hardest by the changes produced by digitalization. After a period of relatively healthy growth that ran across the 1990s, revenue in the US music industry shrank by 16 per cent to 2003. As Leurdijk *et al.* (2014) observed, copyright infringements of illegally shared and downloaded music from P2P networks could take off on a large scale due to the digitalization of music and the growth of the Internet. In fact, Oberholzer-Gee & Strumpf (2007) claimed that revenues from recorded music contracted by 50 per cent in the 7 years following the introduction of Napster and, the number of compact discs shipped in the US alone, fell by 25 per cent to 705 million units between 2000 and 2005.

In 2005, the Motion Picture Association of America (MPAA)² released a report that claimed the major US motion picture studios lost US\$6.1 billion to piracy in 2005. The report cited that US\$4.8 billion of the loss, or 80 per cent, resulted from piracy overseas and US\$1.3 billion, or 20 per cent, from losses in the US. Furthermore, US\$3.8 billion were lost to hard goods piracy, defined as acquiring films by either purchasing or securing an illegally made VHS/DVD/VCD through a business, or accepting from friends or relatives an illegal copy of a legitimate VHS/DVD/VCD. The study went on to claim that

² Consisting of Buena Vista Pictures Distribution, Metro-Goldwyn-Mayer Studios Inc., Paramount Pictures, Sony Pictures Entertainment Inc., Twentieth Century Fox Film Corporation, Universal City Studios, LLP, and Warner Bros. – sometimes known as the ‘Hollywood oligopoly’.

\$2.3 billion were lost to Internet piracy, defined as obtaining films by either downloading them from the Internet without paying or acquiring hard copies of illegally downloaded films from a personal contact (MPAA, 2005). Research undertaken by Siwek (2006) around the same time argued that the true cost of motion picture piracy far exceeded its impact on the film producers themselves, harming not only the owners of the intellectual property but also US consumers and taxpayers. The authors went on to claim that as policymakers sought to maintain the health and vitality of the US economy and preserve its global competitiveness, it was imperative that government and industry work together to combat this growing problem.

The need to focus governmental attention on the negative impact of piracy was based on the fact that the MPAA was convinced that piracy activity was equal to, or greater than, the challenges faced during the 1950s, the decade that saw a) the introduction of television; b) the impact of the 1947 Paramount anti-trust consent decree, which led to a separating of ownership for production companies and cinema chains; c) large swaths of newly married young Americans moving to the suburbs; and, d) a loss of foreign revenues brought about by quota systems, high taxes and blocked funds. The film studios saw themselves as a significant player in the US national innovation system, they were in need of protection against an invisible adversary. To protect their competitive position, the film studios (producers) sought to address the apparent destruction of the music industry's business model with an ultra-cautious high-tech breakthrough approach, designed to enable digital distribution (and consumption) of content in cinemas, while maintaining control of the main access routes to market. So, for the first time, the studios collaborated (creating the DCI [Digital Camera Initiative] business model) to maintain their control of the flow of IP (content). The studios argued that this *linear* approach would a) maintain quality standards (through technology); b) enhance the market experience (for customer and consumer); and, c) eradicate piracy (via a financial model), which they perceived was a growing concern for consumers at the start of the 2000s.

As observed by Rob and Waldfogel (2006) the growth in CD sales had already stopped by the end of the 1990s, as by then most consumers had replaced their vinyl collections

with CDs. More recently, De Vinck and Lindmark argued we also need greater “insights on the disruptive force of innovation, building on the pioneering work of Schumpeter... and more recent works on disruptive innovation” to appreciate how interactions between business, consumer and institutions (public and private) facilitate innovation and technology diffusion (2014:105). Cinema was once but a final destination for movies (before they were repurposed as videos or DVDs), a place reliant on one product, within a traditional commercial and cultural supply chain. However, the end of celluloid provides the cinema business with an opportunity to re-position itself at the heart of a new digitalized value network. A network, in which, digital technologies provide alternative revenue and value-producing opportunities that may ultimately lead to the emergence of completely different business models.

Therefore, the purpose of this composite analysis (dissertation and associated papers [P1–8]) is to investigate the extent to which **a high-tech breakthrough approach could deliver novel supply and demand solutions, through a study of the digital cinema rollout**. This work is situated in the context of high-tech breakthrough approaches seemingly conferring advantages over simpler entrepreneurial approaches, especially when dealing with incumbent firms.

As a result, three further questions contribute to the primary question:

- Is digital cinema an example of disruptive innovation?
- If it is, what adoption and diffusion patterns can be identified from the approaches taken in the three countries investigated – the UK, Norway and the US?
- To what extent can the absence or presence of national or sectoral institutional activity explain the different experiences of the three countries?

This dissertation explores the phenomenon of the digitalization of value networks in the context of digital cinema, focusing on the contribution of the distribution and exhibition of creative content to national innovation systems in the UK, Norway and the US – three countries that exhibit marked differences in their approach to entrepreneurial innovation (Culkin, 2016a; 2016b [P7 & P8]).

Findings should provide stakeholders such as policymakers, universities and entrepreneurial innovation researchers with a greater appreciation of the features of a value network that may enhance the contribution of entrepreneurial innovation in strengthening the UK's national innovation system.

1.2 Chapter summary

In this chapter, I have shown the evolution of cinema (as a place) followed a singular path, forged from its dependency on celluloid (Hanson, 2007a). While researchers have arrived at its path from many directions, their attention was focused on the cinematic experience for creative talent, the films, and their audience; despite cinema hosting technological innovations from the first moving image projected onto a screen, through the introduction of digital sound systems were introduced in the first part of the 1990s, to the emergence of virtual reality, in 2016. As a result, cinema has primarily been viewed as the first destination for a cultural and economic medium that represents both the best and worst of a film supply chain dependent on the largesse of Hollywood. In terms of a movie-going experience, the reason this condition has endured is that cinema was situated at the end of a linear supply chain. Despite periods of change and potential, the overall technological evolutions have up until now been to the advantage of Hollywood (De Vinck & Lindmark, 2014:122; Hanson, 2007b). A separate and distinct chain was created when a film was written on to a different medium (videotapes and later DVDs) and shipped to individuals on planes, in hotel rooms and finally - region by region - into private homes.

It has not escaped my attention that while the European Commission have called for greater insights on the disruptive nature of innovation, little comparative work has been undertaken in this area, since my research outputs between 2000 and 2014 (entrepreneurial innovation, digital cinema and national innovation systems). In 2000, I wrote about the need for the UK government to develop their understanding of both the context and composition of small firms and the markets within which they operate [P1]. In 2003, I wrote that technology now existed to distribute and exhibit a film digitally; and, that the pace of change was increased significantly and that it was not

inconceivable that digital cinema would equal the best conventional cinema has to offer more rapidly than previous adoption periods [P2]. Later on (with Randle) I explored the fluidity of freelance work in the US entertainment industries, which provided a graphic picture of the uncertainty of project-based work in the creative industries [P3]. Finally, my work around regional and national innovation systems has revealed that given the aggregate effects of distributed knowledge production and information asymmetries we need a cultural change in universities to encourage collaboration with industry across the UK. Much value can be gained when universities are engaged and, take the lead regarding offering insights and developing regional initiatives to support the micro and small business sector to overcome systemic issues responsible for holding back UK competitiveness and innovative performance for decades [P8]. In **Table 1.1**, below I have sought to identify how the published works address the three areas of entrepreneurial innovation, digital cinema and national systems of innovation.

Table 1.1: Published works and their relationship to entrepreneurial innovation, digital cinema and national systems of innovation

| Paper ID & Publication Year | Title | Citations | Focus (***Primary **secondary * Tertiary) | | |
|-----------------------------|---|-----------|--|----------------|--------------------------------|
| | | | Entrepreneurial Innovation | Digital Cinema | National Systems of Innovation |
| No. 1 (2008) | Cinema No Country for Old Entrepreneurs | 3 | ** | *** | * |
| No. 2 (2003) | Digital Cinema: Opportunities & Challenges | 25 | ** | *** | * |
| No. 3 (2006) | Digital Cinema as Disruptive Technology | 3 | ** | *** | * |
| No. 4 (2009) | Getting in and getting on in Hollywood: Freelance careers in an uncertain industry. | 56 | * | *** | * |
| No. 5 (2004/05/07) | Facing The Digital Future: Digital Technology and the Film Industry | 8 | * | *** | * |
| No. 6 (2000) | An Emotional Business: A Guide to Understanding the Motivations of Small Business Decision Makers | 225 | *** | N/A | ** |
| No. 7 (2016a) | Anchor Institutions and Regional Innovation Systems for supporting micro and small businesses' | 0 | *** | N/A | *** |
| No. 8 (2016b) | Entrepreneurial universities in the region: the force awakens? | 1 | *** | N/A | *** |

On one level, the aim of **Table 1.1** is to provide an overview of the contribution to knowledge and impact of a body of work that commenced with an initial set of anecdotes, during a fieldwork trip to Los Angeles. Here, I met with Scott Billups, author of *Digital Moviemaking* (2000), whose book had been mentioned by two respondents. Billups spoke about the impact that digitalization would have on filmmaking and film projection over the next twenty years. Despite the fact that the discussion was highly technical and taking no notes, I still recall many of the ideas that Billups was working on. And, the fact that our conversation was interrupted - while he took a telephone call from Marlon Brando - suggested he was also a well-connected, forward thinker. As part of the original research project (freelance film work) I returned to Los Angeles on two further occasions. During these visits, I was able to piece together 'scraps of data' in order to construct a more nuanced picture of the emergence of digital cinema. This led to the production of the paper (P2) as previously discussed in this first chapter (P19).

Although the idea of focusing entirely on digital cinema was appealing, I had just published a paper from my first research degree, which looked at decision-making in small firms and why the UK Government struggled to implement policies that made a difference in supporting, small-firm growth. The upshot was that I thought it would be interesting to explore the synergies between the two. Such an applied research agenda was difficult to establish in the UK; there was much interest in the UK film production from the New Labour Government, but far less interest in the distribution sector, let alone the exhibition sector. It has been noted elsewhere that, in the UK we can be somewhat dismissive about applied research, but in reality, such use-inspired research can be truly excellent. I will go on to demonstrate through the digital cinema case-study, that while the UK's innovation ecosystem is a complex, non-linear process, the complexity of the policy support mechanisms for research and development poses a barrier to business engagement in collaborative activities, especially for entrepreneurial innovation (Dowling, 2015). The digital (r)evolution that swept through other creative content industries was finally embraced by cinema at the start of the twenty-first century. Before then, perceived wisdom told us that although movies made money throughout cinematic economic history, cinemas themselves depended on revenue

generated from the front of house - hot-dogs, popcorn and fizzy drinks –to make money (Hanson, 2007b).

However, as I will show over the next seven chapters, the digital cinema rollout demonstrates that a high-tech breakthrough can deliver novel supply and demand solutions and provide a better understanding of the role of entrepreneurial innovation for regional and national innovation systems. Finally, taken together, the dissertation and published papers, will establish how the methodology has emerged, over time, building from scraps of data to complex data sets.

Chapter 2: Technological innovation

In innovation literature, the arrival of digital technology created a major rethink on how organisations, industry structures and economies operate. Margetts & Dunleavy (2013) reported that digitalization is now lapping at the edges of government establishments and the way they interact with the societies they represent.

In the second half of the 1800s, a new wave of industrialisation spread throughout developing nations. Innovation brought about new technologies such as the steam engine, railroads and telegraphs, making communication and transportation faster and easier. Industry grew as business developed innovative means to extract natural resources such as oil from the ground and to produce steel cost-effectively. Many local firms were transformed into national companies through their ability to locate and ship materials across country with relative ease. In the workplace, the assembly line method of production, long considered one of the greatest innovations of the 20th century, then enabled these companies to produce goods on a mass scale. As Beninger (1986) argued, such developments sparked a wave of societal disruptions, including the birth of trade unionism, urbanisation and improvements in healthcare and income levels. According to Schatzberg (2006), when the term 'technology' became widespread in elite discourse in the US, it was as the result of a long struggle over the meanings of industrialisation. He went on to claim that Karl Marx viewed technology as having helped to raise the useful arts above the world of grubby artisans and into the spheres of big business and the university. In a similar vein, Oldenziel saw technology as the product of a class and gender struggle, becoming a keyword to denote the useful application of scientific knowledge for the benefit of humankind, and engineers were designated as the sole bearers of that form of knowledge (1999:14). Taken together, the work of these and other scholars complicates not only the early twentieth-century meanings of technology, but also its current use (Schatzberg, 2006:487).

Today, as technology increasingly allows products, services and knowledge to be digitised and mobile devices accelerate in ubiquity and processing power, physical and digital components are combined and the distinctive features of digital technology

facilitate new types of innovation processes that are uniquely different from the innovation processes of the industrial era (Lucas & Goh, 2009; Nylén & Holfström, 2015). Digital technologies occupy an individual's customs and habits through everyday activities such as communicating with friends and work colleagues, organising and employing knowledge in previously unimaginable ways and combining factors to create novel supply and demand solutions (Henfridsson & Yoo, 2013). However, alongside the novelties ushered in by the widespread employment of digital technologies sits obsolescence: first in the form of a radical shift in job-skill demands (Randle & Culkin, 2009 [P4]) and second, in the widespread displacement of labour brought about by pattern recognition capabilities, robotic innovations and the bypassing of geographical boundaries (Btyonjolfsson & McAfee, 2014; Culkin, 2008 [P1]).

To explore the effects of the technological evolution in the film and audiovisual industries, the following sections present an overview of relevant literature that holds potential for explaining changes in the wider creative content industries. In so doing, I first discuss dominant theories of innovation, before investigating the concepts of national innovation systems, disruptive innovation and creative destruction, and entrepreneurial innovation.

2.1 Defining and contextualising innovation

Innovation can be defined as the process of commercialising or bringing into common usage an invention. This is posited within the context of an invention as an idea, concept or design for a new or improved device, product or process that is available as concrete information in the form of a description, sketch or model (Freeman, 1982). The term *innovation* was first employed at the start of the twentieth century during a time when the field of science was changing beyond recognition. New products were developed for both industrial and consumer markets, which in turn led to a further rapid development of technologies across a wide range of industries, to sustain economic growth, from the 1950s onwards. As markets advanced and became increasingly global in reach, businesses and public research organisations turned to patents to protect their innovations from research and development programmes. However, growth in patenting corresponded to new modes of innovation research practice, which placed

more emphasis on knowledge networks and markets than the individual firm as we approached the twenty-first century.

The original definition of innovation was too narrow to reflect the role, patents and knowledge networks, played in innovation and economic performance and the Organisation for Economic Co-operation and Development (OECD) was tasked with broadening its scope. The update - announced in 2005 – now asserted that innovation was, “the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (OECD/Eurostat 2005:17). Although the definition above is well understood today, it was Schumpeter who saw innovation very broadly as a product, a process and as organisational change that does not necessarily have to arise from new scientific discoveries, but that may combine already existing technologies or their applications in a new context. It has been argued elsewhere that the concepts of both innovation and entrepreneurship are Schumpeter’s most distinctive contributions to economics (Hanush & Pyka, 2007:857) and while he was not the first to write about innovation, very few have been as influential as he.

Today, innovation lies at the heart of structural change and discontinuous change is one of the driving forces of economic development. Two salient features of western economies are product routines (e.g. technological stability often favoured by incumbent firms) on the one hand and product development (e.g. technological breakthroughs, more often favoured by new firms) on the other. Interest in the process of competition between two technologies – one old, one new – arises from the observation that there remain technologies that have outlived their technological ‘sell-by’ date, despite being outperformed by new ones. This mechanism is often referred to as the ‘sailing-ship effect’, after Gilfillan’s study on innovation in ships (Gilfillan, 1935). He showed how the then-current product (sailing ship) was improved as the new product (steamer) surfaced in 1813. Almost all of the components and materials of the sailing ship were subject to incremental advances, transforming it from a wooden structure to basically a metallic one, whose carrying capability was hugely improved. Gilfillan wrote, “it is paradoxical, but on examination logical, that... during her decline

and just before extermination, [she] was partly vouchsafed by her supplanter, the steamer” (1935:156).

It is worth noting here that Schumpeter’s original concept of an entrepreneur was that of a ‘heroic individual’ who possessed supernormal qualities of intellect, carrying out new combinations, while powerful elements of society erected barriers in his way, intent on maintaining the status quo. He viewed the occurrence of discontinuous and revolutionary change as the core of economic development, which breaks the economy out of its static mode (e.g. the circular flow) and sets it on a dynamic path of fits and starts (Śledzik, 2013:89). While Schumpeter did not move from his view of the distinctive role of the entrepreneur, his observation on the issue changed over time. Schumpeter never turned his back on the notion of the “travelling salesman” which recognised that entrepreneurs came from all social classes (Schumpeter, 1939). He distinguished between small firms and high-growth firms, maintaining that while both undertook an essential role in a successful economy, they were very different sorts of enterprises.

However, after taking up permanent residence in the US, Schumpeter came to the conclusion that the agents who drive innovation and deliver economic growth are actually large(r) firms, in particular, those that had built up capital reserves to invest in R&D activities to facilitate the absolute optimal way to commercialise new technology. Nor did Schumpeter (unlike many of his fellow economists) share the view that big business was somehow anti-American. He argued that over time only the largest corporate units prospered in certain industries – most requiring big capital investments to maintain their position in the face of competition (e.g. oil, cars and chemicals). In other industries, established firms – once entrepreneurial start-ups – would try to preserve their dominant position through patents, further innovation, secret processes and advertising, each move an act of aggression in the face of new firms springing up alongside the incumbents. The dynamic process will come many times: *all* successful firms have been entrepreneurial at some moment in their histories, though a given company is certain to be more entrepreneurial at one point and less so at another. Early in the twentieth century, firms such as AT&T, GE, Kodak and DuPont set up research departments in an effort to make innovation part of their business routine. But, when

their innovations dwindle, firms begin to die; in this way Schumpeter used entrepreneurship to explain structural change, economic growth and business cycles, using a combination of economic, sociological and technological considerations (McCraw, 2007:181).

Alongside the importance of the entrepreneurial corporation, Schumpeter also recognised the changes that brought about the modern financial system. However, as Festré & Nasica (2009) have noted, the enormous contribution Schumpeter made on entrepreneurship and innovation cast his banking and credit analysis into the shadows. At each stage of capitalist development, it is shaped by the institutional structure, especially banking institutions, and this structure is always evolving in response to profit-seeking activity under the constantly renewed financial institutional setting (2009:336-337). The two main functions of the Schumpeterian banker – as an ephor³ and as an innovator – reveal the specific industrial and financial environment of this historical period of capitalism. The implication Schumpeter makes is that banks cannot be described as passive intermediaries as in the case of steady growth since they now play a key role in the distribution of economic resources; the banker, “has either replaced private capitalists or become their agent; he has himself become the capitalist par excellence. He stands between those who wish to form new combinations and the possessors of productive means” (1934:74). Schumpeter’s view of the banker as “ephor” underpinned his understanding that innovation in finance was essential to finance the capital development of the economy. The houses of Rothschild and Morgan epitomised the sort of players who could organise the resources necessary for financing the large-scale investments that made the industrial revolution possible. Such banking dynasties took on a brokering role when expediting trade in existing business matters and as dealers when underwriting new business; these new lines sprang from the need to trade positions in the liabilities of enterprises and provide external finance for capital asset ownership. Those investment bankers, adroit at providing funding for innovative

³ The ephors were a council of five magistrates from eight-century BC Sparta who shared power with the two kings. Elected annually by the assembly, they presided over meetings of the council of elders and were responsible for the execution of their decrees.

combinations of resources, soon became the mainstay of economic power, the “ephor” of the “exchange” economy (Festré & Nasica, 2009:347).

But this period also paved the way for cycles of price wars between industrial firms, which if left unchecked could do untold damage to the quality of the instruments the investment banker sold, and soon they “began to abhor competitive markets” (Minsky 1993:109). Their response was to protect cash flows in the firms they financed by simply financing industrial combinations through a series of cartels, trusts and mergers. At an industry level, investment bankers took a controlling position in the economy, first in stimulating merger activity and then, securing large ownership shares on the boards of directors of newly combined corporations (Festré & Nasica, 2009:348). Schumpeter realised that banks were active agents and if they did not grant credit to finance investment expenditures, they obstructed entrepreneurial innovations. But equally, he knew that: “The banker must... know what the transaction is which he is asked to finance and how it is likely to turn out, but he must also know the customer, his business... and get... a clear picture of his situation. But if banks... finance innovation, all this becomes immeasurably more important” (1939:116).

Schumpeter was of the view that it was this entrepreneur who created innovation. And innovation was not only invention: driven by competition to improve technology, finance and organisation, the Schumpeterian entrepreneur does more than textbook equilibrium theory allowed (McCraw, 2009). As such, banks are at the core of entrepreneurial innovations and should possess “moral and intellectual qualities” to perform their function, which is essentially a “critical, checking, admonitory one”. In his book, *Capitalism, Socialism and Democracy*, Schumpeter established that:

“...in capitalist reality as distinguished from its textbook picture, it is not [textbook] competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization (the largest-scale unit of control for instance) – competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives...” (1950:82)

Innovation propels the capitalist economy with “gales of creative destruction”, the phrase that Schumpeter borrowed from Werner Sombart, which represented a dynamic

process in which new technologies replace the old (Reinert & Reinert, 2006). In Schumpeter's view, "radical" innovations create major disruptive changes, whereas "incremental" innovations continuously advance the process of change. Schumpeter (1934:66) proposed a list of five types of innovations:

- i) Introduction of new products: that is, one with which consumers are not yet familiar – or of a new quality of a good;
- ii) Introduction of new methods of production: that is, one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a scientifically new discovery, and also exist in a new way of handling a commodity commercially;
- iii) Opening of new markets: that is, a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before;
- iv) Development of new sources of supply for raw materials or other inputs: irrespective of whether this source already exists, or whether it has to be created;
- v) Creation of new market structures in an industry: like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position).

Observed through a Schumpeterian lens, innovation is a sort of creative act in economics, requiring a business attitude, whereby profit could be accrued - in the long term - by those entrepreneurs capable of repeatedly forming new innovations. Schumpeter's concept of innovation became the basis for numerous studies and modern concepts in innovation and greatly influenced theories of innovation, including the Organisation for Economic Cooperation and Development (OECD) in the production of the Oslo Manual.

2.2 Why firms innovate

As well as categorising what types of innovation exist, it is necessary to understand why firms deem it necessary to innovate. During a period of rapid technology evolution Lawrence & Lorsch (1967) published a study of six firms that operated in the same

market; this study proved influential for the understanding of why firms innovate. Lawrence and Lorsch observed that the sales, research and production functions in each organisation were differentiated from each other in terms of formal structures, management's goal orientation, time orientations and interpersonal orientations. A relationship was identified between the extent to which the states of differentiation and integration in each firm met a) the requirements of the environment and b) its relative economic performance (1967:1). All the firms had similar integrative devices (integrating teams and departments), but in the high performing firms, the integrative devices more fully met six determinants of effectiveness, which included such factors as the pattern of influence in the organisation and the typical mode of behaviour used to resolve conflict.

Subsequent research, applying a more dynamic perspective, has gone on to identify that firm-level innovation is essential to fostering new ideas for products and services, providing staff with a sense of job satisfaction, encouraging teamwork and enabling firms to find competitive advantages in the marketplace. Utterback & Abernathy (1975) looked at relationships between the pattern of innovation within a firm and certain of the firm's characteristics: the stage of development of its production process and its chosen basis of competition (1975:639). Their results suggested the sources and types of innovations a given firm might expect to undertake successfully, critical resources required and potential problems or constraints. Special attention is called to the interrelated nature of decision-making within the firm (Culkin, 2008 [P1]). The capabilities of a firm to innovate, to achieve efficient operations and so on cannot be divorced from one another: they are a matter of overall strategy. In a second study, the same authors went on to argue that entrepreneurially orientated firms are typically likely to champion radical innovation, expecting new, fluid units to view as barriers any factors that impede product standardisation and market aggregation (Abernathy & Utterback, 1978:46).

The second half of the twentieth century saw the development of new industrial products yielding path-dependence outcomes, which evolved from the process's own history, as firms searched for novel innovations to maintain economic growth. This paradigm held until the early 1970s and was built on energy and oil-related

technologies, mass production and specialised corporate R&D (Freeman & Perez, 1988). Such innovation management insights are drawn from the binary classification of mechanistic or organic systems approaches among incumbent firms (Burns & Stalker, 1962); from Rosenberg (1976) on the history of technology and the role of universities in technical advances in industry (Rosenberg & Nelson, 1994); from Nelson & Winter (1982) on the “natural trajectories” evolutionary theory of economic change; and from Penrose’s (1959) theory of the growth of the firm. Thus, successful innovation by a firm depends on the generation of feasible new capabilities, the operation of which adds new value to the existing circular stream of income and thereby creates new profits and higher income (Cantwell, 2000:2). Edith Penrose argued that such firms have a general entrepreneurial bias towards growth and the opportunity costs of failing to grow create strong inducements to growth: “As management tries to make the best use of resources available, a truly dynamic interacting process occurs which encourages continuous growth but limits the rate of growth” (Penrose, 1959:5). She went on to suggest that for the entrepreneurial firm, this creates incentives to exploit unused resources, including knowledge, through further growth and this opens up further opportunities in the environment (*ibid.*:58). Entrepreneurial firms do not wait for the technologies to become available to take up these opportunities. Such a continual adjustment between internal resources and evolving external opportunities make likely the prevalence of *improvisation* and *adaptation* strategies followed by entrepreneurial managers (Martin & Matlay, 2001:407; Brown and Eisenhardt, 1998:3; Bhidé, 2000:61, Garnsey, 2002:110).

2.3 Measuring innovation activity

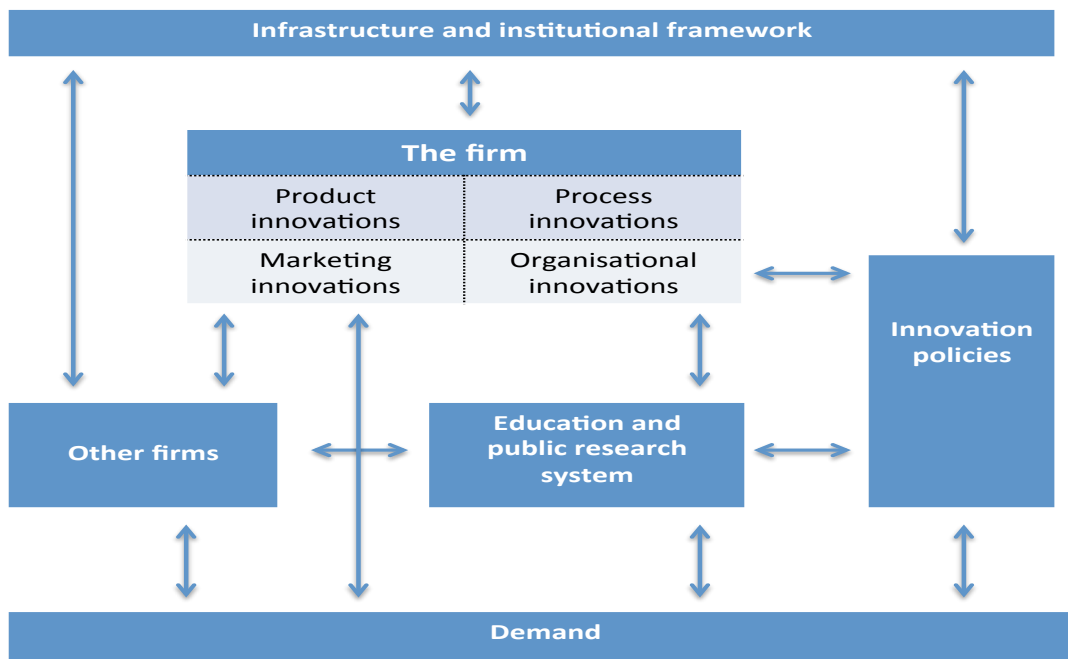
The Oslo Manual (OECD, 2005) defined four types of innovations that encompass a wide range of changes in firms’ activities: product innovations, process innovations, organisational innovations and marketing innovations. Product innovations involve significant changes in the capabilities of goods or services. Process innovations represent significant changes in production and delivery methods (OECD/Eurostat, 2005:16-17). Organisational innovations refer to the implementation of new organisational methods. These can be changes in business practices, in workplace organisation or in the firm’s external alliances. Marketing innovations involve the application of new marketing

methods e.g. product design modification, packaging changes, promotion and pricing of goods and services (Rothwell, 1994).

The manual also recognised the role of linkages with other firms and institutions in the innovation process through the introduction of an innovation measurement framework (**Fig. 2.1**). This approach was important for two main reasons. First, it sought to highlight the importance of innovation in less R&D-intensive industries (e.g. services and low-technology manufacturing [OECD/Eurostat, 2005]). Second, it recognised the status of new and small firms in a world that has shifted from a managed economy to an entrepreneurial economy (Thurik, 2009). In the former, science and systematic large firm R&D was central to policymakers' thinking whereas, in the latter, entrepreneurship is a cornerstone of innovation (Audretsch & Thurik, 2004; Mahroum, 2008; OECD, 2010).

The need to incorporate linkages came as a direct result of increased knowledge flows among firms and other organisations during the development and diffusion of innovations.

Fig 2.1: The innovation measurement framework



Source: OECD (2005).

The adjustment acknowledged the changing role of organisational structures and emergent practices employed to share and use knowledge and to interact with other

actors; and that innovation was not the sole preserve of the manufacturing sector: “innovation in services oriented sectors can differ substantially from innovation in many manufacturing-oriented sectors. It is often less formally organised, more incremental in nature and less technological” (OECD/Eurostat, 2005:17). However, while changes relating to service innovations may seem subtle to managers, they can often destroy an incumbent’s capabilities, knowledge and competencies, which are deeply embedded in organisational structures, processes and routines. Thus, new entrants typically perform better than incumbents in a context of service-led innovations (Henderson and Clark, 1990; Christensen, 1997).

2.4 Innovation as part of an evolutionary process

Despite acknowledging the importance of small firms in general and service industries in particular, there is a growing body of scholars who believe we must distinguish innovation from ‘invention’, which is an act of intellectual creativity without importance to economic analysis (Godin, 2016). They argue that the long accepted linear model is only one of several theories developed over time to explain how technological innovation continues through applied research and then enters the development phase. Such ideas speak to the notion concerning invention and innovation that there is no relation between science (basic research in particular) and innovation. Adherents cite Schumpeter: “innovation is possible without anything we should identify as invention and invention does not necessarily induce innovation” (1939:84-85). They further argue that this will avoid or counteract the bandwagon movements in markets that prematurely commit the future inextricably to a particular technical standard, before enough information has been obtained about the likely technological or organisational and legal implications, of an early precedent-setting decision (David, 2007:110). However, the linear argument continues to feed into policy-making and remains in many alternative models of technological innovation (Godin & Lane, 2014:165).

In the context of localised technological change, evolutionary economists consider growth and change rather than equilibrium to be the relevant object of analysis and hence they “[value] historic time and philological investigation as basic tools to study the dynamics of social events” (Antonelli, 2006a:51). Accordingly, a technological trajectory

is one possible development path that can be pursued within the framework of a technological innovation. The evolutionary argument draws heavily on the notion of path dependence, which argues that buyers rarely have access to perfect information with which to make rational decisions (David, 1985; Arthur, 1989). The argument further contends that current choices are influenced by earlier decisions which in turn limit later choices, channelling the sequence of economic outcomes along one possible path rather than another (Antonelli, 2006b; Culkin, 2008 [P1]; Culkin *et al.*, 2006 [P3]).

In part, the difference between 'path-dependent' and 'path-independent' processes can be explained by the fact that foresight doesn't matter for path-independent processes (Puffett, 2008). Regardless of the journey, path-independent processes will invariably lead to a set of predictable outcomes – those that lead to the most efficient outcomes and produce maximum payoffs. However, path-dependent processes have multiple potential outcomes, and the outcome selected is not necessarily the one producing maximum payoffs. For evolutionary theorists, the technological trajectory concept arises from the view of innovation as a cumulative and specific problem-solving process (Dosi, 1982; 1988). In Arthur's (1989) basic analytical framework, "small events", which he ascribed as random, lead to initial oscillations in the market shares of competing disruptive innovations; such fluctuations are augmented by positive feedbacks, because technologies with larger market shares tend to be more valuable to new adopters. As a result, one technology grows in market share until it is 'locked in' as a *de facto* standard.

It is possible to see that such approaches can be traced back to Gabriel Tarde, who made a clear distinction between accumulable inventions and substitutable inventions, observing, "...we already know that its two tendencies are distinguishable, the one creative, the other critical, the one abounding in combinations of old accumulable inventions and discoveries, the other in struggles between alternative inventions or discoveries" (1903:154). Tarde raises a question that still lies at the heart of contemporary evolutionary theory today: is innovation a factor leading to convergence ('universal uniformisation') or divergence? Although imitation leads to gradual similarity among individuals, in Tarde's view it does not, for all that, stifle their originality: on the contrary, it encourages it, because there is not a single model to be imitated but rather

an infinite number thereof; this combination is a source of both originality and divergence (Djellal & Gallouj, 2014:28).

2.5 From creative destruction to technological disruption

While the term 'creative destruction' is firmly associated with Schumpeter, the term 'disruptive technology' emerged from research into the disk-drive industry by Christensen (1992) to describe a revolutionary change in an industry (Thomond *et al.*, 2003), which leads to technological discontinuity and causes disorder in the market and failure of certain incumbents. Danneels (2004) subsequently defined disruptive technology as a technology that changes the bases of competition by changing the performance metrics along which firms compete; in essence, these technologies create fissures along an industry's traditional lifecycle path. Christensen (1997) argued that a key distinction here lies between the terms 'sustaining' and 'disruptive' technologies. While sustaining technologies are used to incrementally improve the performance of established product categories, disruptive technologies enable the creation of disruptive product innovations that bring novel values to the market (Nylén & Holmström, 2015). Customers seeking certain benefits determine which attributes they value in a product, with different customer groups valuing different attributes. New products based on a disruptive technology have different attribute sets from existing products. They tend initially to have a lower level of performance on dimensions relevant to mainstream market segments but have higher performance on dimensions valued by remote or emerging market segments. Christensen characterised disruptive technologies as typically "cheaper, simpler, smaller and frequently, more convenient to use [than established technologies]" (1997: xviii).

One of the main reasons incumbent firms struggle to innovate with disruptive technologies involves traditional innovation management methods (e.g. monitoring existing customer needs and key competitor benchmarking). The outcomes regularly lead to product developments with increased features that are adequate for sustaining technologies; however, applying such methods to disruptive technologies may prove deleterious to incumbents. As such, when the disruption has established itself in an underserved customer segment; incumbents may be displaced as the disrupter

continues to develop new revenue-creating opportunities in their core markets. The consequences of not securing disruptive innovations can be “far more devastating than simply lost opportunities or lost market share” (Thomond *et al.*, 2003:6).

The interest in disruptive technology is a direct response to the theoretical developments in the field of innovation management, which has focused to explain how (often large) firms attain and sustain competitive advantage. The resource-based view (Penrose, 1959) relies on the notion that incumbents, in stable environments, can achieve competitive advantage where resources and capabilities consist of four attributes: rareness, value, inability to be imitated and inability to be substituted (Barney & Clark, 2007; David, 1985). It does not, however, explain how incumbents can build competitive advantage in rapidly changing environments when barriers to entry are under threat, *inter alia*, from information and communications technology (Bhatt, *et al.*, 2005; Christensen, 2003).

The resource-based view and resource dependence theory are founded on a notion that all firms depend critically on environmental stakeholders for the provision of vital resources, and that this dependence is often reciprocal (e.g. between major customers and investors). The checks and balances such a situation creates led Christensen (1997) to argue that innovation managers have far less control over a firm’s resources than they generally imagine. This is particularly relevant, and environmental stakeholders actually impose key barriers to innovation, when firms seek to invest in disruptive technology.

Despite the suggestion that the theory of disruptive innovation is one of the most pervasive models generated by management research, it has not been without its detractors. In its original form, the theory of disruptive innovation was unclear as to which attributes of disruption were essential to disruptive success and which ones were ancillary (Danneels, 2004:250). For example, there was an implication that disruption embraced technical and market standards, consumer expectations and the relative strengths of incumbents and entrants. Christensen later stated that the construct of disruption related to the area of business models, “understanding that disruptiveness is not an absolute phenomenon but can only be measured relative to the business model

of another firm.....an innovation that is disruptive relative to the business model of one firm can be sustaining relative to the business model of another” (2006:48).

More recently, as Kolawole (2013) reported, Christensen *et al.* had tried to expand on the theory of disruptive innovation to explain a phenomenon they chose to call “hybrid innovation”. The authors went on to claim hybrid innovation was a special type of sustaining innovation that attempts to offer mainstream customers the reliability and performance of incumbent technologies while simultaneously providing some of the benefits of new disruptive technologies. One of their examples used to support the evolution of their work involved referencing the sailing ship versus steamship innovation, with no mention of Gilfillan’s earlier work (of 1935).

While Christensen *et al.*’s work has been helpful and insightful, the theory of disruptive innovation has its limitations when seeking to understand changes in content-based industries in so much that it fails to provide the tools required to fully theorise the unique aspects of digital technology (Nylén, 2015). A contemporary of Christensen at the Harvard Business School, Jill Lepore (2014), recently took aim at the very foundations of the disruptive innovation literature by suggesting that many of the incumbent firms featured in *The Innovator’s Dilemma* (Christensen, 1997) actually turned their fortunes around. Lepore (a history professor) went on to demonstrate that a number of the original disrupters identified by Christensen were themselves displaced. In fact, Lepore wrote, “Christensen’s sources are often dubious and his logic questionable” (2014). While the phrase ‘disruptive innovation’ has become overused, it remains a useful narrative to describe how incumbent firms can sometimes struggle to fend off new entrants pushing seemingly lower-quality products. The theory of disruptive innovation can also provide useful insights to the importance of testing assumptions, seeking external verification, and other means of reducing myopic thinking; however, it was inspired by the disk drive industry which even Christensen admitted was highly unusual (King & Baatartogtokh, 2015). Where I agree with Lepore is that disruptive innovation has become much more than a theory of business economics in that it carries with it a set of social and political values that seem much less attractive goals now than they once did. Whereas Schumpeter focused on how enterprises succeeded, to quote Lepore,

“...disruptive innovation is a theory about why businesses fail. It’s not more than that. It doesn’t explain change. It’s not a law of nature. It’s an artefact of history, an idea, forged in time; it’s the manufacture of a moment of upsetting and edgy uncertainty. Transfixed by change, it’s blind to continuity. It makes a very poor prophet” (2014).

2.6 Digitising innovation

Since its inception and subsequent diffusion, the Internet has regularly been acclaimed as a pervasive democratising agent (e.g. Groshek, 2009). Whether or not the Internet in itself is a disruptive technology, it has allowed disruption to travel along its highway, from Napster to Airbnb, Uber and Oculus virtual reality hardware. However, reflecting on the realities of the post-Napster music marketplace, Lefsetz concedes:

The Internet was supposed to wipe out major labels. But it’s only made them stronger... with major labels now... more powerful than at any time since Napster when the Internet cacophony restored the major label hierarchy... Case in point, Sam Smith has been featured in every major outlet, the press on his Apollo show alone was incredible. This is what a major label can do, it can build a star overnight. An indie act could be as good as Sam Smith, but without the muscle, money and relationships, it could never get the push, the head start. (Lefsetz, 2014)

What we need, therefore, is a passage of time through which we can understand more fully whether the surfacing and status of Napster and Uber have resulted in substantive entrepreneurial firms or travelled a long arc back to many of the same institutionalised power relations these platforms appeared to disassemble (Carter & Rogers, 2014). While Christensen’s view was founded on failure, Schumpeter’s vision of creative destruction was more encouragement of entrepreneurship to stimulate process and product innovations between existing firms and potential competitors. The fiscal policy system he outlined was designed to promote savings that could finance new ventures and ensure American prosperity far into the future (McCraw, 2007:431). The question is, does creative destruction, with its focus on building sustainable competitive advantage for nations, hold the same ambitions in the digital era as those of Schumpeter’s day? And, in an increasingly boundary-less era, does there still exist a role for national or sectoral institutions in a nation’s innovation ecosystem?

2.7 National systems of innovation

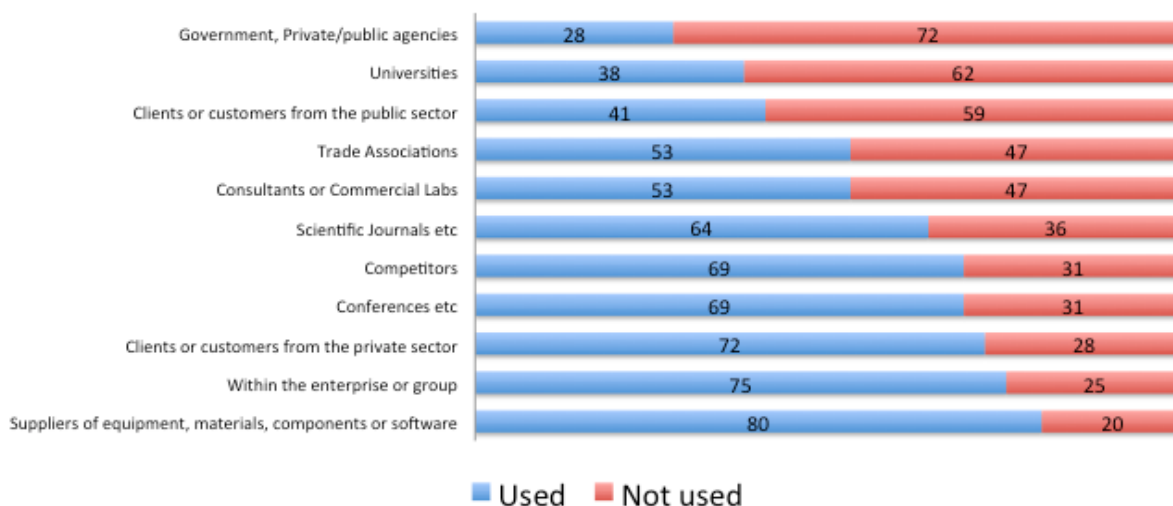
Freeman (1987) was the first to publish the expression 'national systems of innovation', abbreviated to NSI, defining such a system as "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (1987:1). The OECD (1997) acknowledged how the NSI rightly focused on flows between technology and information among people, enterprises and institutions, which are key to the innovation process. Innovation and technology development are the results of a complex set of relationships among actors in the system, which include enterprises, universities and government research institutes. For policymakers, an understanding of the NSI can help identify leverage points for boosting innovative performance and general competitiveness. It can be used to highlight mismatches within the system, within institutions and how government policies are played out in the market, which can frustrate technology development and innovation. Policies that seek to advance networking among the actors and institutions in the system and that aim at augmenting the innovative capacity of firms, particularly their ability to identify and absorb technologies, are most valuable in this context (1997:7).

According to Freeman (1995), the earliest exponent of the term "national systems of innovation" was Bengt-Ake Lundvall, although Friedrich List's conception of "the national system of political economy" (1841) may well have been called "the national systems of innovation". In his work, List proposed a number of policies designed to help the (less developed) German economy in combating its more developed neighbour, England. As Freeman (*op. cit.*) noted, most of these policies were concerned with learning about new technology and applying it to further industrialisation and economic growth through the protection of infant industries. List was also clear that the health of a nation's economy was the result of knowledge accumulation and physical capital investments made over generations and that in order to support future prosperity, industry should be linked to the formal institutions of science and education. Technology-related analysis has habitually focused on inputs (e.g. research expenditures) and outputs (e.g. patents). But the interactions among the actors involved in technology development are as important

as investments in R&D, especially as many advanced economies have moved from an industrial to a service basis (Cunningham, 2014:14).

Results from this shift to a new set of ‘business-pull’ interactions have exposed the problems with the prolonged reliance on a science-push narrative. Large international surveys such as the European Union’s Community Innovation Survey (CIS) point to how the most innovative and entrepreneurial firms use internal and other enterprises’ ideas to develop businesses opportunities. In the 2012 survey EU firms provided data on sources of information used by product and/or process innovative enterprises. Based on this data, **Figure 2.2** demonstrates the level of importance given by firms to each type of source and whether it was used or not used. It can be seen that information from suppliers is widely used among enterprises in the EU as a source of information: 80 per cent of innovative firms used intelligence garnered from their suppliers between 2010 and 2012. The firm itself, and clients or customers from the private sector, were the second and third most common sources of information, both reported by more than 70 per cent of such enterprises in the EU for the period 2010–12. However, less than two-fifths of innovative firms (38 per cent) reported having used information from higher education institutions (HEIs) between 2010 and 2012; although among EU member states there existed a wide range in the shares for this type of source, with more than 60 per cent of the innovative firms in Norway and Finland reporting the use of information from HEIs.

Fig 2.2: Sources of Information Used for product/process innovation 2010-2012



Source: Eurostat, 2012 & Author

The share of innovative firms using information from the government, public or private research institutes came in last place – along with HEIs the engine rooms of the ‘science-push’. This is perhaps hardly surprising when the renowned health journal, *Nature*, published findings from a survey of 1,576 researchers who took an online questionnaire on reproducibility in research (Baker, 2016). More than 70% of researchers have tried and failed to reproduce another scientist's experiments, and more than half have failed to reproduce their own experiments. Based on these findings *Nature* is now proposing not to publish research until a secondary, independent ‘preclinical trial’ has been carried out. This crisis in trust follows Nobel prize-winner, Professor Randy Schekman’s announcement in 2013, that his laboratory would no longer send research papers to the top-tier journals. Schekman cited that pressure to publish in such journals encouraged researchers to cut corners and pursue popular fields of science instead of doing more important work. Schekman went on to claim that the prestige of appearing in major journal had led the Chinese Academy of Sciences to pay successful authors the equivalent of US\$30,000 (£18,000), which for some researchers made half of their income through such inducements (Sample, 2013).

However, armed with these findings alone it would be wrong to assume that no role exists for universities in a nation’s entrepreneurial innovation ecosystem (Sam & Van Der Sijde, 2014:900). Faced with the Community Innovation Survey findings and a shift in UK Government oversight, culminating in universities and science policy being split between two departments, led to two further outputs on universities as entrepreneurial institutions and knowledge partner to regional micro and small firms (Culkin, 2016a, 2016b [P7 & P8]). Following the November 2015 Spending Review, a series of events were set in motion that would have left just science, research and higher education teaching as items of revenue spending in a post 2017 BIS budget. However, these two papers were formulated pre-Brexit and the changes I envisaged have gone even further; now universities are divided between the Department for Education, which is responsible for higher education, and the new Department for Business, Energy and Industrial Strategy, which will oversee research. With the Treasury currently assessing 38 landmark devolution deals from cities, towns and counties across the UK; it is not unreasonable to expect that, most of the £1.5bn adult skills budget will be moved into

the regions along the lines of the Greater Manchester devolution deal struck in 2014. This will come as little surprise to some commentators as Nowotny *et al.*, (2013) and Scott (2013) noted there has always existed a lack of coordination between national policies for higher education and regional development; notwithstanding the fact that universities contribute to UK productivity targets by delivering direct and indirect expenditure on goods and services, providing jobs, developing a more highly skilled workforce and generating new knowledge.

2.8 Chapter summary

I have tried to demonstrate in this chapter the dilemma for both private and public sector agents is significant in that they seek to influence the adoption of competing technologies as a way of supporting the developments in national and regional innovation systems, which themselves are increasingly dependent on services. In this respect, they exhibit Schumpeterian tendencies in that “every social environment has its own ways of filling the entrepreneurial function” (Schumpeter, 1949:70), acknowledging that one outcome of a market disruption is that it brings with it multiple and mutually exclusive solutions (David, 1985, 2007). This, in turn, leads to the development of many different standards if no supplier can achieve early market leadership, which can lead to ‘lock in’; or at least that was an issue in a pre-digital, analogue-focused economy.

I have also shown that it is difficult to dispute the view of Cunningham when he states that there is a compelling need to accommodate the arguments and evidence for innovation in the service sector, which has been poorly served by the dominant technological product and process (TPP) approaches (2014:38). For example, hard-to-access, intermediate services are widely available, a reality that has created a system of global specialisation in a post-digital era. However, on this ‘flat’ landscape, characterised by hyper-competition, the capabilities required to orchestrate and deploy the available resources remain scarce and geographically isolated (Teece & Al-Aali, 2013).

Perhaps the most important class of intangible assets not universally available is technological know-how, which is why social researchers claim that technological innovation is a sociological concept and that the concept of basic research originates

from natural scientists (Kline, 1995; Lucier, 2012; Godin, 2014). Know-how and other intangibles are increasingly the ‘bottleneck assets’ that allow innovating firms to differentiate and establish some degree of competitive advantage. They cause ‘hills’ – and sometimes ‘mountains’ – to appear on otherwise flat competitive landscapes. Value can flow to the enterprise from the astute creation, combination, transfer, accumulation and protection of intangible assets. Such assets are the new ‘natural resources’ of the global economy (Teece & Al-Aali, 2013; Cunningham, 2014) but they are not naturally occurring and depend on managerial action and, in part, on national systems of innovation (Nelson, 1993:13).

The question is whether or not creative destruction, with its focus on building sustainable competitive advantage for nations in the digital era, holds the same ambitions as those of Schumpeter’s day. And, given the findings from the CIS Survey of 2012, does there exist a role for national institutions – such as HEIs and government agencies – in a nation’s innovation ecosystem? Governments across the world speak of the contribution that technological innovation has made to national economic growth, which in turn has been persuasive as a rationale for the development of policy to stimulate technological innovation. As Harris makes clear, innovation becomes a *supercategory*, it “integrates what would otherwise be separate activities and inquiries” in order to redraw the intellectual world that society adopts (2005: xi). What I have therefore sought to demonstrate is that over the twentieth century innovation became a fundamental axiom, percolating through the corridors of power. Innovation was seen as the panacea for every socioeconomic problem. What has been presented is grounded in the outputs of peer-assessed researchers and accepted international definitions; whatever society’s problems might be, innovation is the *a priori* solution (Godin, 2016:550).

Finally in this chapter I demonstrated that, despite its origins, when higher education largely reflected the values of localism, the reform of English higher education (first triggered by the Browne Report (2010) encouraged universities to shift their attention towards an international growth trajectory, at the expense of local and regional development support (Goddard *et al.*, 2014). But as we know, universities are

somewhere in the UK and that *somewhere* matters, especially since the demise of the Business Link network in 2011 and the government committed to a widening devolution agenda (Christopherson *et al.*, 2014). Concerning two of the appended papers [P7 & 8] I suggested why, and how universities might reinvigorate their relationships with local business, to retain highly skilled talent, re-exert their influence on local and regional economies and emerge as a long-term anchor institution (Sam & Van Der Sijde, 2014:892-893). As such, the overall purpose of the chapter was to present an overarching view of the phenomenon before exploring the three elements of the conceptual framework in the rest of the dissertation and the published material. In this context, these concepts have neither been debated nor explored in any depth.

Chapter 3: Research design

3.1 Research problem and justification

A growing body of research has sought to address reasons behind why incumbent firms are often displaced by entrants, under conditions of discontinuous technological change (Tripsas & Gavetti, 2000; Gavetti, *et al.*, 2005; Sandström, 2013) and/or digitalization (e.g. the process of making digital everything that can be digitized to change a business model and provide new revenue and value-producing opportunities). As discussed in the previous chapter, recent thinking around innovation policies, models and approaches, highlights the importance of entrepreneurial innovation (both public and private); an increasing reliance on Mode 2 knowledge on technological advances; and, a need for content creators, intermediaries and consumers to cooperate, learn and construct commercial and cultural artefacts to make effective contributions to regional and national innovation systems. The discussion around entrepreneurial innovation also provides a novel way in which to re-evaluate the traditional film chain. The process of digitalization allows us to reimagine this chain, as part of an evolving value network⁴. A chain dependent up to now on a set of intricate relationships constructed at the start of the last century. Such connections were underpinned by the colluding role played by first-tier cinemas, that enabled the major US studios to continue to dominate the industry, despite the fact those cinemas only constituted a small portion of the overall exhibition market (Huettig, 1944).

3.2 Research approach

The principal epistemological and ontological considerations shaping the research design and methodology for this dissertation are constructivism and interpretivism. The iterative research approach adopted to explore this phenomenon is that of pragmatism, due to the insights it offers for research into management and organisations; as well as providing an epistemological justification for mixing approaches and methods

⁴ This composite analysis is the first of its kind to examine these issues within the bounds of a national innovation system.

(Onwuegbuzie et al., 2009; Gray, 2013; Slife & Williams, 1995; Manning, 1997). As this dissertation seeks to address one key research question and three secondary research questions, I employed a mixed methodology strategy, based on a complementary relationship between the following qualitative and quantitative research methodologies:

Historical research to source key documents that describe the nature, development and performance of the film and audio industry and the national innovation system in each of the three research countries. Key documents were also examined for any mention of how the creative industries contribute to the national innovation system in each of the countries.

Multiple-case studies research to report on the actions of entrepreneurs, senior business leaders, policymakers, technologists and intermediaries in the fields of science, wireless communication, engineering and innovation, in each of three countries (e.g. one case study per country).

Collection and analysis of statistical data that complemented the historical research component.

Engaging with informants over an extended period of time requires practical solutions, which is often underexplored in the research literature. Building on the 1988 paper by Buchanan, *et al.*, entitled '*Getting in, getting on, getting out, and getting back,*' I designed a novel approach to overcome what the writers termed, the 'darker' realities of field research work (1988:67). While the 'opportunistic' side of Buchanan, *et al.*, work is acknowledged, it often appears to relate to studies in large organizations; such an approach does not necessarily help build trusted relationships and maintaining goodwill in dynamic, creative networks, spread across (in this instance) two continents and three countries (Pauwels & Matthyssens, 2004). I provide an explanation of the approaches used further in, Sections' 3.4 - 3.6; they are described more fully in the associated papers.

While in philosophical terms both positivism and constructivism paradigms are located at opposite ends of a research spectrum, it is possible to find the two employed in one study. In support of this argument, Guba and Lincoln assert there is "great potential for

the interweaving of viewpoints, for the incorporation of multiple perspectives, and for borrowing, or bricolage, where borrowing seems useful, richness enhancing, or theoretically heuristic" (2005:197). In researching topics, where 'true statements' are notoriously difficult to acquire – as in the film industry – it provides the researcher with an enriching and flexible approach, especially for the historical and case study research, while allowing them to respect Tashakkori and Teddlie's axiom to "study what interests you and is of value to you" (1998:30).

With its implied relationship between 'researcher' and 'researched', pragmatism became the most appropriate epistemological position in which to locate this study. It afforded me the flexibility to modify my methods as further evidence was revealed, sustained the methodologies selected and allowed me to construct my own response to the outcomes, over a ten year period (Rorty, 1989; Stich, 1990; Lincoln, *et al.*, 2011). And so, to a pragmatist, "the mandate of science is not to find truth or reality, the existence of which are perpetually in dispute, but to facilitate human problem-solving" (Powell, 2001:884).

3.2.1 Pragmatism

The foundations of the 'classical' pragmatic philosophical tradition can be found in the writings of Charles Sanders Peirce (1839–1914), William James (1842–1910) and John Dewey (1859–1952). All three of the founding pragmatists combined a naturalistic, Darwinian view of human beings with a distrust of the problems which philosophy had inherited from Descartes, Hume and Kant (Rorty, 1989). Despite sharing similar ideals, each had their own particular approach to pragmatism (Heelan & Schulkin, 1998; Haack, 2003).

However, there is general agreement among Pragmatists that research occurs in social, political, historical and other contexts. In this way, mixed-methods studies may include a postmodern turn, a theoretical lens that is reflective of social justice and political aims. So, embracing a pragmatic epistemological position opens the door for the mixed-methods researcher to incorporate multiple methods as well as a diverse range of approaches to data collection and analysis (Creswell, 2013:203). Pragmatic method is, therefore, concerned with the uncovering of goals, interests, values and consequences

(Bryman, 1985; Cherryholmes, 1992). It is here where it differs from neutral observation, historical and hermeneutical analysis. Pragmatism is thus an epistemology, which differs from empiricism, rationalism and historicism (Ormerod, 2006).

3.3 Methodologies and methods

Before explaining the approach undertaken for this dissertation, it is necessary to address the words 'method' and 'methodology'. According to Crotty (1998) *methods* are the practical tools you employ for undertaking research, the techniques or procedures used to gather or analyse data related to some research question or hypothesis, whereas, *methodology* (or research design) is the debate around methods or the strategy, plan of action, process or design, stipulating the bases guiding the choice and use of a specific set of research methods (1998:3). In an attempt to moderate uncertainty and a growing recognition that findings (generated from both quantitative and qualitative research methodologies) would shine a brighter light on the research questions, a mixed methodology procedure was employed in this dissertation (Creswell, *et al.*, 2003).

In addition, this approach helped to produce a more complete picture of the phenomenon, one that was more meaningful than each of the components (Feilzer, 2010; Bryman & Bell, 2015). In this case, the constituent parts were historical research, case study research and statistical collection and analysis. For example, the development of national innovation systems and breakthrough (or disruptive) technology was generated from analysis of secondary data (e.g. government, trade, and academic papers) and interviews were supported through an exploration of the impact of breakthrough technologies using statistical data. In contrast, the entrepreneurial innovation constituent was constructed entirely within case study research, a qualitative methodology involving participant observation at industry events and panel discussions (in person and online), and semi-structured interviews in a number of different countries. The key stages involved in the diffusion and adoption of the digital cinema innovation took place broadly within a 10-year period (2003–2013), and for that reason, the innovation lent itself to historical research and statistical collection and analysis.

Data were collected over a six-year period: primarily, but not exclusively from 2006 to 2010 in the US and UK, and from 2009 to 2012 in Norway. Document analysis, interviews with innovation and cinema industry experts, and statistical analysis were the main methods used in the historical research component.

Case study data collected via semi-structured interviews, short observations and document analysis were captured and analysed. Data collected from the European Audiovisual Observatory (EAO), Organisation for Economic Cooperation and Development (OECD), Screen Digest/IHC, and country sources in relation to: innovation investment and performance; size and outputs of film and audiovisual systems; international gatherings of industry players, and economic and non-economic impacts of capital investment at the box-office, all contributed to the quantitative research component. This combination of qualitative and quantitative viewpoints, data collection, analysis and inference techniques is situated at the heart of mixed-methods research and for the purpose of breadth and depth of understanding and corroboration (Johnson *et al.*, 2007:123) is one way of improving both the validity and reliability over a single method approach (McCutcheon & Meredith, 1993; Neuman, 2013; Tashakkori & Teddlie, 2008).

Any study in the film and AV industry is fraught with difficulties. First, there is the secretive nature of deal making at all stages of the supply chain from script development, through green-lighting a project to sales and distribution across many territories (Daniels *et al.*, 1998) and finally audience measurement. As a consequence, there is little published data available to analyse with any great level of statistical confidence. A mixed-methods approach provides opportunities to react to, reflect upon and incorporate emerging themes in a dynamic system requiring the researcher to embrace expansive and creative lines of inquiry. In addition, the fieldwork was spread across a number of countries poses a challenge in terms of interviewing key players; this challenge was deepened when there are both private and public players engaged in the innovation process.

The way that I found to overcome this problem, in part, was to take advantage of what Maskell *et al.*, referred to as “temporary clustering” (2006:997). My approach made use

of the fact that film and cinema professionals meet regularly at conventions, festivals and conferences. Here, their latest and most advanced findings, innovations and products are demonstrated and evaluated through a mix of exhibitions and seminars. The benefits are clear if one makes the most use of the networking opportunities – the existence of local buzz of high quality and relevance created a dynamic cluster, providing follow-on interviewing opportunities that I used to build relationships and trust, over time (Bathelt *et al.*, 2004:45; Hardy *et al.*, 2007). The existence of temporary clustering in the film and AV industry proved particularly well suited to data collection. I was able to maintain an ongoing conversation with 8 – 10 respondents in which to, develop my understanding of the subject, refine case-study ideas, test (and receive) news stories from in-country trade-press and get early warning of when they were travelling to conventions, festivals and conferences.

Two of the most important film and AV industry conventions are, the American Film Market (AFM) in Los Angeles and the International Broadcasting Conference (IBC), in Amsterdam. Both annual events attract key personnel from film and AV industries around the world to network (including cinema owners, marketing and sales agents, distributors, studio executives, national and regional film institutions). These clustered, temporary markets create a rich space in which the researcher can reach and engage with normally dispersed and difficult-to-interview senior personnel in the film and AV industry. While the AFM is focused entirely on the film industry, the IBC is the leading international forum for the electronic media industry. It attracts more than 50,000 visitors from 160 countries and responded to the emergence of digital cinema by creating a specialist day within the conference; it brings together senior personnel involved in the creation, management and delivery of entertainment content training through a mix of keynote talks, workshops, and panel discussions. Overall, such initiatives act as an efficient way to share market, product and service intelligence on specialist topics. Similar to the industry markets, these short, intensive events pull together a diverse range of high level, key industry figures to debate the most pressing issues in relevant areas for an engaged audience. In the course of this research, primary data have been collected at the events shown in **Table 3.1**, among others.

By attending these temporary digital cinema-clustering events, entry was gained to a wide range of intelligence and intellectual property that would otherwise be inaccessible via more traditional approaches to data collection. The benefits - measured in costs and timescales - make temporary clusters ideally suitable for the research agenda. Moreover, during the diffusion and adoption stages of the digital cinema rollout, such events captured the zeitgeist, where latest industry knowledge was exchanged and new management approaches explored in a way that had not been possible before.

Table 3.1: Non-exhaustive list of events attended for data collection

| | |
|---------------------------|--|
| <i>Industry markets</i> | <ul style="list-style-type: none"> • IBC, Amsterdam (2010) • IBC, Amsterdam (2008) • American Film Market, Los Angeles (2007) • IBC, Amsterdam (2006) • IBC, Amsterdam (2005) |
| <i>Industry events</i> | <ul style="list-style-type: none"> • D-Cinema Day, Amsterdam (2010) • 3D Systems, London (2010) • Digital Cinema Roadshow, Manchester (2009) • Digital Cinema Roadshow, Hull (2009) • Digital Cinema Roadshow, Cambridge (2009) • Digital Cinema Roadshow, Wolverhampton (2009) • Digital Cinema Roadshow, London (2009) • D-Cinema Day, Amsterdam (2008) • D-Cinema Day, Amsterdam (2006) • European Digital Cinema Forum, Amsterdam (2006) • D-Cinema Day, Amsterdam (2005) |
| <i>Industry workshops</i> | <ul style="list-style-type: none"> • Old Dogs, New Tricks: the many modern forms of film and their audience, London (2013) • Digital Storytelling: The Art & Science of Visual Effects, Oslo (2012) • European Digital Cinema Forum, Amsterdam (2010) • European Digital Cinema, London (2008) • European Digital Cinema Forum, Amsterdam (2008) • 9th DeSantis Center Workshop in Motion Picture Industry Studies, Los Angeles (2007) • European Digital Cinema, London (2006) • European Digital Cinema Forum, Amsterdam (2006) • 8th DeSantis Center Workshop in Motion Picture Industry Studies, Fort Lauderdale (2006) • European Digital Cinema Forum, Amsterdam (2005) • 7th DeSantis Center Workshop in Motion Picture Industry Studies, Los Angeles (2005) |

Source: Author.

A range of data gathering methods were used during these events, including ethnographic and unobtrusive approaches, direct observation, free and semi-structured interviewing. This process helped me to explore the role of the distribution and exhibition of films within the UK, Norway and the US national innovation systems; three countries that exhibit marked differences between them in terms of their approach to entrepreneurial innovation (Culkin, 2016a, 2016b [P7 & P8]). The process also contributed in the development of the three constituents of my conceptual framework (**Fig: 3.1**):

- *Constituent 1*: A state of entrepreneurial innovation whereby a sector is able to take on new paths of development or several paths at once without recourse to breakthrough technologies. It is resilient to change from outside and allows strong co-evolution between technological development and supportive institutions.
- *Constituent 2*: A state of responsive innovation of ‘incremental change’. These are minor changes among sector incumbents, possibly leading to a state of hysteresis, where there is a general unwillingness to change and little ability to renew or reinvent an area. This may or may not lead to further institutional change and if it does, only to minor adaptations.
- *Constituent 3*: The third and most negative outcome is that of the state of ‘lock-in’. The sector fails to adapt in any way to change and eventually faces economic decline or redundancy.

Following the development of the three constituents, in **Fig 3.2**, I have overlaid the outputs from published papers on the conceptual framework to demonstrate (graphically) how each contributes to the dissertation overall. Taken together with the inputs (Table 1.1 [P20]) this helps to establish how the methodology emerged over time, building from scraps of data to complex data sets and provides a contribution to knowledge. Data were collected in and from the three countries over a six-year period: primarily – but not exclusively – from 2006 to 2010 in the US; from 2006 to 2011 in the UK; and from 2009 to 2012 in Norway.

Document analysis, interviews with innovation and cinema experts and statistical analysis were used in the historical research component. Data for the multiple case

studies (each unit = one country) was collected via semi-structured interviews, short observations and document analysis were captured and analysed within two elements of the conceptual framework. Data collected from the European Audiovisual Observatory (EAO), the OECD, Screen Digest/IHC and country sources in relation to: innovation investment and performance; size and outputs of film and audiovisual systems; international gatherings of industry players, and economic and non-economic impacts of capital investment at the box-office, all contributed to the quantitative research component.

Interviews were undertaken with 20 senior executives, analysts and commentators in a mix of private and public institutions across a number of countries, but primarily in the UK, Norway and the US. My participation in a number of temporary cluster events gained me access to a further 25 global motion picture business people and cinema professionals. Taken together these contacts provided me with a robust understanding of the phenomenon (Walsh & Koelsch, 2012). A further five interviews sought to uncover issues pertinent to the emergent entertainment digital value chain in the context of organisational (and personal) learning from the experiences of the music industry. Of relevance (from all interviews) here were the strategies companies created for a journey from linear landscape to digital ecosystem and to what extent they had learned from history to avoid a possible 'motion picture digital bubble'. I was particularly interested in focusing on areas where companies, entrepreneurs and institutions have demonstrated or claimed to demonstrate, innovative behaviour in the face of the Hollywood studios' attempt to control the digital cinema rollout through their Digital Cinema Initiative (DCI).

Repeated interviews provided an ongoing commentary on the extent to which having 'first mover' advantage or being on the cutting edge is central in deploying a 'disruptive innovation' or, whether taking a different approach or being a fast follower can be as successful locally in an emergent digital ecosystem (Buchanan, *et al.*, 1988). In addition, the choice of interviewees was determined by the type of institutions engaged in digital cinema in each country; building on the technique of snowball sampling, I was able to use the relationships forged with respondents (over multiple exchanges) to engage

senior industry experts, who would otherwise remained hidden, in the darkest recesses of field research work. A further aim of the interviews was to understand the nature and strength (in terms of quality) of relationships between institutions and organisations, the type of support on offer to them, and the extent to which they engage (or don't) with the assistance on offer.

Fig 3.1: Conceptual framework - diffusion, disruption or destruction?

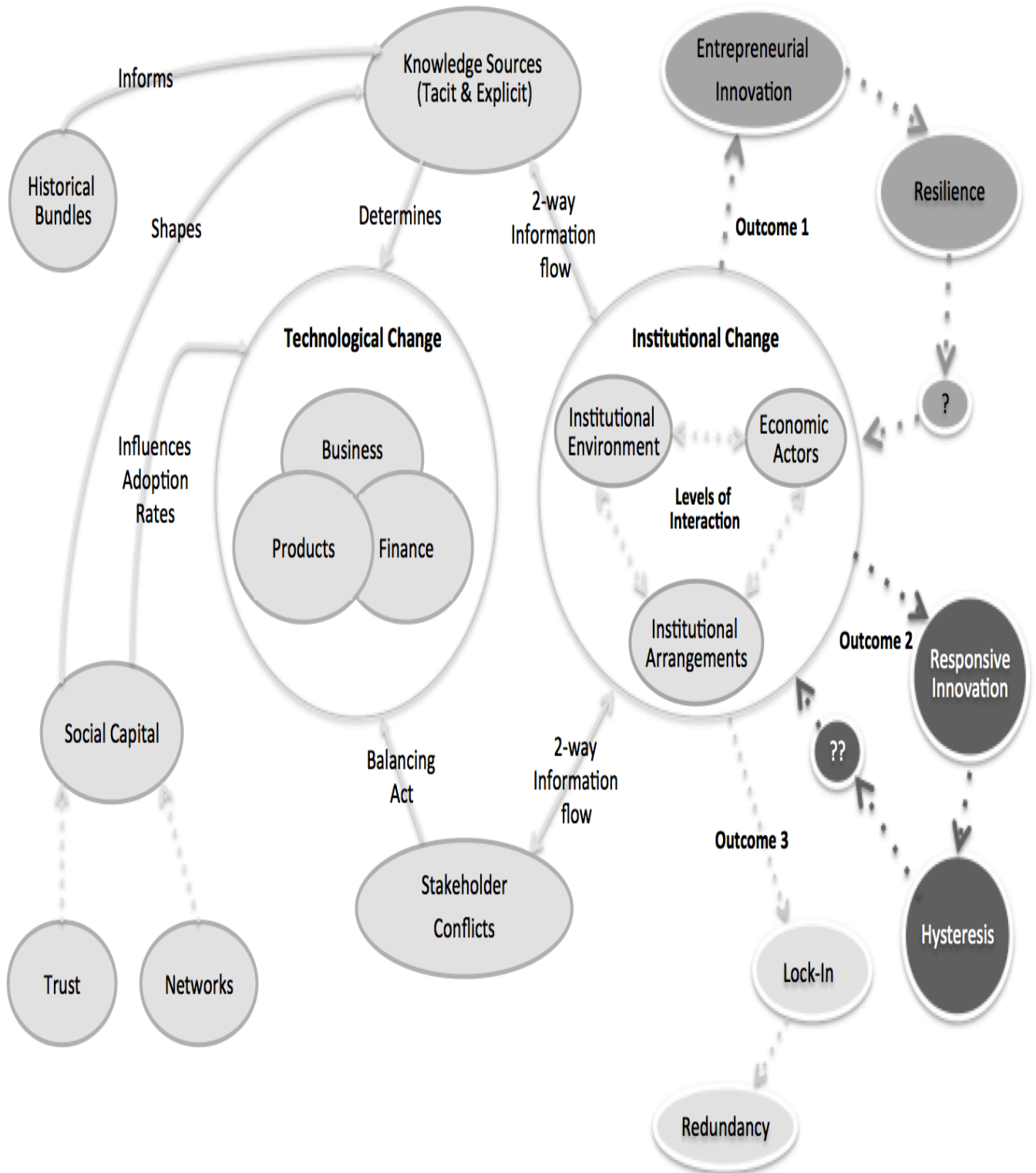
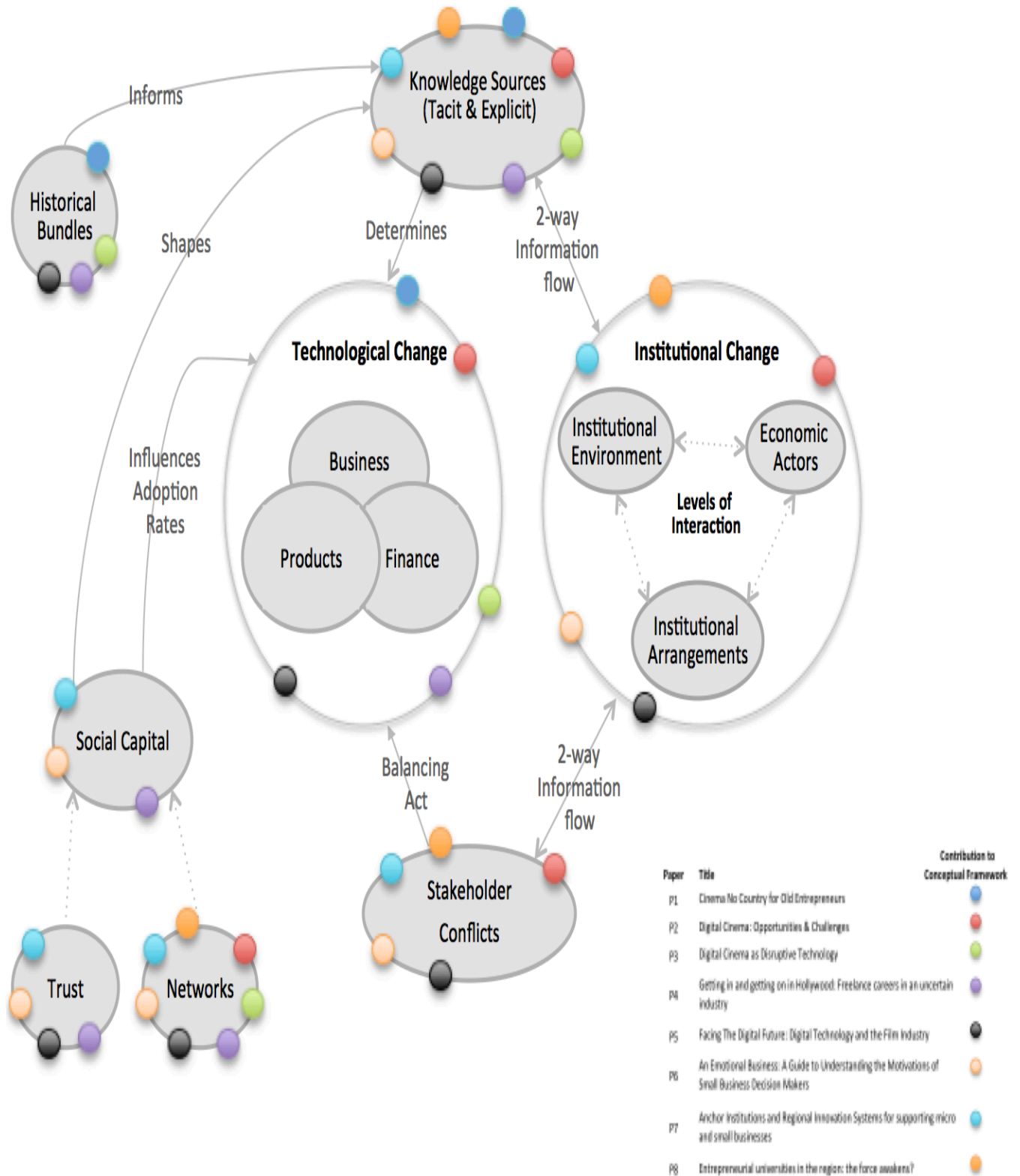


Fig 3.2: The eight published papers and their relationship to the conceptual framework



3.6.1 Historical research

History adds perspective, richness and context to the study. Historical methods of research are the process of systematically examining an account of what has happened in the past. In this dissertation, historical research was not used as a simple accumulation of facts and dates or, even a description of past events. It was employed here, to provide a flowing dynamic account of past events to recapture the nuances, personalities and ideas of events that took place during the digital cinema roll out. Following Tilly (2004) and Deflem & Dove (2013) I examined the traces of previous justifications (for the roll out) had left behind in the present. As Savitt argues, in a most ideal and systematic case, the procedure of historical enquiry recognises that 1) historical events are in the past and cannot be known as contemporary events are known; 2) historical events are unique and unclassifiable; 3) history is about the actions, statements and thoughts of human beings; and 4) historical events have irreducible richness and complexity (2009:198).

By tracing the recent historical processes, which characterised the unfolding of the events of the digital cinema deployment, my intention was to construct a robust account, identifying the actors, the decision points they faced, the choices they made, the paths taken and shunned, and the manner in which their choices generated events and outcomes (Bates *et al.*, 1998:13-14). As such, the use and the goal of historical research in this dissertation has enabled me to communicate an understanding of past events, as they unfolded over a 10-year period (Hodder, 2000). Data generated from papers obtained from each country and supported from expert interviews have been combined to paint a picture of the rollout of digital cinema in the UK, Norway and the US.

3.6.2 Case study research

Case study method enables a researcher to closely examine the data within a specific context. In this dissertation I follow Yin's definition for case study research: "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (1984:23). In addition,

the case study method “explores a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in- depth data collection involving multiple sources of information... and reports a case description and case themes” (Creswell, 2013:97).

This study is a mixed methods multiple-case study of three countries during the period they introduced the products and processes necessary to complete the digitalization of the distribution and exhibition sector of the film industry. Such characteristics make the three countries selected a contemporary and dynamic context for my study. Leading researchers (e.g. Yin, 1994; Stake, 1995; Eisenhardt & Graebner, 2007) highlight that two advantages of multiple-case studies above a single-case study are first, you are able to analyse the data within each situation and also across different situations. And, second, multiple cases allow wider exploring of research questions and theoretical evolution.

The research was performed as a longitudinal, embedded multiple-case study, providing a single setting with multiple observations at two or more different points in time (Yin, 2009:49). This allowed me to study, in-depth, behaviour of the leading actors involved in the digital cinema rollout, on a historical as well as a real-time basis. Such a research method matched my overall aim of studying a phenomenon with a dynamic process nature, and in which the continual adjustments of, improvisation and adaptation strategies, play an important role in building explanations in knowledge networks (Martin & Matlay, 2001). This was crucial as knowledge development plays a central part of the entrepreneurial process; and, what contribution entrepreneurs make to a national innovation system will largely depend on how they engage with the market during and after adoption of a new product or service.

3.6.3 Statistical analysis

Statistical information for this research mainly came from public sector organisation and film support institutions with a high authority such as the European Audiovisual Observatory, Eurostat, the UK Film Council and the European Union Media

Programme. Further statistical information came from the International Movie Database and secondary data collected in trade journals such as *Screen Finance*, *Screen International*, *The Business of Film*, *Variety* and *The Hollywood Reporter*. These raw or compiled data were accessed both in print and electronic sources. Further secondary data were collected during field trips to industry summits and workshops (in a number of countries) and included sources such as sample and real production budgets, financing structure outlines, draft policy documents, presentation handouts and descriptive accounts of co-productions. These documents were obtained either through participation in a summit (thus gaining access to restricted documents) or by specifically asking participants for written documentation.

Statistical data on exhibition activities were compiled from European Audiovisual Observatory datasets, as well as individual country sources, allowing for a comparison of statistics in regards to different classification systems. All data were critically evaluated in regards to their authenticity, credibility, representativeness and whether their meaning was clear and comprehensible. Both trade journals and film support institutions showed some bias in the presentation of collected data, but the data collection methods themselves were generally found to be sound and reliable.

3.7 Ethics

Finally, I need to speak to the question of research ethics as part of the registration process for a PhD, which is a requirement of the University of Hertfordshire Business School. The School's Ethics Committee approved the application form. In approving the request there was the question of anonymity to address. The University of Hertfordshire *Approvals Form* stipulates that, "...the anonymity of Respondents must be preserved. This involves not only withholding their names and addresses, but also other information by or about them which could in practice identify them (for example, their company and job title) must be safeguarded." The (written and oral) statement for respondents outlined that their participation would involve a semi-structured interview and that I would guarantee complete anonymity, unless they

specifically wished to be named. I also granted anonymity to contributors in panel discussions and workshops in which I participated, either in person or by other means (e.g. webinars, online discussions and panel debates).

Of those respondents involved in the business of film and especially those with strong ties to the US film studios, no respondent was prepared to waive their right to anonymity. While some respondents were happy to provide commercially confidential information, in two cases I was asked to write an assurance to protect such information. Lincoln and Guba (1985) posit that a crucial technique for establishing accuracy and credibility in case study research is for respondents to be given the opportunity to check the accuracy of the facts presented in their interview transcript – a process they refer to as “member checking”. It is possible to provide the offer formally, or informally as opportunities arise during the normal course of observation and conversation. I made this offer at the outset and at the debriefing stage but only two respondents took up the opportunity.

This is not an uncontroversial technique. On the one hand, it does provide the opportunity to understand and assess what the respondent intended to do through their action and gives them a chance to correct errors and challenge what are perceived as wrong interpretations. However, member checking does rely on the assumption that there is a fixed truth of reality that can be accounted for by a researcher and confirmed by a respondent. Equally, respondents may disagree with the researcher’s interpretations. Then the question of whose interpretation should stand becomes an issue (Morse, 1994). Although with indirect measures (e.g. passive observation, panel discussion) ethical issues are arguably less contentious, they cannot be ignored. In an indirect measure you are, by definition, collecting information without the respondent's knowledge. In doing so, you may be violating their right to privacy and you are certainly not using informed consent. Of course, some types of information may be public and therefore not involve an invasion of privacy (Trochim, 2000; Hsieh & Shannon, 2005; Trochim *et al.*, 2015).

3.8 Chapter summary

In this chapter, I have outlined the research philosophy and methodology I have implemented to explore the phenomenon of the digital cinema rollout. The research design for this dissertation required a novel approach in which to observe the transnational dimension of the digital cinema rollout, and to gather data from a wide range of institutions and professionals. My approach is based on a mixed methodology strategy characterised by a complementary relationship between historical research, case study research and statistical analysis. I have been fortunate to attend a number of professional gatherings and temporary industry clusters (e.g. industry workshops and film summits), which has allowed me to gather much of the primary data; on occasions data has emerged following invitations to speak or evolved out of participating in panel debates with intermediaries and film professionals.

Such an approach was necessary as my work focuses on disruptive technology, entrepreneurial innovation and national (and regional) innovation systems. As such, the aim of this chapter was to offer a broad overview of the current understanding of the current digital issues and draw comparisons to the introduction of technological innovations in other parts of the media entertainment landscape, which, taken together have not been the subject of previous debate and therefore remain, underexplored. The conceptual framework was formulated to manage the different concepts across the literature and structure the data gathering and analysis in the dissertation. These components served as a lens through which to explore the process and management of a high-tech disruptive innovation adoption and diffusion patterns that followed. Taken together, these components will help point towards the need for a more nuanced approach about the potential role and contribution of the digital cinema sector vis-à-vis national innovation systems. These involved:

Constituent 1: A state of entrepreneurial innovation whereby a sector can take on new paths of development or several paths at once without recourse to

breakthrough technologies. It is resilient to change from outside and allows strong co-evolution between technological development and supportive institutions.

Constituent 2: A state of responsive innovation of 'incremental change'. These are minor changes among sector incumbents, possibly leading to a state of hysteresis, where there is a general unwillingness to change and little ability to renew or reinvent an area. This may or may not lead to further institutional change and if it does, only to minor adaptations.

Constituent 3: The third and most negative outcome is that of the state of 'lock-in'. The sector fails to adapt in any way to change and eventually faces economic decline or redundancy.

Finally, the overall aim of this chapter has been to establish the methodology employed has been rigorous and appropriate whilst using widely accepted techniques, in order to obtain new insights to the research question(s) posed. I believe a pragmatic approach, characterised by a complementary relationship between historical analysis, case study research and statistical consideration has provided a richness of data from observations spanning a period of ten years. Such a method of ongoing triangulation has enabled me to provide a comprehensive understanding of the digital cinema rollout, in the context of a country's national innovation system, which reflects the pragmatic research philosophy adopted in this dissertation.

In the next Chapter I provide a brief overview of the eight published works that support this dissertation. Taken together they highlight the need for policymakers to focus their attention on emerging entrepreneurial innovations, the utilisation of current knowledge and strategies for novel solutions in order to strengthen their respective national innovation systems. The published works help explain the creation, diffusion and adoption of digital cinema, explore the new content creation opportunities they support, and how three nations in particular have sought to innovate and reorientate themselves in relation to these novel phenomena.

Chapter 4: Research paper summaries

4.1 Overview

Between 2003 and 2012 my work on the impact of digital cinema on the global film industry made me a leading national authority with an established international presence in this field.¹ Situated within the very midst of the changes to cinema, my outputs have made a significant contribution to the furtherance of knowledge around institutional, business, technological and cultural impact of digital cinema on film distribution and exhibition.

The disruptive nature of the digitalization of the film industry originally emerged from research carried out on project-based work in film production for FiRG (Film Industry Research Group), which I co-created in 1998 with Professor Keith Randle.

Early published findings established a counter-argument to the popular idea that 'Cool Britannia', a phenomenon that occurred while New Labour were in power, would be a source of 'good jobs' in knowledge-intensive and creative industries, replacing some of those disappearing from manufacturing. Between 2000 and 2004 Randle and I ran a longitudinal panel study of film crew in the US. An article comparing the US and UK contexts demonstrated that the production process in film gave rise to the informal, networked structure of labour market intelligence in the sector (Culkin & Randle, 2009 [P4]).

Exposing the fact that the US participants were increasing their use of digital technology over time, I then led a research project which produced the first academic article on the disruptive nature of digitalization on existing business models in the distribution and exhibition sector (Culkin & Randle, 2003 [P2]). This was expanded into a longer study, which explored the impact of digitalisation across

¹ In 2006 I was made the first International Fellow at the DeSantis Center for Motion Picture Industry Studies, Florida Atlantic University, at a ceremony that followed my presentation entitled *Digital Cinema as Disruptive Technology* (8th Annual DeSantis Center Workshop Summit in Motion Picture Industry Studies, November).

international boundaries, in countries producing comparative outputs on the diffusion and adoption of innovation processes (the USA, India, Norway and UK) (Culkin, 2008 [P1]).

The novel results prompted me to seek support to continue to explore these changes in Europe. In 2002, I secured the first of a number of applied research grants to support this novel enquiry. The first, for £60,000, was commissioned by the East of England Development Agency (EEDA) and built on my experiences of collaborating with UK universities and professional intermediaries. The project, 'Higher Education and the Media Industries', sought to examine the role HE could play as an anchor institution in the creative enterprises, an industry consisting of entrepreneurs, micro-firms and a small number of international conglomerates (Culkin, 2016a [P7]). I later expanded the project to consider all regional enterprises (Culkin, 2016b [P8]), which helped inform my PhD student (D. James) successfully completing her dissertation entitled, *The Knowledge Economy, Marketisation and Value Chains: The case of Higher Education in England* (2013). Based on a survey of industry opinion leaders and entrepreneurs the first of three groundbreaking reports was published in April 2004 and circulated widely (Culkin & Morawetz, 2004; 2005; 2007 [P5]).

I also co-authored a book chapter on digital cinema, which was the first to identify it as a potential 'disruptive innovation'. That piece focused on the development of possible new business models in the global international entertainment industry, examined the strategies of the companies at the forefront of the technology and the financial implications associated with change, and how different territories were adapting their business models in order to meet this disruptive technology (Culkin, *et al.*, 2006 [P3]).

In 2009, findings from the original study also gave rise to a chapter in a collection of research-based articles on labour in the creative industries (Culkin & Randle, 2009 [P4]). The reputation of FiRG grew and resulted in further PhDs: *The Marketing of European Films* (Kerrigan, 2006) and *Entrepreneurship in the Creative Industries: The rise of new forms of co-productions in the global film industry* (Morawetz, 2009).

I was awarded £2.5 million from a national competition through the Higher Education Innovation Fund (HEIF2). Film and Digital Media Exchange (FDMX); a project that ran from 2005 to 2010. These collaborative centres were the forerunner of the 'Catapult' movement: a series of centres established by Innovate UK to transform the UK's capability for innovation in specific areas and help drive future economic growth. However, these initiatives are informed by innovation policies centred on STEM – science, technology, engineering and maths – and large businesses. My research on digital cinema as a disruptive innovation suggests such an approach does not necessarily lead to productivity gains that create the added value to drive up wages and living standards, unless there is a more nuanced understanding of decision-making strategies of entrepreneurial innovators (Culkin & Smith, 2000 [P6]). A further PhD, *Entrepreneurial Characteristics of Owners in Small Firms in High Growth Markets* (Mourouti, 2005), went on to develop these ideas further.

4.2 Supporting papers

Paper No. 1: Culkin, N. (2008) 'Cinema: No Country for Old Entrepreneurs?' *Journal of Retail Marketing Management Research* 1(2). (4 citations)

“Abstract: This paper reflects on current developments in the exhibition sector of the movie industry. It will examine why the adoption of an innovation (digital cinema), capable of revolutionising the movie industry, has stumbled in its attempts to cross Geoffrey Moore’s ‘chasm’ (Moore, 1991) and will argue that despite numerous setbacks, d-cinema can now rightly be considered within Christensen’s framework of disruptive technologies.

“The author will examine the strategies of exhibitors at the forefront of the adoption process; describe some of the emerging business models being developed to facilitate change; and analyse how two different territories (the international markets of the USA and India) are realising the opportunities afforded by this technology.

“Finally he will project the overall implications of the advent of d-cinema for the future of the global movie industry and how (private and public) entrepreneurs are already changing the basis of competition in certain sectors to create new markets.”

Fit to dissertation research question:

This paper was the first to suggest that, despite their best efforts, the US studios (working collaboratively [in the open] for the very first time) had been unable to dictate to the global market their preferred single standard for the digital rollout. As such, the adoption and diffusion pattern reflected a Schumpeterian view that “every social environment has its own ways of filling the entrepreneurial function,” rather than a path-*independent* process leading to a set of predictable outcomes in the form of a single global standard (1949:70). I acknowledged that global standards may yet emerge but pointed out that this would require territories such as China, Brazil and India (large and largely self sufficient) to acknowledge that DCI standard had benefits above and beyond the technology they were currently employing - simpler, cheaper, and more reliable and convenient than established technologies. Unlike other media entertainment technologies, I had argued previously that the market for d-cinema was not large enough to support more than one standard [P2] but that was not the same as saying that DCI was the *de facto* solution. Territories such as Europe faced with an opportunity to make their own path were in danger of following the Hollywood herd rather than seeking entrepreneurial alternatives through a clear and

integrated national innovation system. For example, in this paper I describe how a benefit in reduced distribution costs could lead to a greater degree of flexibility providing improved choice to the consumer, in terms of scheduling and content. I then demonstrate how this could lead to an increase in entrepreneurial innovation involving local institutions to build local markets. Entrepreneurs, such as Europa Cinemas, were just starting to understand that such developments could create a need for more sophisticated customer relationship management techniques, as well as better marketing, in the cinema business. Founded at the start of the 1990s and with funding from the MEDIA programme Europa Cinemas was the first film theatre network focusing on European films. Its objective was to provide operational and financial support to cinemas that commit themselves to screen a significant number of European non-national films, to offer events and initiatives as well as promotional activities targeted at Young Audiences.

Finally, this paper concluded that research was needed to further explore strategies of new entrants in this market and assess the performance of third party initiatives such as the UK Film Council's, Screen Network.

Paper No. 2: Culkin, N. & Randle, K. R. (2003) 'Digital Cinema: Opportunities and Challenges'. *Convergence: The Journal of Research into New Media Technologies* 9(4) winter. pp. 79-98. (24 citations)

“Abstract: While the process of distributing and exhibiting a film has changed a little over the past century, Digital Cinema, the process of using digitally stored data instead of strips of acetate, has arrived. With technology continuing to develop, it is expected that d-cinema will overtake the quality of conventional cinema within the next two years.

“This paper considers how the film industry might affect the transition from film to digital products. Rather than contributing to the continuing debate about the qualities of the competing technologies or the creative merits or demerits of digital product, this paper focuses on the search for new business models in an industry wedded to an analogue process.

“It considers the strategies of implications associated with change; and how different territories might adapt in order to accommodate to this transition.”

Fit to dissertation research question:

When this paper was first submitted, digital cinema was in its infancy with fewer than 160 screens converted globally – 76 in the US, 22 throughout Europe and 33 in China at the time of publication. There was little awareness of the impact that digitalization – disruptive innovation – was about to play in the music industry; companies offering technology could push this evolution forward without approval from studios and acceptance from the exhibitors. There was little, or no agreement between the parties about the way forward. Technology firms could not push this evolution forward without approval from studios and exhibitors; the reason being that unlike previous innovations in cinema like surround sound, acetate/cellulose film, or 35 and 70mm formats, digital cinema was incompatible with conventional cinema technology. The two were mutually exclusive; meaning that before digital cinema could be rolled out across screens it would have to have the backing of the studios in order for them to provide product to the cinemas. It was assumed that in North America, Western Europe and Japan investment from studios and exhibitors would be required to fund the change. Therefore they would, no doubt, expect to have the final decision on determining standards; at the time it was perceived to be uneconomic for others to establish alternatives.

However, the implications of the digitisation of cinema would not impact on the technology alone. In this paper it was (for the first time) proposed that a digital cinema would require less human input into the running of the facility. In theory the potential of technology could allow a cinema to run automatically, with internet bookings and ticketing, vending machines for refreshments and a system of screening the film that is run from a central control centre. In practice employees would continue to feature in the ‘front of house’ running of cinemas if for no other reason, to intervene if the system goes dark. However, backstage less labour will be required and the role of projectionist may be taken on by managers.

Paper 3: Culkin, N., Morawetz, N. & Randle, K. R. (2006) ‘Digital Cinema as Disruptive Technology’. In Van Der Graaf, S. and Washida, Y. (eds.) (2006) *Information Communication Technologies and Emerging Business Strategies*. Hershey: Idea Group. (3 citations)

“Abstract: The distribution and exhibition of motion pictures are at a crossroads. Ever since the medium was invented in the 1890s the ‘picture’ has been brought to the spectator in the form of photochemical images stored on strips of celluloid film passed in intermittent motion

through a projector. Now, at the beginning of the 21st century, an entirely new method has emerged, using digitally stored data in place of film and barely needing any physical support other than a computerised file. This opens an intriguing portfolio of revenue-generating opportunities for the movie exhibitor. This chapter will give an overview of current developments in digital cinema (d-cinema). It will examine potential new business models in an industry wedded to the analogue process. The authors will consider the strategies of companies at the forefront of the technology; implications associated with the change; and how different territories might adapt in order to accommodate this transition.”

Fit to dissertation research question:

This paper built on P2 above, situating digital cinema adoption in 2005/06 within Christensen’s framework of disruptive technologies. At the time, rollout had not yet reached Moore’s chasm, never mind crossing it. As such, attention was focused on how the major players in (US Studios) had sought to contain d-cinema within the film industry supply chain.

Research indicated that the market for d-cinema exhibited network externalities and that a common standard was desirable from the perspective of major incumbents. However, the discussion on standards also revealed the conflicting interests a diversified and vertical integrated corporation such as Sony faced, as the competition had become a ‘preliminary battle’ for the consumer electronics market. Sony’s strategy (with its knowledge of the consumer market) appeared to be geared towards delaying the progress of the whole transition to digital cinema for its own benefit, in other media entertainment markets.

The paper was the first to discuss the complexities linked to the transition of celluloid to digital and its impact on incumbents. The emergence of new markets and new entrants was examined and it was speculated that d-cinema had significant benefits to entrepreneurial innovators (creative destruction); conversely, the US studios had a strong leverage (digital rights management) to exploit the technology to their advantage (sustaining innovation).

The question was posed, that given the change in the terms of competition (linked to potential hold up problem), possible future scenarios could lead to further diversification and even the disintegration of major distributors. In addition the paper raised critical issues associated with d-cinema, such as alternative content, training and the possible dangers of ‘lock-in’ for the US studios via an over-reliance on digital rights management as a strategic tool.

Working in films (book chapter)

Paper 4: Culkin, N. & Randle, K. R. (2009) 'Still "A Perfect World for Capital?" Hollywood in an era of globalizing film production'. In Smith, C. and McKinlay, A. (eds.) *Creative Labour and the Labour Process*. London: Palgrave. (52 citations)

“Abstract: This chapter explores issues in film industry related employment in the US, reporting on a study carried out between June 1999 and March 2002 around the themes of ‘getting in, staying in and getting on’ in the Hollywood (Los Angeles) visual media industries. The study set out to explore the experience of freelance workers within a sector changing rapidly at both a global and local level (Wasko, 1994) and is part of a wider comparative project concerned with similar issues in the UK.”

Fit to dissertation research question:

The findings reported here emerged out of earlier work from members of the University of Hertfordshire’s, Film Industry Research Group (FiRG); work concerned with the nature of employment and management in the UK film industry, with the relationship between the US and UK industries and with a comparison between the industries in the two countries. Our research suggested that technological change comprised the single most important influence on employment and industrial relations in the electronic entertainment and media industries in the 20th Century, would, no doubt continue in to the next century. FiRG research into the impact of digitalization on business models would aid the rise of regional film production centres around the world that could finally mount a serious challenge to the Los Angeles film cluster (Culkin & Morawetz, 2007 [P5]). If Hollywood had been the first choice for the majority of US producers, other countries would not only offer aggressive competition seeking to attract US investment but also seek to build their own capacity and competencies, as part of a mission driven national innovation system (e.g. New Zealand, China and Brazil).

Our conclusions of freelance working in the US entertainment industries provided a graphic picture of the insecurity and uncertainty of project based employment in the creative industries. Nevertheless, we were able to demonstrate that this was a ‘structured uncertainty’ whereby industry features were well known, understood and acknowledged as a fact of occupational life. If creative content jobs in the UK are seen simply as replacing lost jobs from more traditional industries, we may will witness the growth of a (freelance) workforce that is left to shoulder the burden of delegated risk against such a background of structured uncertainty. In effect, UK policy makers would need to design a dynamic national

innovation strategy that fully understands the nature and role of the creative industries, in order to contribute the productivity growth afforded by more traditional industries.

Digital cinema and disruptive technology (reports)

Paper 5: Culkin, N. & Morawetz, N. (2004; 2005; 2007) *Facing the digital future: Digital Technology and the Film Industry*. Industry report commissioned by the East of England Development Agency. (7 citations)

Between 2000 and 2004 Randle and I carried out a longitudinal research project investigating how film and television employees operated within the largely freelance Hollywood labour markets. The study also identified that the US participants were increasing their use of digital technology over time, prompting Culkin to design a further study to consider the likely impact of similar changes in the UK. This led to the commissioning of industry reports: *Digital Technology: Implications for the Film Industry in the Eastern Region of the UK* for the East of England Development Agency (2004) and in the same year *Facing the Digital Future, Digital Technology and the Film Industry*, also for the EEDA.

Furthermore, it provided the underpinning research that led to the creation of the Film and Digital Media Exchange (FDMX). Overall, the various outputs provided significant insights, over a decade on the developments, adoption and diffusion of various entrepreneurial innovations and subsequent reactions of both incumbents and new entrants.

Decision-making in small firms

Paper 6: Culkin, N. & Smith, D. V. L. S. (2000) 'An Emotional Business: A Guide to Understanding the Motivations of Small Business Decision Makers'. *Qualitative Market Research: An International Journal* 3(4). pp 145-157. (216 citations)

“Abstract: This paper argues that the way in which the UK Government, operating through various departments and quangos, approaches policy implementation designed to improve the effectiveness of the small business sector, is based on a flawed understanding of how small businesses actually operate. This naïve, over-simplistic understanding of the motivation of those in the small business sector means that many government interventions that are made, are blunt instruments destined to fail, given the limited understanding shown of the complexity of the small business market.”

Fit to dissertation research question:

This paper presented evidence from two recent studies among small firms: a series of large-scale qualitative studies undertaken for a blue chip company and a mixed study of the Business Link network. The findings clearly demonstrated a need for UK government to develop and refine their understanding of both the context and composition of small firms and the markets within which they operate, in order to regardless of whether they saw themselves having a legitimate role to play as an entrepreneurial agent in exploiting new technologies. One key insight the research produced informed us that small business owners describe themselves as 'operating on their own in a "cruel world"' [P6:150], despite, having an extensive support and information network, which included, accountants, suppliers, staff and competitors.

The recommendations was based on first, getting to grips with the emotion, ambiguity and complexity that characterises this market, and second, establishing an intervention framework that stimulates entrepreneurial innovation among small firms. The paper predicted that there would be a competitive advantage for a government who, at the outset of the intervention process, can help define the problem in a manageable way, while at the end of the intervention helping the decision maker through the decision making process. The government at the time (through its Business Link network) was in the right position to take advantage of that opportunity, but without a dynamic national innovation strategy, UK policy makers did not have the vision to see it through.

National and regional innovation systems (journal articles)

Paper 7: Culkin, N. (2016a) 'Anchor Institutions and Regional Innovation Systems for supporting micro and small businesses'. *e-O&P, The Journal of the Association of Management Education and Development (AMED)*. Summer. pp. 22-32. (0 citations)

"Abstract: Universities should, and must take a lead role as an *anchor institution* within their region, especially in light of the Brexit decision. Such a role will include providing a wide range of formal and informal support, knowledge and resources targeted at micro and small businesses (MSBs), complementing usual Small and Medium Enterprise (SME) support. Drawing on my evaluation of the winners of the annual Times Higher Education (THE) Entrepreneurial University of The Year Award and analysis of the Chartered Association of Business School (CABS) Small Business Charter Awards, I suggest four different ways to

enhance collaboration to enable MSBs to make maximum use of 'anchor university' support."

Paper 8: Culkin, N. (2016b) 'Entrepreneurial universities in the region: the force awakens?' *International Journal of Entrepreneurial Behavior & Research* 22(1). pp4-16. (Single author: 0 citations)

“Abstract: The growth in popularity of the Regional Innovation System (RIS) approach has, in part, been driven by the need for economies to respond to the after shocks of the global financial crisis. At the same time, we see the term *Anchor institutions* is used increasingly to describe organisations that have an important presence in the local community and make some strategic contribution to the local economy. The purpose of this paper is to consider the needs of the micro and small business ecosystem through the lens of the entrepreneurial university as a regional anchor institution.”

Fit to dissertation research question [P7 & P8]:

The results emerging from both papers point towards a need for national and regional policymakers to embrace an entrepreneurial innovation culture that actually enables firms and systems to evolve over time and this would be far more effective than the policies proposed in the November 2015 Comprehensive Spending Review; the outcomes of which will see some of the most robustly evaluated programmes, designed to support small firm growth, closed down to be replaced with a commitment (by government) to further cut red tape and extend small business rate relief for an extra year.

I propose that (national and) regional innovation systems for the glue that binds together economic and social interaction between agents, span the public and private sector to engender and diffuse innovation within a region, which is embedded in wider national and global systems. I discuss the dimensions that underpin the RIS and NIS) concept, elsewhere in this dissertation but briefly they are i) the interactions between different actors in the innovation process, ii) the role of institutions, and iii) the use of regional systems analysis to inform policy decisions. Finally, drawing on contemporary literature on the entrepreneurial university and field visits to the eight Entrepreneurial Universities of the Year Award winners I recommend a number of ways in which collaboration might be enhanced to ensure MSBs can make maximum use of the advice and support on offer from universities playing the anchor role, once occupied by the Business Link network.

Technological know-how is arguably the most important class of intangible assets not universally available, but it does flow from universities. This may be one of the why social researchers claim that technological innovation is a sociological concept and that the concept of basic research originates from natural scientists. Overcoming 'bottleneck assets' enable entrepreneurial innovative firms to enter new markets and quickly establish a degree of competitive advantage over incumbents. They are able to 'scale-up' a process, which causes 'hills' – and sometimes 'mountains' – to appear on otherwise flat competitive landscapes; in doing so, contribute to a nation's productivity gains, which in itself major driving force behind wealth creation and economic growth.

Finally, I demonstrate how value can flow to entrepreneurial innovative firms from the astute creation, combination, transfer, accumulation and protection of intangible assets. Such assets are the new 'natural resources' of the global economy but they are not naturally occurring and depend on managerial action and, in part, on mission-led national systems of innovation.

Chapter 5: Disturbing effects of digital cinema rollout

D-cinema is certainly a new technology but there is limited evidence to suggest this is delivering, or is likely to deliver, a new culture for cinema.

(McDonald, 2016)

5.1 Introduction

Productivity is the main determinant of economic development. Growth in productivity is, therefore, one of the major driving forces behind wealth creation and economic prosperity; and, strong economic growth is behind enhancements in living standards. We can measure productivity growth as the ability to produce more for less, and *inter alia* it is the result of improved products, services, processes, technologies, organisational structures and ideas. These measures can inform us how efficient an economy is functioning in both a static and dynamic sense. Economists usually distinguish between two main types of efficiency: allocative or productive efficiency, and dynamic efficiency (Hodgson, 1988). The former is a static concept, concerned with how much can be produced from a given mix of resources at a particular moment in time (e.g. firms operating at the current technological frontier). The latter is a dynamic concept, concerned with directly pushing forward the technological frontier; in the past this has often involved governments investing in new technologies to encourage firms to adopt best practices of the moment (Mazzucato, 2013).

In this dissertation I have sought to answer one question – ‘can a high-tech breakthrough approach deliver a novel supply and demand solution’ – through the lens of digital cinema. To arrive at the answer, I looked at whether institutional activity could help to explain the outcome, i.e. does government or public institutions have any role in pushing forward the technological frontier?

In the McDonald quotation, used at the start of this Chapter, he appears to suggest that given the [implied] power of the US Studio system, the answer is no. However, the creative industries contain a multitude of players across its value networks. These

range from creative talent to production companies, distributors, exhibitors, finance players, sales agents, broadcasters, cable companies, home video retailers, and a plethora of Internet companies, from individual creative entrepreneurs to micro (project-based) firms, independents, medium and large incumbents, right up to the US (major and micro) studios and their distributors.

In 2007, I recognised that having transformed content production, the digital frontier had moved on to distribution and exhibition, an area previously under the complete control of the US studios and specialised distributors, broadcasters and home entertainment retailers (Culkin & Morawetz, 2007). It became apparent that new business models would be required and experimentation with release strategies would become the norm. This would present opportunities for entrepreneurial innovators to respond to changes in the means of distribution to usher in an era that was, less about delivering content and more about providing content and allowing consumers to find it for themselves. In essence, digital distribution would reduce the distance between consumer and producer, across a range of platforms. In turn, this would speed up consumer response to product, and make demand more immediate; and present cinema with the opportunity to reposition itself from the last stop on an analogue train line to that of a major hub for audiences on the digital highway. Based on my observations of what doors Napster and others had opened in other parts of the creative content industries, I was of the view that those who could not supply their product instantly, on multiple platforms would miss out on a growing business (best case) or find themselves out of business (worst case). Moreover, new emerging delivery channels would substitute established and understood channels of distribution (for example, television, pay-per-view and DVD).

For the next phase of the digital cinema rollout concern would be less focused on technology and more about distribution, market access and audience development. What was not obvious was how revenues would be generated and, more importantly, shared between the new distribution channels. Revenue streams would emerge if players were allowed to experiment by, and between, incumbents and new entrants especially in the area of exhibition, as this is where revenue is first

generated. The major US studios had already staked out their digital claims - building technical infrastructure to maintain control of the process. But in cost-efficient online environments, entrepreneurs would have plenty of opportunities to circumvent costly intermediaries. Activity in the digital cinema rollout in the three countries, at the time of the global economic crisis, is summarised in **Table 5.1**. What we can see from the paths followed is the newly digitised film industry has, over the last decade lived a great revolution that now embraced cinema. Perkis (2009) suggested digital projection was a silent revolution for the cinema audience. While Hanson (2007a) argued it involved a technical innovation with the potential to change the industry and create new business models for entrepreneurial firms prepared to take advantage of the possibilities brought about through the transformation. Such a technical innovation can also make an economic and cultural contribution to a nation's growth in productivity.

On the other hand, digital cinema provided a low-risk opportunity for cost eradication and value extraction for the US studios. Although, such benefits could not occur until exhibitors had embraced the new technology. Once global technical standards were published in 2005 (the Digital Cinema Initiative specifications), the main obstacle for adopting the technology was the lack of a viable business model, one that made commercial sense for the exhibitors (Culkin *et al.*, 2006). The adoption and diffusion phase literature informs us that only when mutually attractive business models are agreed between players can the value chain grow. Or, perhaps as Weiser speculated, "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it" (1991:94); echoing the view of Perkis above (Perkis *op. cit.*).

Table 5.1: Selected country status – 2007

| Country & D-screen penetration (%) | Digital cinema status |
|------------------------------------|---|
| <p>Norway (3.4)</p> | <p>An industry-wide approach has been taken for the d-screen conversion. All major players are financing a comprehensive study into technology, business models and financing implications and permutations of the digital rollout. There are two R&D projects taking place at present: the NORDIC project, an innovative idea in its own right was trialled in 11 screens with a second 10-screen trial organised with the Digital Cinema Alliance. Both of these schemes highlighted the importance attached to cinema by the government. Complete conversion is anticipated within the next 2-3 years. Learning for rapid digital conversion is based, in part, on the experience of screen advertising company CAPA who switched from 35mm to digital screen advertising overnight in January 2002.</p> <p>In addition to the NORDIC project, Norway is also home to a unique exhibition structure in which municipally owned and operated cinemas hold in excess of 70 per cent of the market. All cinemas (both municipally and privately owned) co-operate under the aegis of the Norwegian exhibitors' organisation Film & Kino. Under a Films and Videograms Act (1987) a 'Cinema Fund' levy was imposed on all cinema ticket sales (2.5%) and on video/DVD sale and rental transactions (NOK 3.50 per transaction). The levy currently brings some EUR 7.5–8 million per year into the Fund.</p> <p>Film & Kino has negotiated a virtual print fee (VPF) financing model directly with Hollywood studios. Producers and distributors provide 40% by way of VPFs, and the cinemas will contribute 60%. Film & Kino will use NOK 100 million from the Cinema Fund to subsidise the cinemas' contribution to the system. Producers and distributors pay VPFs over a period of up to six years, while cinemas can choose whether they pay cash, installments or take out a six-year loan.</p> |
| <p>UK (4.1)</p> | <p>Europe's most advanced digital cinema territory due to government action in the form of the UKFC Digital Screen Network (DSN) initiative. Arts Alliance, the project's facilitator, is in charge of this publicly-funded rollout for the purpose of increasing admissions to specialised films. On the commercial front, Odeon has recently converted two multiplexes to all-digital as part of a nine-month test.</p> <p>There is considerable movement behind the scenes in the UK, which could translate to relatively rapid rollout when the conditions are right. At the end of this process the UKFC will have helped to convert 7 per cent of the total UK screen base. Unlike Norway, public involvement has merely facilitated the conversion without any suggestion of involving other stakeholders in the process.</p> |
| <p>USA (5.0)</p> | <p>By the end of 2007, the number of digital screen globally stood at 5,500 across 44 territories. In the US some 2,000 d-screens (total market of 40,000) had been deployed, driven primarily by cinemas in the d-screen network from AccessIT, who had been backed by the US distributors with a VPF deal. Technicolor also received support but is yet to move from beta-test mode. Predictions suggest the market will evolve towards full compliance with the Digital Cinema Initiative (DCI) specifications, released in June 2005.</p> <p>However, the market is not fully defined for one major factor: the grouping of three leading exhibitors, the NCM umbrella and more recently DCIP (Regal, AMC/Loews, Cinemark), is yet to pronounce on what course of action it is to take to convert its screens to digital technology. The scale of its circuit, which bringing together nearly 14,000 screens (35 per cent of the market), means that whatever it intends to do will have a significant effect on market development.</p> |
| <p>Postscript</p> | <p>By the end of 2012, global digital screen conversion stood at 90,000 or 75 per cent of the world's screens. Converting the remaining 25 per cent presented a real challenge. In North America, 85 per cent of auditoriums (36,000 screens) were digital while in Europe the figure stood at 67 percent (25,000 screens).</p> |

Source: Based on Author's research and Digital Screen (2007).

To explain how the digital cinema rollout continued, the original research questions were formulated to explore the constituents of my conceptual framework:

- *Constituent 1*: A state of entrepreneurial innovation whereby a sector can take on new paths of development or several paths at once without recourse to breakthrough technologies. It is resilient to change from outside and allows strong co-evolution between technological development and supportive institutions.
- *Constituent 2*: A state of responsive innovation of 'incremental change'. These are minor changes among sector incumbents, possibly leading to a state of hysteresis, where there is a general unwillingness to change and little ability to renew or reinvent an area. This may or may not lead to further institutional change and if it does, only to minor adaptations.
- *Constituent 3*: The third and most negative outcome is that of the state of 'lock-in'. The sector fails to adapt in any way to change and eventually faces economic decline or redundancy.

Over the next three sections, the overall goal is to present findings from my fieldwork and publications to arrive at the answer to my research question(s) in regard to business, industrial and technological change. The objective being to explore the new content creation opportunities the innovation supports, and how three nations, in particular, have sought to innovate and reorientate themselves in relation to these novel phenomena. In the spirit of this approach, the paper draws upon a selection of interview quotes, where appropriate to explore the creation, diffusion, and adoption of a high-tech breakthrough product. The findings reported seek to explain the distinct characteristics of digital technologies that are implicit in an evolution from, stable to fragile product innovation, and further highlight the need for a dynamic approach to entrepreneurial innovation within a nation's innovation system. The wider implications build on extant innovation literature to examine the diffusion, adoption, and use of knowledge in the rollout of digital cinema technology.

The conclusions reported in Chapter 6 will suggest a radically different reading of both disruptive innovations and national innovation systems than has been offered in previous accounts. By viewing the digital cinema rollout, as a case study situated within an increasingly mobile sector, I suggest that technological factors need to retreat in importance, behind entrepreneurial innovation, as a key driving force in reaching markets and building audiences.

5.2 From supply chain to value networks

Throughout the fieldwork for this dissertation it became increasingly apparent that, in creating the DCI, the US studios saw digital technology as the vehicle through which they could continue farming the first-run movie market, to reap the financial benefits from exploiting bytes to project content in cinema. Despite the opportunities digital cinema presented the studios, through their insistence on compliance to the exacting standards proposed via the DCI, once again demonstrated their capacity to shape the speed and direction of the latest entrepreneurial innovation in an increasingly networked entertainment environment. This protectionist mindset remained at all levels during the adoption phase; despite views expounded at temporary clusters (e.g. increase in choice and the flexibility offered by adopting digital cinema over celluloid) that would bring to the US and European markets. However, during the information-gathering phase, it became evident that both industry and audience alike were largely unaware of the range of opportunities digital cinema was capable of delivering. Exhibitors especially were simply unfamiliar with the process for accessing knowledge about its potential value. As we know, innovation propels markets with Schumpeter's, *gales of creative destruction*, whereby new technologies blow away the old. However, only radical innovations create major disruptive changes and for that to happen, continual adjustments of *improvisation* and *adaptation* strategies emerge from entrepreneurial managers actively engaging in knowledge networks (Martin & Matlay, 2001).

When asked about the digital cinema would be disruptive or deliver the same product more effectively, at the American Film Market, one respondent said:

I fail to see how we...[the theater owners]... are going to benefit from this change. Most of our profit comes from the concessionary business, out front [of house]. The distributors will make certain they have their backsides covered before they'll offer something outside the box. (Sen Exec [1]: US Cinema Chain)

This view is juxtaposed with the views of the Studio:

You ain't seen nothing yet. Digital will give you more choice than you have ever thought possible. Adoption and DCI standardization will lead to the most significant and fundamental change to the way movies are made and exhibited.....and then there's 3D. (Senior Exec [1]: US Studio)

A very similar position was taken at a major conference in Amsterdam; suggesting new entrants had recognized its value:

As you see with 3D, digital cinema has opened up many great opportunities for the market. I know the Met Opera is looking seriously at making their productions available... (Sen Exec [1]: US Digital Intermediary)

When, in fact 3D was never part of the DCI specification; however, in Scandinavia, the need for exhibitors to invest in technology to support 3D projection was further enhanced through such views:

They can say whatever they like...[about 3D]...but quality will make a difference... eventually the latest technology will be an asset. Exhibitors must innovate because in a fast evolving technology world the highest 3D cinema experience will make their cinema different. (Sen Exec [1]: US Digital Intermediary)

And:

3D is getting everybody excited. 3D is making people go from this.....“well I'm not really sure”.....to..... “we've got to get onto this 3D stuff” because you heard stories about the multipliers.....when anybody suddenly gives you a multiplier at 4, 5, 6, 7 8 times the normal box office, you'd better watch out because that's serious..... (Sen Exec [2]: US Studio)

The introduction of 3D into the digital cinema narrative was difficult to comprehend for three reasons. First, there was no mention of 3D in the DCI specifications; second, the technology had stalled on more than one occasion in the past, first appearing in the 1950s in Arch Oboler's film, *Bwana Devil* with a second wave initiated by the same producer in his film, *The Bubble*; finally, the costs for digital cinema conversation were high compared to 35mm projectors without the added cost of a silver screen (and polarized glasses) required to view 3D films.

5.2.1 The Strength of the straitjacket

It was challenging to reconcile such public expressions with the position of the MPAA who, in a 2002 press release, quoting its then President, Jack Valenti “that unless we find suitable technological armor to protect the digital movie, we will soon be standing in the ruins of a once-great enterprise.” This is not an isolated case of myopia; earlier in 1974, Valenti warned that the infant cable industry would become “a huge parasite in the marketplace, feeding and fattening itself off of local television stations and copyright owners of copyrighted material. We do not like it because we think it wrong and unfair” (Corliss, 2007). And, later during talks to establish the WTO, the interests of the US film, television, music and publishing industries were at the forefront of Valenti’s thinking, when it came to discussions around cultural exceptions. French negotiators proposed at the General Agreement on Tariffs and Trade (GATT) round in 1993 that an exception or exemption rule be applied, which was eventually supported by the European Commission. The USA voiced strong opposition to such a proposal - whereby cultural goods and services were recognized differently from other commercial products - and exempt from international treaties and agreements. Valenti who had a significant role in the lobbying and negotiations was angered by the defeat for the US audiovisual industry, which he would refer to as the jewel in America’s trade crown, making over US\$530 billion, in excess of 5 per cent of gross domestic in 2001 (Bruner, 2008). What this position did make clear was the central role that the audiovisual industries played within a US innovation system; a system that relies heavily on and benefits from the basic precept of free trade whereby goods should circulate the global market without distinctions based on national origin. As Pager (2011) posed the question, why culture, and why audiovisuals in particular? Answering his own question, Pager went on to argue that the basic economics of creative content production - subject both to economies of scale and consumer preferences for homegrown content - matters when it comes to full-length feature films. Throughout history, the high fixed costs required to produce original content, compared to the marginal costs of exhibiting it, favoured a US system whereby producers could rely on a large, wealthy domestic audience. In a largely linear (or non-networked) world Hollywood's resultant scale economies

supported bigger budget productions that experienced a competitive advantage in global markets (2011:69). In short, the audiovisual industries are an integral part of the DNA of the US export machine.

This position was preserved during recent (and ongoing) negotiations the proposed Transatlantic Trade and Investment Partnership (TTIP). The European Commission stated that, they would ensure that any agreement with the US would not jeopardize the ability of the EU and its Member States to maintain their commitment to cultural diversity and fully implement and adapt their policies and instruments to the rapid evolutions of the environment (EC, 2013). The obvious goal was to protect and promote not only domestic culture but to maintain measures to limit the diffusion of non-EU creative works (e.g. French TV Channel quotas and subsidies to cinema). The European Parliamentary Research Service (EPRS) reported that the European Parliament had adopted a resolution calling for all cultural and audiovisual services, to be excluded from the TTIP negotiating mandate. Furthermore, in 2013 the Council had agreed that audiovisual services would not be covered in the mandate; the EU argued it was under the legal obligation (2005 UNESCO Convention [unsigned by the US]) to protect and promote the diversity of cultural expressions, a principle also enshrined in the EU Treaties.

In bypassing the UNESCO convention, the US simply turned to Foreign Trade Agreements brokered on a one-to-one basis with other countries. As Crane (2013) described, FTAs eliminated film quotas and promoted exports of US films to other countries. The US government's reaction to the UNESCO Convention and its use of FTAs further reflected the enormous importance that the US government attaches to its film industry. Cultural industries, such as film, music, and television, are major sources of US exports. What is equally important is that of the 20 countries who signed FTAs with the US, many saw a rapid decline in their domestic film markets as indicated by the market share of domestic films e.g. Canada and Australia, which were no longer able to adequately protect their industries (2013:372). Moreover, in relation to trade agreements, individual EU member states have a veto in areas

related to culture and the audiovisual sector if an agreement threatens cultural and linguistic diversity (EPRS, 2014). The Audiovisual Media Services Directive, which contains measures to promote European audiovisual content both for broadcasting services and video-on-demand services, would also remain outside any future TTIP agreements. The implication being that public institutional instruments (e.g. taxes on film tickets, co-production agreements, digital rights management) would remain available for Member States as a way to maintain their commitment to cultural diversity. The Nordic Councils of Artists (NCA) sent an open letter to the trade commissioner, to ensure that the aims and obligations of the UNESCO Convention were fully respected in the TTIP negotiations, further reinforced the European position. Specifically, they asked that any agreement should secure a broad and future-proof exclusion of audiovisual services that were both technologically and platform neutral (NCA, 2014).

It is not difficult to see the dominant position held by the US approach to trade and culture, especially when it comes to the important box office league tables, which form a major marketing component for the US studios and their overseas distributors. In 2015, cinema admissions growth in the EU was down to US studio titles that accounted for 18 of the top 20 performing films, exhibited that year. It is also worth highlighting that nine of the top ten grossing films consisted of sequels, prequels or spin-offs. According to the European Audiovisual Observatory (EAO, 2016), admissions for European films declined in 2015, causing European market share in the EU to drop to 26 per cent with only two European films appearing in the top 20, French action thriller *Taken 3* and German comedy *Fack ju Göhte 2*; at the same time US studios continued to make less movies and the EU produced more movies. Boosted by the success of films such as *Spectre*, UK (qualifying) films captured a record domestic market share of 44.5 per cent, and giving it the highest share of the EU market. However, the year before without *Spectre* the UK domestic market share stood at approx. 26 per cent, a figure similar to Norway (EAO *op.cit.*). In addition to the state of EU Cinema market in 2015, the TTIP negotiations highlight the twin concerns of fragmentation and territorial barriers, which do not exist in a

physical single market (e.g. the US) but have long been argued hold the EU market back (e.g. only 7% of European SMEs sell cross-border). If Europe could create a Digital Single Market (DSM), it could contribute €415 billion to the European economy allowing business to trade, innovate and interact legally, safely, securely, and at an affordable cost (Junker, 2016). Once complete, significant opportunities for entrepreneurial innovation and a new space for true scale-up of businesses - given a market of 500 million consumers - to compete with the largest US firms will exist.

5.2.2 *The value of nothing*

Given the fact that the US did not sign up to the UNESCO Convention, it is hardly surprising that the representatives of their audiovisual industries carry on in the spirit of Jack Valenti. According to, President of Independent Film & Television Alliance, based in Los Angeles, when asked about the DSM:

“It’s like Chinese water torture...[w]hen you look across the full spectrum of proposals, it’s terrifying. Each proposal has a lot of detail...the Commission is attempting to do two different things, which operate together: Firstly, limit the ability of copyright holders to license content, whether it’s film or television, on a territorial exclusive basis, and secondly, which we are finding increasingly difficult to justify, is the persistent taking pieces of our rights, such as the ancillary online services of broadcast and catch-up rights.”
(Jean Prewitt, 2016)

Elsewhere, McDonald (2016) has constructed a coherent argument, which similar to the IFTA stance lays clear that, combating protectionism and anti-piracy have always been fundamental policy priorities for the MPAA. The organisation had, over the years, built a coalition of partners in order to protect their members: the legal, through anti-piracy litigation; the political, by joining with other trade groups from across the copyright industries to lobby for stronger domestic copyright laws (and influence US trade policy); and the discursive, seen in the production of statistics to evidence the value of copyright to the US economy and consequent harms caused by piracy (2016:686). Not surprisingly, given the economic value placed on the audiovisual industry by the US government, Prewitt joined IFTA after nearly a decade as a senior US government official and lobbyist in Washington D.C., where she represented film and entertainment interests and the high-technology community. Before that, she was Senior Vice President and General Counsel of United

International Pictures (the international distribution entity formed by then-Universal, Paramount and MGM-UA studios) and managed legal and government affairs on a worldwide basis (IFTA, 2016).

It is not difficult to see that the MPAA's 'protectionism' policy has had a significant cultural and economic influence on the US approach to national innovation from the days of its founding fathers. Such a linear approach to innovation management is further reinforced through the work of Andrew Currah (2006) who in the course of a major study interviewed senior managers across the media, entertainment and technology industries, including unique access to decision-makers in each of the six Hollywood studios. He arrived at the conclusion that managers in these firms were tied to a specific view of the networked environment, which advocates the use of Digital Rights Management (DRM) to realize the absolute defense of property rights around the world. Crucially, this vision has steadily been globalized through intellectual property laws, which are bolstered by the influence of the US state in trade negotiations. However, the approach advocated by the US studios will be shown to have slowed down the market development opportunities offered by digital cinema, provided new entrants with gaps to compete in and leave certain entrepreneurial incumbents with alternative strategies to follow. The question of whether this would be another example of a disruptive innovation or the gales of creative destruction will now be explored.

Despite the possibilities of improved choice and an increase in flexible programming (Culkin, 2008), the DCI standards looked far more disruptive when observed from a linear lens situated in the US domestic theatrical market:

It would be wrong to say that there aren't some amongst our members [theater owners] who are concerned they're going to lose control of their business; and that d-cinema gives back control to the studios, digitally.

(Senior Exec [1]: US Trade Assoc.)

A similar view from one of its members was equally concerned:

This is not a situation [in reference to the DCI standards] we have not seen coming. The Studios are getting more powerful. If they're not being swallowed up by bigger

media firms they're making more and more of the same. When will we get Toy Story 4 or a Fast and Furious 4, 5 or 6?
(Sen Exec [1]: US Cinema Chain)

And,

The new kids on the block [in reference to digital intermediaries] are quick to point out that we can make a killing by digitising adverts and running more before the movie starts. It won't take long before three or four of them merge and we're left buying from one national supplier. That's less choice in my language
(Sen Exec [2]: US Cinema Chain)

Such fears were not unfounded as consolidation in the film industry continued throughout the digital cinema rollout via a series of mergers and acquisitions. The impact can be clearly seen in **Table 5.2** below and highlights the intricate network of firms that forms the US Studio oligopoly of today. In 2005, the Paramount Motion Pictures Group purchased Dreamworks SKG in a deal worth US\$1.6 billion. However, this did not include Dreamworks Animation, which went public in 2004. That did not stop NBCUniversal acquiring it for US\$3.8 billion in 2016; while in between, Disney acquired Lucasfilm for US\$4.04 billion, in 2012. As such Disney took ownership of the Indiana Jones and Star Wars franchise and also included Lucasfilm's operating businesses in animation, audio post-production, consumer products, live-action film production video games and visual effects. A year later, Walt Disney Studios bought the distribution and marketing rights to future Indiana Jones films from Paramount Pictures, although the latter would maintain distribution rights to the first four Indiana Jones films and receive 'financial participation' from any additional films (Kroll, 2013).

Table 5.2: US studio ownership

| Studio parent | Major film studio unit | Founded | Independent movies | Genre movie | Animation | Other divisions & brands | North American market share |
|---|------------------------|---------|---|--|---|---|-----------------------------|
| Warner Bros. Entertainment | Warner Bros. Pictures | 1923 | | New Line Cinema DC Films | Warner Animation Group Cartoon Network Studios | Catle Rock CNN Films Flagship HBO Films | 17% |
| Walt Disney Studios (The Walt Disney Company) | Walt Disney Pictures | 1923 | | Disneynature Lucasfilm Marvel Studios | DisneyToon Studios Lucasfilm Animation Marvel Animation Pixar Disney Animation | WDSMP ESPN Films Maravista Films UTV Pictures | 26% |
| Fox Entertainment Group (21st Century Fox) | 20th Century Fox | 1935 | Fox Searchlight Pictures | | Blue Sky Studios 20th Century Fox Animation | Fox 2000 Pictures Fox Star Studios New Regency | 13% |
| Universal (Comcast) | Universal Pictures | 1912 | Focus Pictures | Gramercey Working Title Films | Big Idea Entertainment Bullwinkle Studios DreamWorks Illumination Entertainment Universal Animation | Focus World High Top Releasing NBCU Ent. Japan Oriental DreamWorks | 13% |
| Sony Pictures (Sony) | Columbia Pictures | 1924 | Sony Pictures Classics Destination Films | Screen Gems Affirm Films Stage 6 Films | Sony Pictures Animation Sony Pictures Imageworks | Sony Pictures Releasing TriStar Pictures TriStar Productions SPWA Triumph Films | 8% |
| Paramount Motion Pictures Group (Viacom) | Paramount Pictures | 1912 | | Image Pictures | Nickelodeon Animation Paramount Animation | Comedy Central Films MTV Films Nickelodeon Movies Paramount Famous Productions | 8% |

Source: Various.

In Europe, similar concerns of the potential bifurcation in cinema were being expressed; this one describing a conversation with a senior US studio Executive, at the Screen Association:

...while they recognise the issue around the smaller guys, I've heard nothing from the studios or their distributors..[the big guys]..that the position of the small guys is a consideration in terms of what they want from digital. It's a very broad brush, as many need to convert as quickly as possible. And we need to re-frame the discussion, just so we don't end up with a big guys versus small guys scenario, which is a particular concern for me. (Sen Exec [1]: EU Trade Assoc.)

Remarkably, despite being a founding member of the European Free Trade Association (AFTA) – an organisation that operates in parallel with the EU and participates in the single market – the view from Norway did not necessarily support the immediate position above. In an interview, with a Senior Executive from one of the largest Cinema Operators, their reaction to whether a collective response to the digital rollout was good, or bad for the cinema ecosystem was the complete opposite:

Yes, absolutely. We were able to just turn the tables overnight or certainly during a year; of course the largest exhibitors, we have paid more than we could have paid, and the smaller cinemas, they got away cheaper and more simple....[laughter]...they wouldn't have been able to have done a single switch from 35 to digital on their own. Teeny weeny small cinemas. But together we are fine.

(Sen Exec [4]: Norwegian Cinema Chain)

And, when asked, how they - the Norwegians - persuaded the US studios to allow the smallest of cinemas to participate:

...not for the financiers, not for the Hollywood studios at least, but most of the money came from Norwegian Government, about a hundred million Norwegian Crowns came from the Norwegian Government, and all that money is....taken care of by Film & Kino...they have a fund, the Norwegian Film and Cinema Fund; they are operating that fund on behalf of all of us..protecting us all.

(Sen Exec [2]: Norwegian Cinema Chain)

In the UK, three interviewees responded to a question about how the cinema landscape might look if the US studios placed more value on democracy as opposed to DRM, as had been promised:

Chance would be a fine thing, but who's to say in a certain number of years the Windows collapse, for example. Cinemas might turn in to venue like the O₂ one that collects all sorts of different forms of entertainment from all sorts of things and re-distribute it and show it digitally.

(Senior Exec [1]: UK Trade Assoc.)

If you look around the world....all the Hollywood major studios [have] got what they call a classics division, an independent division, every single one. Why? Because they've seen the value of having them not just in their own domestic market but in the markets they operate round the world, ownership of a wider, more diverse range of film. But, just one owner or supplier....

(Exec [1]: UK Govt Agency)

What you fail to realize is that digital cinema was not on top of the Studios 'To Do' list. It was maybe 27. So, the idea that sharing screen space, which may cost them money would have been much lower down the food chain, in their thinking.

(Sen Exec [1]: UK Govt Agency)

Given the UK dependence on US product, any opportunities for growing the UK market, would be stifled due to the lack of appetite from the US to enable a radical change from a supply chain to value network. However, in Scandinavia in general and, Norway in particular, such opportunities had not only been recognized but were actually playing out in the market.

I think most of what the..[audience] notice is that they have content they didn't have before...like Opera, we had great success with screening Metropolitan Opera. We started with that quite early, 2008...an immediate success.....soccer from South Africa in 3D...heavy metal concerts from Sofia; ballet; symphonic orchestras....it's really starting to grow.....[T]hey notice the quality in the screening.....it's the same quality the first and screening number a thousand.

(SenExec [1]: Norwegian Cinema Chain)

A Swedish interviewee suggested that the content was spread right across the sector, it was just the timing of the presenting content that differed:

[T]he flexibility in programming has been a great achievement for us.....both alternative content and also the flexibility in putting up shows, that's the biggest victories we have won, I think, because for larger cities, it has never been a challenge to have films. The distributors have always provided us with films, so for the smaller cinemas, that is an issue, but not anymore.

(Sen Exec [1]: Swedish Cinema Chain)

Notwithstanding the position that the audiovisual industries play in the US economy, such views from leading stakeholders highlights the opportunity for domestic policymakers to focus their attention on emerging entrepreneurial innovations, the utilisation of current knowledge and strategies for novel solutions to strengthen their respective national innovation systems.

5.2.3 The charge of the rollout

All of the trade and culture tensions between the US and European markets raise a number of questions around the effects the digital cinema rollout had on the European market. In this section I describe the adoption process of change across the European cinema market, as part of a recent research project with a colleague in

Spain. To achieve the goal, the time taken to adopt the technology in cinemas was analysed. The adoption phases were identified on the diffusion curve (following Rogers, 2003), which allowed us to build a country classification according to penetration rates across Europe (2005 – 2013).

To recap, Rogers (2003) work on the diffusion of innovations brought together diffusion research traditions from a number of different fields. Diffusion is ‘the process in which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication in that the messages are concerned with new ideas’ (2003:5). Rogers proposed four main elements of the diffusion of innovations, which arise from this definition: an *innovation*, *time*, *communicated* [through certain] *channels* and a *social system*. Because of this, ‘individuals can be classified into adopter categories on the basis of when they first begin using an idea’ (2003:253). For this part of the analysis, we were only concerned with the innovation use over time; feedback from interviews with individuals are reported and treated separately in this dissertation. Once adoption phases and country clustering were developed, we investigated the rate of change over the pan-European exhibition market². The prevalent business model employed to facilitate this change was, in the US principally through the use of the third party intermediaries and the Virtual Print Fee (VPF). As detailed elsewhere, under the VPF system, the distributor paid a fee-per-print to contribute to the purchase of the digital equipment (Culkin, 2008). But what worked for the US market is not necessarily replicable across the European cinema landscape. In comparison, the European cinema market is fragmented, consists of a long tail of small cinemas, embraces multiple languages and a wide variety of operators with limited knowledge network flows.

² A HBS Working Paper is currently in production. It will describe the building of research model, data and methodology employed; the analysis of the diffusion curve and country clustering according to the innovation adoption (over time) and the findings and conclusions (Culkin & Marco, 2017). An overview of the approach and conclusions, including issues for future research will be discussed in this dissertation.

As a result, a major problem existed in establishing VPF contracts. For example, in 2007, 31 per cent of European screens were mono-screen cinemas and only 9 per cent of European cinemas were classified as multiplexes, compared to 35 per cent in the US. It was argued that this would probably slow down the diffusion and adoption rates across Europe (European Commission, 2010). What I was also keen to evaluate was the constructs involved in the post-adoption diffusion stages of acceptance, routinization, and assimilation to try and understand, which cinemas accepted the technology (e.g. sustaining innovation) and which cinemas embraced the technology to create novel supply and demand solutions. For this purpose, a battery of key film industry indicators were collected and analysed, for example market dimensions, cinema density, demand, profitability, ticket price, market film shares and the concentration in the distributor and the exhibitor sector. Based on discussions with industry commentators this is the first time such an approach (modeling empirical data) has been undertaken in the European cinema market. As a Senior Executive in an international consulting firm commented:

If the motive of the UKFC was to increase choice in the market, it will be very interesting to see if you can pull off this piece of analysis. If I can help fill in any of the country gap data that you can't access, let me know. I'm intrigued.

(Sen Exec [1]: UK Digital Intermediary)

The findings from the statistical analysis of the digital cinema are explained in the next section.

5.3 The disruption of markets

As digital cinema rollout involved potential change in the supply chain, one question arises over how the concentration in the distributor and the exhibitor sector might be affected. While digitalization lowers barriers to entry into the distributor sector; simultaneously, it increases the economies of scale related to both film distribution and exhibition. In theory, the largest companies, therefore, stand to benefit far more from the transition to digital than smaller players. For example, concentration levels in markets could increase through mergers and acquisition activity, at one end of the spectrum and a percentage of smaller firms exiting at the other end. The lower

barriers to entry to the distributor sector and the likely increase in economies of scale could lead to fundamental changes across a fragmented European theatrical landscape. Given what we know of the potential disruptive opportunities of the digital cinema rollout, a number of outcomes were possible. To what extent they manifested themselves in the market would depend on the power relationships among the many actors and their often mutually exclusive objectives.

Distribution, you know, the studios are obsessed about the big release, even though they have their own platform to release independent films, their budgets and their incentives are set around the big releases. (Sen Exec [1]: UK Studio)

The film industry is by definition....becoming more global and it's going to be harder and harder for the single territory insular company, so for that reason alone, digitalisation is accelerating, which depending on where you're sitting will signal the success or failure of these companies. (Sen Exec [2]: UK Govt Agency)

Our motive was not to play with this new technology. Our motive...[was]..to get more choice in cinemas. (Sen Exec [1]: UK Govt Agency)

This analysis will seek to explore the impact of the digitalization process on the European cinema market. To this end, data was employed to: first, defined the adoption phases on the innovation diffusion curve and developed a country clustering by phase, and: second, assessed statistically the changes related to digital cinema through the analysis of a set of indicators representing the multiple dimensions of the film industry. **Table 5.3** describes the selected indicators and data availability across these years. The original database included annual data from 36 European countries covering the period 2005 to 2013³. The data was accessed from two main sources, the *European Audiovisual Observatory's Yearbook* and the World Bank database.

Our model sought to uncover what, if any relationships existed between the variables. Due to its dynamic nature, we created a longitudinal design to utilize repeated assessments of the dependent variable (cinema screen) at different time

³ The authors are in the process of incorporating new data for the years' 2014, 2015 & 2016, prior to the completion of the HBS Working Paper.

points. The phases defined over the diffusion curve according the digital cinema adoption provided us with the specific time moments where the indicator is measured. This is a repeated measures design, since the same subjects (the European countries) are measured at different times.

Table 5.3: Cinema indicators, 2005 – 2013

| <i>Indicator</i> | <i>Years</i> | <i>Description</i> |
|--------------------------|--------------|--|
| DigScreens % | 2005-2013 | Digital screens as a percentage of total screens, in % |
| 3D DigScreens % | 2009-2013 | 3D screens as a percentage of digital screens, in % |
| Screens x Site | 2007-2013 | Number of screens per site, in units |
| Screen Density | 2005-2013 | Number of screens per 100 000 people, in units. |
| Admiss x Person | 2005-2013 | Cinema admissions per inhabitant, in units per person. |
| Ticket Price | 2005-2013 | Ave. cinema ticket price, in Euros (total GBO divided by Admissions) |
| Ticket at constant price | 2005-2013 | Average cinema ticket at constant 2005 base price, in Euros |
| GBO x Screen | 2005-2013 | GBO per Screen, in EUR thousand. |
| Nat Share | 2005-2013 | National market share, in % of total admissions |
| Non-Nat Share | 2005-2013 | European Non-national film market share, in % of total admissions |
| US share | 2005-2013 | US market share, in % of total admissions |
| RoW share | 2005-2013 | Rest of World market share, in % of total admissions |
| Top5 Distr % | 2005-2013 | Top 5 Distributors market share, by revenues, in % |
| Top5 Exhib % | 2005-2013 | Top 5 Exhibitors market share, by screens, in % |

Source: Culkin & Marco (2017 [forthcoming]).

The observations are not independent when repeated measures are taken over the same subjects, breaking one of the assumptions of the independent or unrelated ANOVA model. Hence, a repeated-measures ANOVA was required for dealing with non-independent data. The mixed design ANOVA dealt with non-independent data as the model involves two types of independent variables, referred to as factors by Raykov and Marcoulides (2008); first, a between-subjects factor, whose levels are represented by independent subjects, which provides unrelated measurements, whereby each subject gives rise to only one score on this factor. Second, a within-subject factor, whose levels represent repeated measurements conducted on the same subjects (time factor).

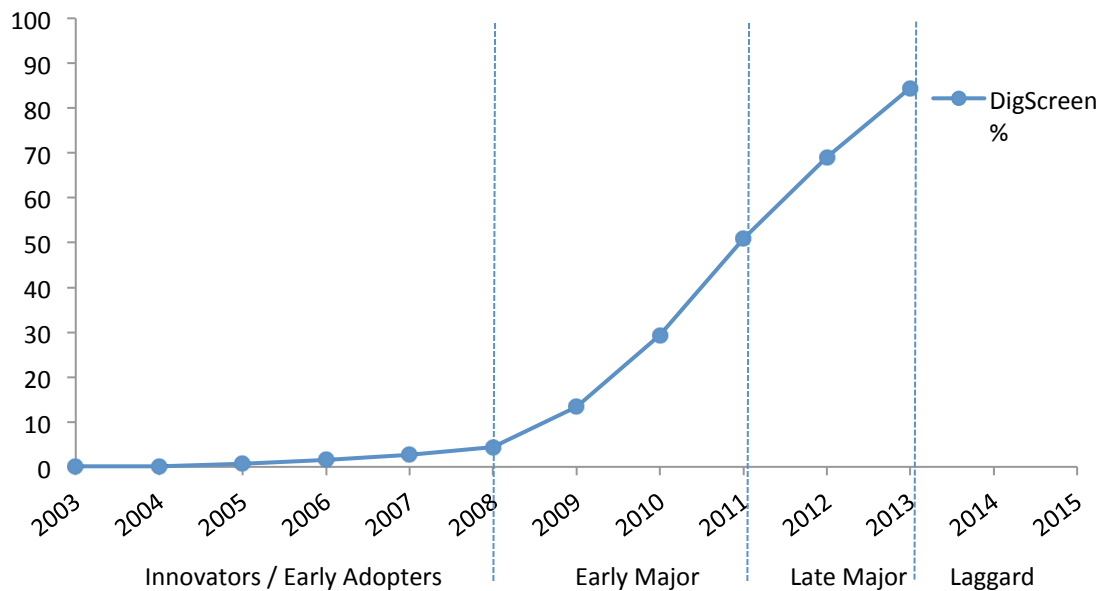
As a direct consequence, the specific model employed was a two-way mixed ANOVA model, as we had one within-subject factor and one between-subject factor (See **Appendix 2** for complete model and descriptive statistics).

5.3.1 The diffusion of digital cinema

The diffusion of the digital cinema rollout was measured by the percentage of digital screens over total screens at the end of each year (DigScreen%) and the rate of adoption over time defines the diffusion S-curve (Rogers, 2003). In **Fig 5.1** the diffusion curve of digital screen deployment since 2003 and adopter phases are built on the work of Rogers (2003). The five original phases have been reduced to four by merging the Innovators and Early Adopters phases, which creates:

The Innovators / Early Adopter phase (2002-08): represents a little over 4 percent of digital screens. After the first digital projection in 1999 (*Star War I: The phantom menace*) uptake was minimal. The diffusion rate gathered pace in 2005, in line with the announcement of the DCI Specification. In the US digital projection was largely embraced on a commercial basis, in larger theater chains as part of the AccessIT network. In Europe, take-up remained in what might be referred to as the experimental or exploration phase. The European rollout was moving out of adopter phase and into the early majority phase, when the global financial crisis struck in 2007.

Fig 5.1: European diffusion S-curve of digital screen innovation. Digital screens over total screens (%)



Source: Culkin & Marco (2017 [forthcoming]).

The uncertainty of the VPF as the sole financial model also prevented acceleration among the early majority adopters. The first European VPF was signed in mid-2007, but the availability of VPF financing alone did not account for the rates of deployment found in the US (EAO, 2011).

The **Early Majority phase (2008–11)**: saw adoption rate reach the mainstream tipping point of 51 per cent. Momentum can be seen gathering in 2009, underpinned by a sudden growth in interest of 3D, following the phenomenal success of *Avatar* and the marketing ‘buzz’ surrounding its reception. *Alice in Wonderland*, *Toy Story 3* and other 3D content followed in 2010. It was argued that the rebirth of 3D was crucial for digital cinema crossing Geoffrey Moore’s “chasm” an argument which purports a chasm exists between the early adopters of a new product and the early majority and very few products make it over the chasm and into the EM phase. For a period digital 3D movies out-performed their 2D versions at the box office, increasing dramatically digital screen conversion rates. Belton (2012) even postulated that 3D created the novelty crucial to product differentiation for the customer and the economic incentive required for the innovation adoption took place. However, in the course of this work 3D failed to provide a business model for exhibitors to digitize, merely a revenue generating exercise during the 2D digital rollout. In fact, James Cameron (Director of the film, *Avatar*) arrived at a similar view, arguing that the US studios were not concerned with the artistic possibilities of 3D more as a means to make money (Foxx, 2013). Other factors that did contribute to the rate of diffusion included the price of equipment – the average cost of a projector in 2009 was €52,000 compared to €83,000 in 2005 (EAO, 2011) - and the existence of a government intervention subsidizing conversion costs not only on commercial but also on cultural grounds. The introduction of a number of public initiatives in 2009-10 led to two smaller countries - Luxembourg and Norway - converting all their cinema screens to digital during 2011.

The **Late Majority phase (2012-2013)**: saw the average rollout across the 32 countries reach 84 per cent and two out of three countries pass the 80 percent conversion mark and 2D again becoming the market driver during this phase. The

contributing factor for the re-emergence of 2D came with full conversion under VPF schemes of large in-country circuits apropos a necessity for creating sufficient 3D screening capacity in which to take advantage of the *Avatar* effect. However, the findings also uncovered the existence of public initiatives encouraged smaller cinema screen providers to convert to digital.

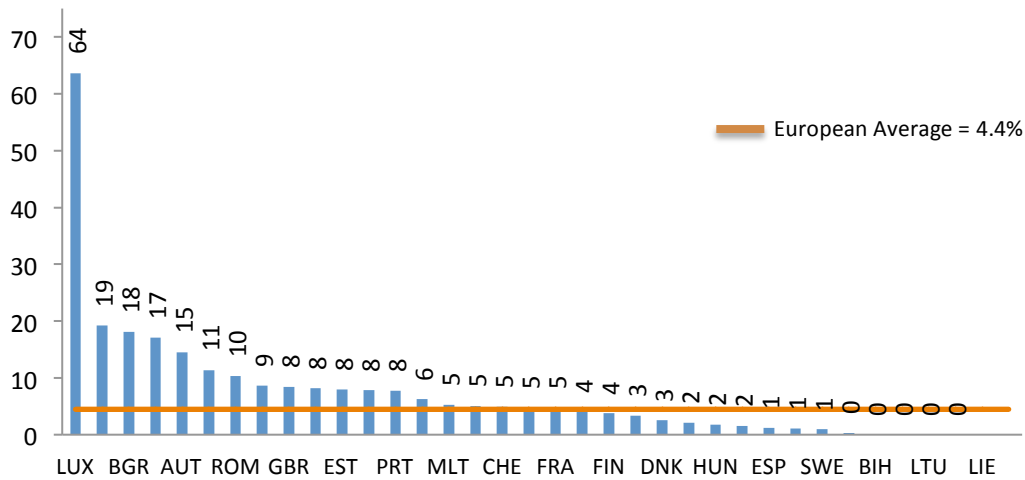
The **Laggard Adopters phase** (end 2013-): saw a position whereby almost 85 per cent of screens had converted to digital; seven territories had reached 100 per cent conversion, and high penetration rates could be identified in most European markets. These findings signal the end of 35mm celluloid film thereby increasing pressure on those distributors and exhibitors still dependent on it. The pace of change towards digitalisation could be described as a sense of urgency to end this dual-distribution system (Crofts, 2011; Hancock, 2013; EAO, 2016).

5.3.2 Member state clustering

Once the timing and phases of digital diffusion were defined, a country cluster analysis was undertaken. Each country was classified into one of four groups corresponding to the existence of digital screens in each country at December 2008, 2011 and 2013. The results are described below:

Early Adopters (EA cluster) is formed from the top quartile of digital screens in existence by country as at December 2008 (see **Fig 5.2**). The nine EA countries in this upper quartile comprised, Luxemburg (LUX), Belgium (BEL), Bulgaria (BGR), Iceland (ISL), Austria (AUT), Norway (NOR), Romania (ROM), Ireland (IRL) and Great Britain (GBR). As demonstrated in **Fig. 5.2** below, this cluster achieved a digital screen conversion rate of ≥ 8.4 per cent by the end of 2008, which is nearly double the average rate (4.4%) across all countries and is represented by the horizontal orange line in **Fig 5.2**.

Fig 5.2: European digital screens penetration at December 2008 (%)



Source: Culkin & Marco (2017 [forthcoming]).

Most of the countries in this upper quartile benefited from public initiatives or early VPF agreements, including UK Film Council who chose Arts Alliance Media (a third party Integrator) to implement its Digital Screen Network between 2005 and 2007 on behalf of the UK Government. As a senior executive from UKFC said at the time:

We were about and still about on the whole just to make sure that there's a wide range of films then being seen in the cinema, so you know, it was...that was the....that was what it's about. But people forget that, they think it's about digital cinema; it wasn't. Absolutely wasn't. (Senior Executive A; UKFC)

Another member of this cluster, Norway was remarkable for three keys reasons. First, the country's unique exhibition structure, which was created in 1913 (as part of the Film Theaters' Act) was fully implemented in 1925. This approach recognised all parts of the cinema business were important. It also broke with the US vertical economy, which linked production and exhibition, and enabled Hollywood to dictate what content was shown, where and when, leading many Norwegian Directors to claim that too little of the economic profit was fed back into feature film production (Solum, 2016:185). Over the next 90 years, this system saw municipally owned and operated cinemas hold up to 90 per cent of the market, organizing themselves first as the National Association of Municipal Cinemas (NAMC) and now as 'Film & Kino'. Second, when the Cinema Law was rewritten in 1987, the film cultural arm of the

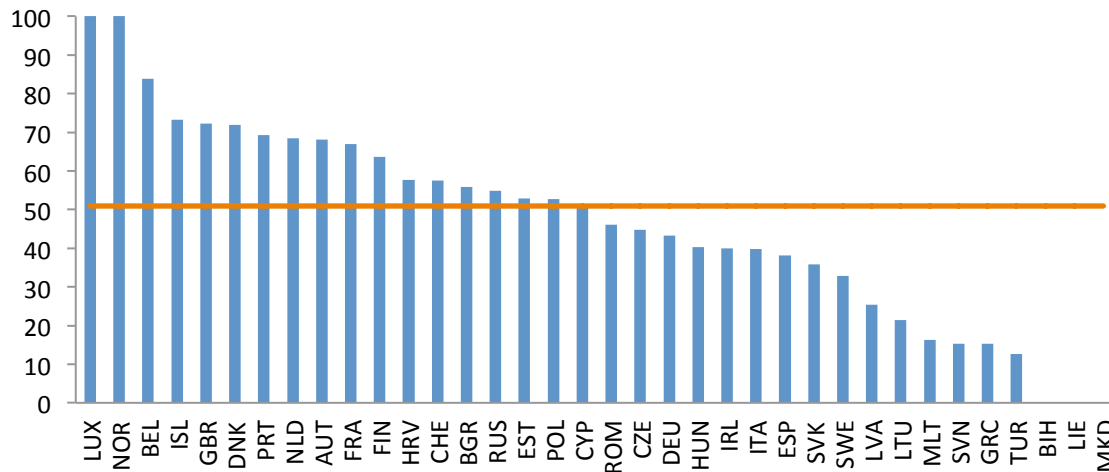
NAMC (known as, the Norwegian Cinema and Film Fund), rendered obligatory a 2.5 per cent cinema and video transaction levy and with it, a mandate to develop the exhibition sector with the fund. In 2011, the year of the digital cinema rollout, this amounted to some €8 million. Even before the digital conversation had begun, the government had recognised the standing of a nation-wide cinema structure, as a means of disseminating film culture. Through a series of green and white papers (1990 - 2005) the government created a de-centralised cinema structure via a series of film and cultural policy instruments designed to promote not only the Norwegian film industry but also ensure their cinema system provided audiences with the ‘best cinema system in the world’ (Asbjørnsen & Solum, 2003). Third, Film & Kino negotiated directly with the US studios a VPF financing model. Producers and distributors contributed 40 per cent of the VPF costs, and cinemas the remaining 60 per cent. Film & Kino used NOK 100 million from the Cinema Fund to subsidise the cinema’s contribution to complete the rollout. Producers and distributors repaid the VPF over a period of up to six years, while cinemas were free to choose whether they paid cash, in instalments or took out a six-year loan (Cabrera Blázquez, 2010).

Early Majority adopters (EM cluster) are those countries not previously identified as EA countries, which are in the top half of the digital screen rate at December 2011 (see **Figure 5.3**). All of them had reached penetration rates above the 51% average rate at this time (orange line in **Fig. 5.3**). These are 10 countries: Denmark (DNK), Portugal (PRT), Netherlands (NLD), France (FRA), Finland (FIN), Croatia (HRV), Switzerland (CHE), Russian Federation (RUS), Estonia (EST) and Poland (POL).

By 2011, two countries, Luxemburg and Norway, were 100 per cent digital. When compared to the first wave from 2008, the 2011 ranking reveals some obvious country jumps; most of which coincide with the launch of a public initiative and / or the signing of VPF deals, but not all from incumbent firms. For example, in France, Ymagis a young digital intermediary firm deployed 1,000 digital systems by the end of 2011. ZON Lusomundo Portugal’s largest cinema chain completed its digital

deployment of 213 full digital cinema systems with XDC, another young digital intermediary, formed in 2004 as a spin out from EVS Broadcast Equipment.

Fig 5.3: European digital screen penetration as at December 2011 (%) (— ave 51%)



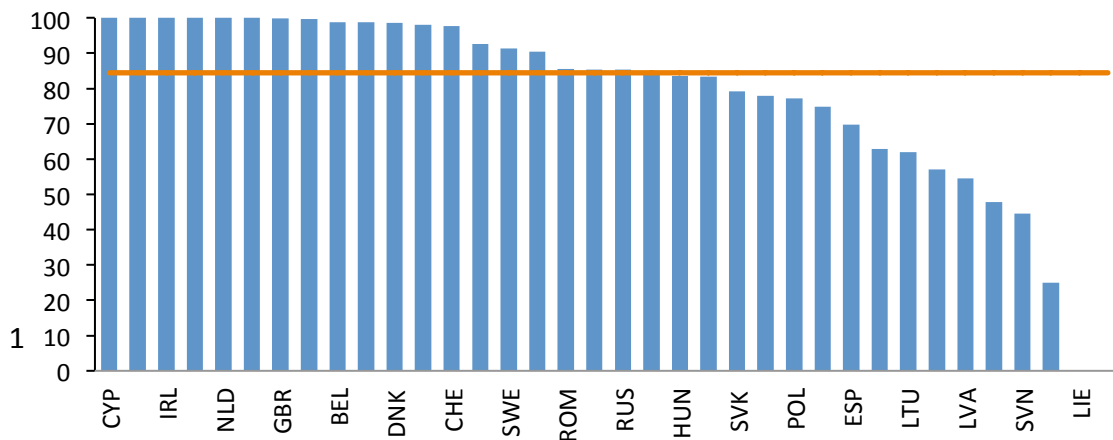
Source: Culkin & Marco (2017 [forthcoming]).

What is significant about these two young, entrepreneurial firms is that the US studios assumed that digital cinema would strip out costs and reduce the number of links in the film supply chain. However, within five years of operating, Ymagis posted a turnover of €39.7 million (2012) with 38 per cent of its revenues generated outside France. The following year, it raised €11.6 million when it floated on the Euronext stock market, accelerating growth by 60,000% in five years (Deloitte, 2013). Ymagis went on to acquire XDC (at the time trading as Dcinex) in 2014 to create the European leader in supply of digital services and equipment to the cinema industry. At the end of 2016, the Ymagis Group had a market capitalization of some €80 million. This new group is now structured around three main units: CinemaNext (exhibitor services: sales and field services, software solutions, customer service and consulting), Eclair (content services: post-production, theatrical delivery, digital distribution, versioning and accessibility, restoration and preservation) and Ymagis (financial services). In 2016, CinemaNext had 6,400 screens installed under VPF contracts across Europe and sits as an example of a new entrant delivering novel

supply and demand solutions in the digitalization process of a very traditional and formerly linear industry.

The **Late Majority** (LM group) countries are those not previously identified as EA or EM countries but occupy the three first quartiles of the digital penetration distribution at December 2013 (**Fig. 5.4:** average 84.4 per cent rate as depicted by the horizontal orange line); this equates to a market penetration level of 70 per cent and above. These 8 countries consist of Cyprus (CYP), Sweden (SWE), Germany (DEU), Hungary (HUN), Malta (MLT), Slovak Republic (SVK), Italy (ITA) and Spain (ESP). Seven countries are now 100 per cent digital and several more were edging ever closer to complete conversion. There were supranational supporting programmes launched during this stage, with all of the Dutch cinema chains (plus independent distributors) signing up to a VPF scheme financed through the collective buying group initiative, Cinema Digitaal BV. The scheme was supported by €5.0 million from the Dutch government. With the exception of Pathe, Utopolis, and some independents, all circuit and independent sites in the Netherlands were part of this scheme and helped to propel the country to 100 per cent digital in September 2012.

Fig 5.4: European digital screen penetration at December 2013 (%) (— ave 84.4%)



Source: Culkin & Marco (2017 [forthcoming]).

Finally, the **Laggard Adopters** (LA cluster) are those countries in the fourth quartile at December 2013 (see again **Fig 5.4**). This cluster contains all countries whose digital penetration rate stood at less than 70 per cent and consisted of 7 countries: Czech Republic (CZE), Lithuania (LTU), Bosnia and Herzegovina (BIH), Latvia (LVA), Turkey (TUR), Slovenia (SVN) and Greece (GRC). For a full list of the countries in each of the four clusters contained in this analysis, see **Appendix 3**.

5.3.3 Digital diffusion curve observations

The statistical analysis of the digital diffusion curve (following Rogers, 2003) clearly identifies that a country shift does correspond with the presence of national institutional activity; and, in the case of Norway cinema, where cinema is situated at the heart of its national economic and innovation system (Iversen, 1998; Asbjørnsen & Solum (1999); Newman-Baudais, 2011; Iversen, 2016). As Solum (2016) and Bjerkeland (2015) highlighted, the incoming Labour government of 2005 had great ambitions on behalf of Norwegian cinema. Their White Paper entitled, 'Veiviseren. For det norske filmløftet' ('Pathfinder. For the Norwegian Film Effort'), named after a Norwegian Oscar candidate (White Paper No. 22 2006-2007) consolidated the economic agenda of film policy by introducing specific performance-based objectives that were to be achieved through new automatic and market oriented subsidy schemes (2015:129).

Returning to the data, two elements used to test the integrity of the research model were extracted from the curve diffusion. First, we defined the key dates, which act as time-points where the countries (subjects) are measured. This repeated-measures design provides the within-subject factor - the time effect. The four key dates are:-

- December 2005: pre-digital stage (0.6% screens digital);
- December 2008: final date of the early diffusion phase (4.4% screens digital);
- December 2011: final date of the early majority phase (51% screens digital); and,
- December 2013 as the end of the maturity phase (84.4% screens digital).

Secondly, we tested country clustering according to digital penetration by the key dates above. Two types of variables are used in statistical analysis - quantitative and

qualitative. Quantitative variables are numerical variables (e.g. counts, percents, or numbers); whereas qualitative variables are descriptions of groups (e.g. breeds of horses or voting preference).

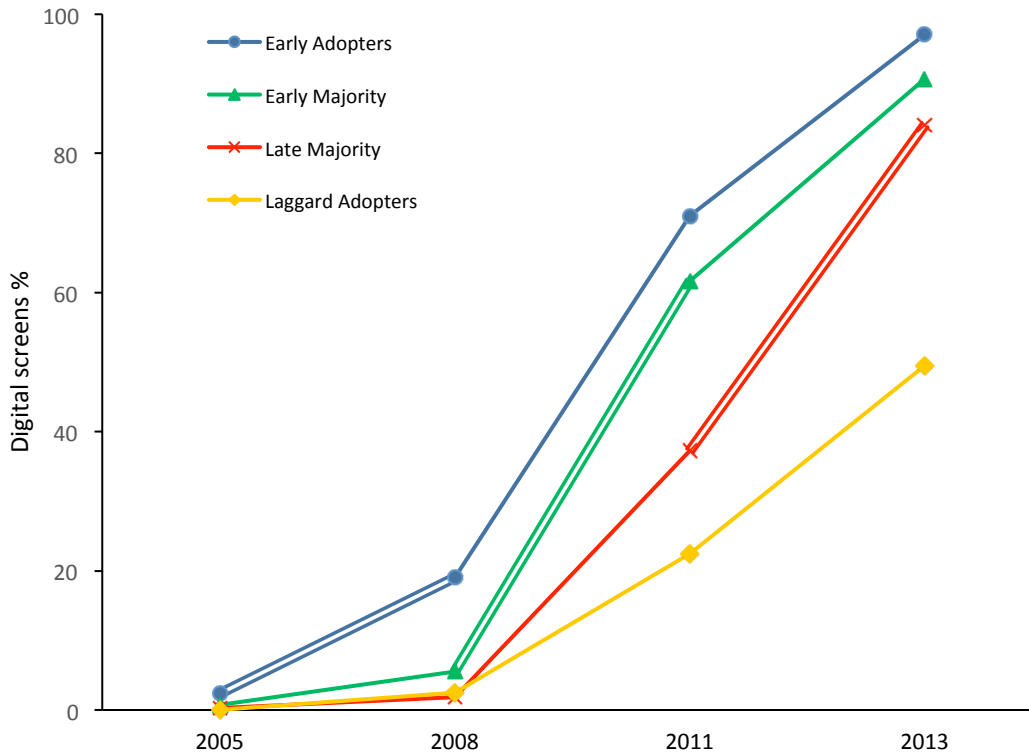
The clustering provides a between-subjects factor and is therefore a qualitative variable used to split the countries into four groups (or categories), which are:-

- Early Adopters;
- Early Majority;
- Late Majority; and,
- Laggard Adopters.

This categorical (or qualitative) factor is called *Adopter* and it is significant that the country classification follows Rogers, along the innovation diffusion phase. This means that our model does explain or account for the dynamic of the rollout. **Figure 5.5** depicts the marginal means of digital screen penetration for each cluster over time or the clusters' time profile. Graphically, the so-called 'goodness of fit' did predict the EA cluster has the steepest slope in the early adopter phase (2005-08, see double-line). The EM group has the steepest slope in the early majority phase (2009-2011) and the LM cluster has the steepest slope in the late majority phase (2012-2013). We would expect that the LA group to possess the steepest slope during the laggard adopter phase (post-Jan 2014), considering that the laggard countries will need to complete the rollout and the other clusters are very close to the 100% penetration rate.

The correspondence between cluster gradients and diffusion phases provide consistency and robustness to the model (i.e. statistically it is fit for purpose). Therefore, the model provides confidence in the inputs to explain any (significant) change in country behaviour brought about through the digital cinema rollout.

Fig 5.5: Marginal means of digital screen penetration by adopter clustering



Source: Culkin & Rocio (2017, [forthcoming])

In the upcoming Working Paper we examine a number of socio/economic/market components; however for the purposes of this dissertation I focus on just two measures. Ticket pricing at the cinema (to test for cost savings) and film market shares (to test for choice of film and [as a proxy for] programme flexibility).

5.3.4 The price of cinema tickets

The average cinema ticket price over the time period is expressed as the total gross box office takings (GBO) divided by total admissions. The time period over which the European ticket price is calculated can be seen in **Figure 5.6** below. The ticket price, extracted from our Two-way mixed ANOVA model clearly shows a significant time effect (p -value=0.000, see **Appendix 4**) consistent with the positive observed trend, as while admissions have increased, GBO has outstripped the increase in admissions.

Fig 5.6: Ticket price at European box office in Euros (€)

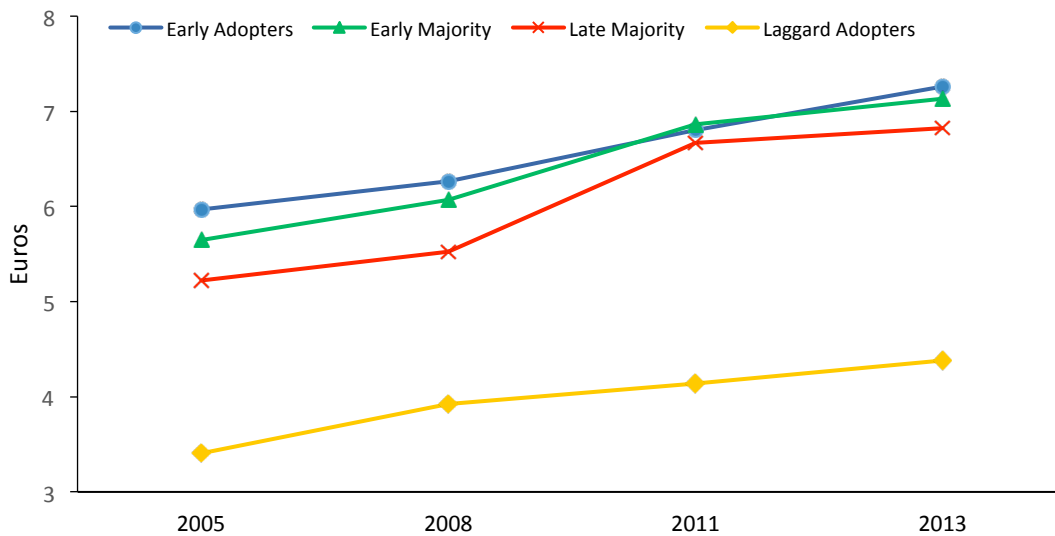


Source: Culkin & Rocio (2017, [forthcoming])

In **Figure 5.7** below, movement in the price of tickets, over time, is observed by each component of the Adopter cluster. The main difference in ticket prices occurs primarily between the LA cluster and the other three clusters, however, at no time does the gap become statistically significant (i.e. there is no adopter effect). Similarly, there is no Interaction effect, as clusters share similar profiles. What is perhaps more interesting is that the price gap between the extreme EA and LA clusters remains stable over time. As such, the observed upward trend is caused by other factors: by a decrease in admissions in the LM cluster and increase in gross box office receipts GBO in the other clusters (see **Appendix 2**, Table A1: Main Descriptive Statistics). The premium price charged for 3D films could explain the steepest slope observed in both the EA and EM markets in the 2008-11 phase. But the increase observed in 2011-13 cannot be explained by premium price charged for 3D films.

This leads to the next question to ask: can the movement be explained if ticket prices are held constant to allow for inflation? The two lines - showing ticket prices by current (at each time period) and fixed (at 2005) - in **Fig. 5.6** provide the answer. As we can see, ignoring for any inflationary effect, the aggregate constant price has remained within a very narrow band of €5.30 – €5.60.

Fig 5.7: Marginal means of ticket price at European box office in Euros (€)



Source: Culkin & Rocio (2017, [forthcoming])

The two-way ANOVA outcome for the ticket at constant price is similar to the Ticket at current price, but the time effect is not significant since the upward trend disappears. In short, digitisation does not appear to have affected ticket price, either at current or at constant prices. As such, the observed increase in admission prices is due to inflation. If, as commentators claimed, the effect of switching from celluloid to digital was to generate substantial cost saving, all or part of these savings have not yet manifested themselves in the market place (e.g. ticket price at the box office). However, as market agents operating under VPF deals are tied into a fixed price, future work will be necessary to assess the impact of the 'out of contract' position to test if our analysis holds firm.

Obviously, cost savings are, to a large extent, dependent on how European digital screens were financed. According to the EAO (2011), approximately 33 per cent of digital screens were self-financed and some 51 per cent by VPF deals (third party, direct VPF and collective VPF) at the end of 2010. This leaves 16 per cent supported through public initiatives e.g. Norway and Italy. Until more recent market data becomes available, there is a small possibility that the prevalent VPF financing model is counteracting the cost savings stemming from switching from celluloid to digital.

5.3.5 Film market shares, by admissions

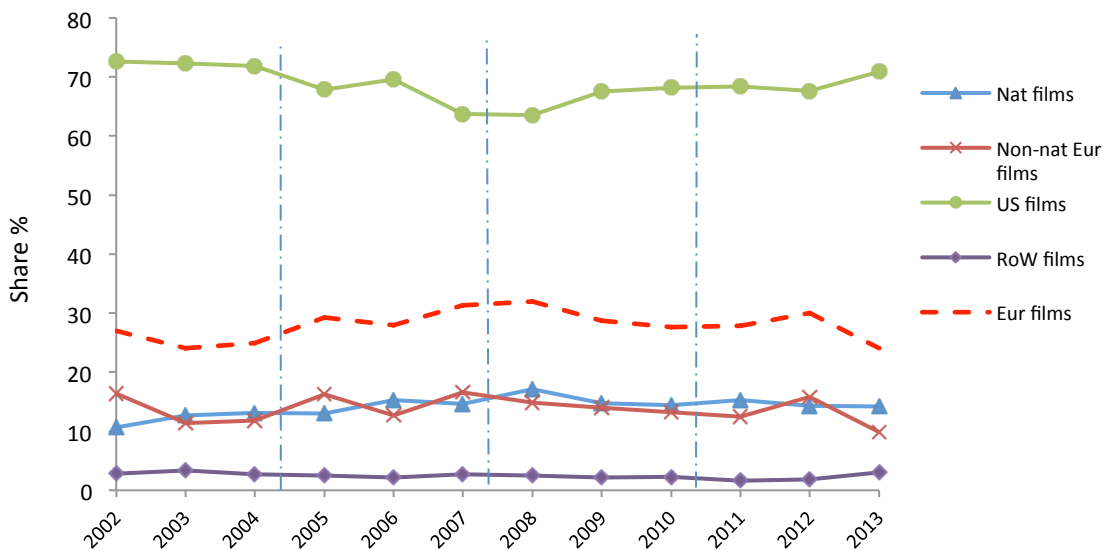
In the previous section, I looked at whether the audience has, as yet, benefited from the cost savings from digital cinema rollout. The answer suggests that whatever the extent of the savings, the US studios and their distributors had not passed that on to either the cinema operator or cinema goer. I will now turn my attention to the other claim for digital cinema – increased choice and programme flexibility. In his 2007 book, 'From silent screen to Multi-screen,' Hanson leaves the reader with an apocalyptic view of the cinema:

The days in which cinema assumed a position of primacy as both a mass-leisure activity and the 'best place to see a film' are gone. Many of us will continue to love older cinemas: however the future of film exhibition, at least in the immediate future, looks increasingly tied up with that of the multiplexes. (Hanson, 2007:186)

In order to test the precision of Hanson's concerns above, I examine the composition of film shares across the four components of the European market across the period 2002-13 in **Figure 5.8** below. The National, Non-National, US and Rest of the World market shares (Nat, Non-Nat, US and RoW shares respectively) are presented along with the aggregate European film market share (National + Non-nat films). The stability in the observed measures of National share is significant, suggesting a strong relationship between the increases seen for US film shares against the decrease found in Non-National and RoW film shares. The narrowest gap between the European and the US share was in 2008, arguably the height of the global economic crisis. From that point on when the digital rollout took off the US film share maintains a slow and steady increase up to the end of 2013.

Based on the most recently released data, this position worsened in 2015; a year in which admissions growth was driven by a number of US studio titles (e.g. Star Wars: The Force Awakens, Minions and Jurassic World) all of which, sold more than 30 million tickets in the EU, according to Kanzler & Milla (2016). On a cumulative basis, admissions to US films increased by around 50 million leading to a market share of 64 per cent. Admissions for European films on the other hand, declined by around 50 million causing European market share in the EU to drop from 2014 level of 33.5 per cent to an estimated 26.1 per cent (Kanzler & Milla, 2016:15).

Fig. 5.8: Film shares in the European market by admissions (%)



Source: Culkin & Rocio (2017, [forthcoming])

During the diffusion phase, conflicting views were held as to the likely impact on the market share of European and US films once the digital conversion was completed. One argument ran that the promise of increased flexibility and diversity of programming on offer from digital cinema would lead to an increase in the market share of European films. Such a view was expressed by public funding agencies in the UK and Norway. However, given that US distributors underwrote most integrator-VPF financing models and they supplied US studio films exhibitors' were faced with contracts weighted towards showing high turn rates of US content, at the expense of European and other independent films. As we saw in the previous section, the commercial VPF scheme facilitated the conversion of 51 per cent of screens digitized, the VPF deals would, at the very least, consolidate the US share of the market, helping to widen the Eur-US gap. The other contributory factor to propel the US film market share up towards 70 per cent was 3D, especially as the US accounted for 19 out of the 20 top 3D films released in Europe during 2009 and 2010.

So, when we look at the anticipated benefits of digital cinema - flexibility and diversity of programming – we are left to consider that Hanson (2007, *op.cit.*) was correct. Regarding specialised cinema, the market share of Non-National European films and the RoW films has not increased (see **Fig 5.8**). In fact, quite the opposite

has occurred, the market share of European film has decreased; to be replaced by more US mainstream content. This outcome was underpinned by the VPF financing model (US backed) and the short-term success of 3D films (US created).

Perhaps we should not be surprised given the view expressed by one respondent vis-à-vis their approach to decision-making:

There is a suggestion that the real battle cinema faces has nothing to do with big battles over the rules and regulations of distributors contributing towards digital cinema equipment or a VPF deal. The US studios biggest concern was that once you don't have a cost barrier of getting into the cinema, or indeed a practical barrier, i.e. 35mm, as it's opened out to anything because it's digital, then cinemas will change their operational offer or actually start a dialogue with consumers then they will show less films.

Later on in the interview, the same respondent elaborated with:

And they are a film business, so it is not in their interest, so they do what they have been trained to do to try and stop that. (Sen Exec [2]: US Digital Intermediary)

One strategy employed by the US studios to sustain their version of the film business can be found in the number of high-profile releases already announced during 2016. If digital cinema represents a sustaining innovation, then CGI inspired franchise films will continue to supply mainstream cinemas for at least six to ten years. Perhaps, in such circumstances, we should not be surprised at the view of cinema operators across Europe, as presented by this senior industry figure:

Right....on the whole exhibitors don't programme for a local audience, they programme to what the distributors will offer to them. And actually in many cases they'll play what the distributors want them to play, the mainstream big distributors, even the shit, even if they're pretty certain it's not going to make any money. (Sen Exec [1]: Govt Agency)

However, while any potential disruption appears to have been subjugated to the market by the power exerted by the US studios marketing efforts, two issues are raised in the above quotations. First, that the decisions taken by the US studios are grounded in the traditional and linear lived experience of first-run films placed in cinemas to market sell-on opportunities for copyright material. And, second, the response of the exhibitor is centered on a lived-in experience of being the recipient

of a film product situated at the end of a linear supply chain.

In the next section, I want to explore further the notion of what learning took place during the digital cinema rollout; and, how this might impact on incumbents, new entrants and entrepreneurial innovation within the context of national innovation systems.

5.4 Disruption of learning

It is my contention that the studios have sought to control, rather than explore, the emerging social and technological possibilities of the Internet
(Currah, 2007:360).

Whether or not Currah was thinking of Sean Parker - the entrepreneur responsible in part, for Napster and Facebook was not clear; however within three years, Parker was quoted as saying, 're-architecting society. It's technology, not business or government, that's the real driving force behind large-scale societal shifts' (Parker, 2010). In 2016, Parker appeared at Hollywood's premier annual convention, CinemaCon; here, according to Ryan Faughnder (writing in the LA Times), 'the best story wasn't on-screen. Instead, it was the attendees' murmurings about what some might consider to be a terrifying new technology: The Screening Room' (Faughnder, 2016). Parker's early stage technology start-up would allow audiences to take the multiplex into their living room to stream first-run movies for US\$50 per viewing, having first installed the technological device (US\$150). During a presentation at the same event, Warner Bros. Entertainment Chairman and CEO Kevin Tsujihara promised the theater owners that the US studios would not allow a third party or middleman come between them.

I sat with a Senior Vice-President from another US Studio, ten years before Tsujihara's made his comment and wrote down almost the same words; although at the time, there was equal weighting given to sharing knowledge and building partnerships.

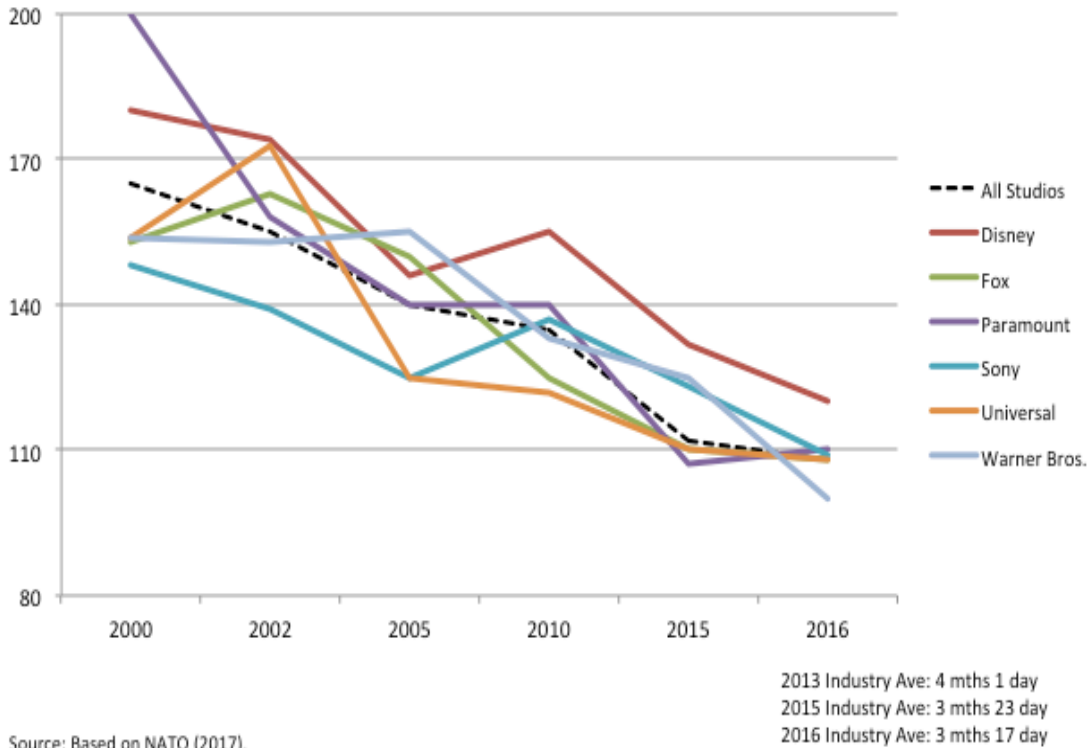
Gate-keepers are a bad thing, so we're not adding new middle-men or new gate-keepers along the way. And ultimately, we want the exhibitors to own the equipment that is being deployed....we want to have better access to the theatrical

information, just like our retail partners give us feedback rapidly on what works.....Let's make sure we understand the audience appreciation of what's going on.
(Sen Exec [1]: US Studios)

5.4.1 It's all about the windows, stupid.

In a discussion on the possible collapse of the 'release window' agreement between studios, their distributors and cinema operators, I advocated that once screens were converted to digital, US studios could break away from its traditional (region-by-region) release strategies (Culkin, 2008). An experiment with global, single day release dates for 'tent pole' movies, including Lord of the Rings, The Matrix and Pirates of the Caribbean, instead of sequential releases by country, had been tested. In addition to building a global marketing campaign - reducing costs between a theatrical and home entertainment release - such a strategy would contribute to that other great concern in Hollywood, the piracy issue. If the US studios took advantage of the interest derived from a successful marketing campaign by releasing a film simultaneously across several territories, why not release a film simultaneously across several platforms in one country to maximise marketing spending for a smaller film (Culkin, 2008 *op. cit*)? The National Association Of Theatre Owners (NATO) has always maintained that the window between theatrical release and successive platforms was negotiated by studios and exhibitors and remained an integral part of the exhibition business. Despite the position held by NATO, the position of the release windows slowly been eroded with the average time between first-run theater and other platforms down from 4 months in 2013 to, 3 months and 17 days in 2016, as can be seen in **Figure 5.9** below.

Fig. 5.9: US Studios release window strategy 2000-2016



The window release discussion continued to play out when in 2011, DirecTV (a satellite television provider) launched a premium VOD service with the Sony Pictures film, *Just Go With It*, starring Adam Sandler only 69 days after its theatrical debut. Later, in 2015, Paramount experimented with two films, *Scouts Guide to The Zombie Apocalypse* and *Paranormal Activity: The Ghost Dimension*, with a group of US theaters including, AMC Theatres, National Amusements, and Landmark Cinemas that saw the titles available on VOD just 39 and 53 days respectively following their release in a little less than 300 domestic theaters. As part of the agreement, the theater owners shared a percentage of Paramount’s digital revenues, equal to their share of the theatrical box-office gross of each film, up to the end of the industry-norm 90-day window. According to David Lieberman a film analyst, *Scouts Guide* grossed US\$3.7M domestically, plus US\$10.3 million abroad; whereas *Paranormal Activity* delivered US\$18.3M in domestic sales and US\$59.2 million internationally (Lieberman, 2015). Despite the time taken to set up the test, the learning required for a flexible distribution model did provide Paramount with evidence as to how the revenue potential of these films (albeit not mainstream films) provide novel supply

and demand solutions via legitimate digital access, within the exclusive theatrical window. However, as the US studios continued to experiment with the release windows, James Murdoch took a different approach, while speaking at the Goldman Sachs Communacopia conference in New York:

‘We have to think about these crazy hold-backs that theatre owners put in place - these blackout periods.....A customer really doesn’t care that..[NATO]..wants members to have exclusive access to films for about 90 days before they move to other venues...[it was incumbent on studios to price films]...in a smart way” and do something about windowing, including the possibility of electronic sell-through. There are a lot of changes over the next couple of years that are going to be very exciting for the film business. (Murdoch, 2016)

In response, NATO suggested that Mr. Murdoch was new to the film business and appeared to moving too fast for his own good. In addition, it was they that had called for a dialogue on more sophisticated release models, in order to grow the ‘pie for everyone;’ and, Mr. Murdoch should take care not to undermine the trust established between Fox and exhibitors (Kay, 2016). However, while such power struggles were being conducted in public, the learning that Reid Hoffman excelled in was market-driven. He and Marc Randolph co-founded Netflix to offer online film rentals, which at the time of launch appeared to be targeting incumbents further downstream to cinemas (i.e. Blockbusters). However, the following year they launched their website and in 2000 announced a personalised film recommendation system, which uses members’ ratings to accurately predict choices for other members. In the same year that the DCI released Version 1.0 of its specification, the number of Netflix members rises to 4.2 million; within seven years, Netflix had introduced a streaming service, which enabled members to view television shows and films on their personal computers. By 2011, the Netflix product was available across the Apple platform and other Internet connected devices; its geographical reach had extended to Canada, throughout Latin America and the Caribbean and in 2012 the UK.

The most revealing aspect of introducing Netflix to the discussion is that throughout the latter stages of my fieldwork, as the business was scaled up (content and market penetration), was the apparent lack of concern to Netflix among film industry

respondents, especially when one reflects on the Currah (2007) quote used at the start of this Section.

When asked about where learning took place there was a general feeling that the film industry was different to other industries and Netflix, Amazon *et al.*, were retailers. In William Goldman's 1984 book, *Adventures in the Screen Trade: A Personal View of Hollywood and Screenwriting*, the quote, 'Nobody knows anything... [for a certainty]...Every time out it's a guess and, if you're lucky, an educated one' has been employed by many people. However, in the context of learning in the context of this dissertation there is an even more confounding quote:

One major studio executive told me recently, "Of course the failures are upsetting. But there have always been failures. What's got us so immobilized now is that whatever it is that we're making, we're missing the audience by a wider margin than ever before. We don't know what they want. All we do know is that they don't want what we're giving them."⁴ (Goldman, 1984:xi)

In terms of learning, I drew parallels with the Eastman Kodak case, who developed the first megapixel sensor in 1986. However, they did not attend the annual Las Vegas Consumer Electronics Show until 2004; instead they had continued to rely on a strategy that had served them well in the past, to fuel growth and profits, despite what their market research had revealed. Kodak's success, not unlike the US Studios, was heavily dependent on the highly profitable margins generated from celluloid and paid progressively less attention to the market until it was too late to ask the right questions of its relationship with evolving markets.

Two US respondents, when asked about the potential threat from technology in general and, audience consumption patterns in general replied:

Well, everything's a competitive threat; the thing is when you have a good story, you don't have to worry about it. Look how well *Avatar* did; it was just what, five years ago, the Internet existed then as well. Cinema had competition from radio and then

⁴ Interestingly, the year after Goldman's book was published, of the top ten 1984 released films by box office gross in North America, eight were the first installment or part of a sequel (including Star Trek, Ghostbusters, Police Academy and Indiana Jones)

it had competition from television and radio and so... (Exec [1]: US Distribution)

There's an enduring quality about seeing a new movie at the theater, with friends or family. No matter what [new] comes along the US audience just loves to come out on that opening weekend and eat, drink and watch movies. It's just how it is.

(Exec [1]: US Producer)

This type of response was mirrored, by other US based respondents who turned the question into learning about technology:

....[we will see]...an increase in people going to movies if they're projected properly...[and]...they're going to pay more, we're going to get more people in, I think, higher dynamic range, higher brightness, increased colour palette, will just be even better for the audience, they'll eventually understand that because you're right....we've got to work together to at least get the standards we have now [35mm film].

(Exec [1]: US Producer)

The response from a UK Executive suggested that their counterparts in the US were not aware of their own isolation when it came to learning about new threats:

...big markets 20 years down the line, China and India, I think are going to be enormous...[and]...unless Hollywood embraces them and their technology one way or the other, they....will lose.....so much business. They've got to accommodate that in their thinking and then if they say operate in China...

(Exec [2]: UK Govt Agency)

When probed further on how disruptive the learning could be, given the answer above they responded:

It's not a good situation. They will have to accept less than 2K or less than DCI but they won't in Europe, there's a tension there. That is truly disruptive, so I think there's a very important point to understand. It won't end well.

(Exec [2]: UK Govt Agency)

It became apparent in the UK that while public intervention was possible in knowledge sharing (and learning) and potentially a good idea, nothing was possible until the standards issue was resolved:

[digital cinema]...what it is, is an upgrade. It's a new technology, but it's not a panacea; it's not going to solve anyone's problems, nor is it a revolution that's going to change, you know, as they said in Star Trek, life as we know it.

(Sen Exec [2]: UK Govt Agency)

However, any entrepreneurial innovation, or early stage experiments could not happen until:

One, it's not a revolution. Two, you ignore it at your peril, but Three, let's hope the

industry collectively both here and in America makes the right decision.

(Exec [2]: UK Govt Agency)

Turning to the network effect on learning, a small group of respondents in the US and UK suggested that their country trade associations were involved in exploring audience development, but only for mainstream cinema businesses:

There are conventions being put together by NATO but it's really just the same old, same old. We're supposed to provide everything and I'm yet to see what's coming along from the studios. (Sen Exec [1]: US Cinema Chain)

The CEA have got this roadshow together, but it feels it's all about 3D and I'm yet to understand how I pay for, install and train up my people for 2D. Not really helpful. (Sen Exec [1]: UK Cinema Chain)

It's an interesting event; but when the presenter's own kit not working doesn't fill you with a huge amount of confidence, does it? The other problem is we're all in the same boat at the same time. In the lunch break I want to speak with [cinema owners] who've been running with the new equipment....not from [one of the major cinema chains] but someone in the same position as me. (Sen Exec [2]: UK Cinema Chain)

When you speak to Sales Agents they're limiting their exposure by taking less films. They claim because of workloads...[due to growth in digital media]...they have stopped working with mid-budget films, or smaller independent films. The conclusion is that you have a lot of titles without sales agents. How do we find them? (Sen Exec [3]: UK Cinema Chain)

However, in Norway a very different picture emerged, one respondent when asked about who was involved in the project, first talked about the national project,

I think the fact that we have Film & Kino. That was the key thing. That and the Nordic Project...with all the partners that brought together.....the whole business and all the members of Film & Kino, they prioritised digitalising the highest, so we said that we will do this too. (Sen Exec [1]: Norwegian Cinema Chain)

And, then went on to describe the standing of cinema within the country:

[Norway is] people are living so spread around, and it was a political issue most of all a political issue, to maintain a structure where we have, where we still can have cinemas because...this industry is going digital....a lot of people in Norway would lose their cinema.....so that was really most of all a political solution[and] because Film & Kino has this fund built up by these little taxes. (Sen Exec [2]: Norwegian Cinema Chain)

Finally, this and another respondent spoke about the learning within their business.

...it was a good decision..there were some problems.....but I would say that we learned a lot.....I think that was much of the success that made us have very small

failure[s]...when we were fully digitalised, we knew a lot about it, and....what is the words....[NC: a catastrophe I think]...Yes, a catastrophe.

We had few of those compared to what I have seen from foreign companies that were digitalised. (Sen Exec [1]: Norwegian Cinema Chain)

Indeed we know [Professor of Digital Systems]. His former department was an important partner in the research and groundwork that was done prior to the digitalization of the Norwegian cinemas. [Professor of Cinema] is also a person I meet frequently. (Sen Exec [1]: Norwegian Cinema Chain)

We have had a long lasting cooperation with [two universities in Norway]. I am a part of the program council for the Institute, and the program manager at our film festival presently is doing a PhD there. We also use the Institute in the work to document the history of all our historical films, made by the cinema from 1905 to the mid-60s. For our 100 year anniversary....we are making a documentary based on the old films, and [Professor at the Institute] will do research on this project. (Sen Exec [3]: Norwegian Cinema Chain)

They [local and one of largest universities in Norway] also hand out a prize for a filmmaker during Kosmorama. Also [local and one of largest universities in Norway] use one of our screens for lectures 5 days a week. They have done so for at least 6-7 years, due to lack of rooms at the university. I think that it differs a lot on how close relation there is between the cinemas and the universities, but we been very fortunate to cooperate closely with [local and one of largest universities in Norway]. (Sen Exec [3]: Norwegian Cinema Chain)

A similar pattern emerged when the topic turned to audiences. The US and UK situation remained for a long period one steeped in a linear supply chain debate:

The upside of digital cinema is it's so much cheaper to deliver content....there are opportunities..[when]..there's just no one in the theatres on Monday and Tuesday nights especially, is that a night that you can air some classic movie,[the]...complexities are how they collect box office; when I talked to the CEO at [US Studio]...that was the barrier, how they attribute the box office and how they collect it... (Sen Exec [2]: US Digital Intermediary)

And, a debate primarily concerned with revenue sharing, as opposed to audience development.

Exactly. Exactly. The problem is, that exhibitors are traditional, you know, their historical costs for real estate and stuff, they're not actually bringing anything to the table. They only offer their space. So you know, what are they doing in return for us giving that exclusivity window is what I'm asking. By the same token, the models in my view haven't changed with time. (Exec [1]: UK Distribution & Exhibition)

The experience of those digital cinemas that had experimented with alternative content for audiences (e.g. live sporting events and opera) was that potential now

existed for this, once niche area, to become a significant focal point for audience development and revenue growth for cinemas. But, as one respondent who ran a small cinema chain and intrigued by the opportunities afforded by alternative content:

The key to success was in marketing...working with specialised distributors was vital. Most UK cinema operators know they lack expertise in areas such as opera and theatre and so would need to rely heavily on external advice and that's a problem. There's nowhere to go and learn. (Exec [1]: UK Distribution & Exhibition)

There resides a key problem for the European cinema market in general and the UK in particular. At the European level:

I'm very keen that, in presenting to some extent the public or the public affairs face of the industry, it's not possible for us to be categorised as we have been in the past as, you know, kind of Luddite or anti-development kind of a mix....For a very long time we've been a very mechanical business, we're now a digital business and there's more innovation taking place across the cinema landscape than there has been for the past sixty years. (Senior Exec [1]: UK Trade Assoc.)

While at the country level, reflecting on how and where the cinema sees itself:

...to some extent the industry's not helped itself in that regard, but it's an interesting kind of discipline sometimes when sat down talking to colleagues from the rest of Europe, step outside of our own context and think about, well if you were there how would you have dealt with it. (Exec [1]: UK Govt Agency)

Perhaps, this is why when asked about the UK Film Council's managing of the digital screen network (DSN), another respondent was critical about the missed opportunity for using the network as a catalyst to draw more people into the project:

We could do more, and more could be done and certainly my observation of the DSN is that it hasn't achieved anything like the aspirations that were placed to the public when the DSN was originally mooted. We're told it will give us greater flexibility but for that to really take off we need more expertise round the table. (Senior Exec [1]: UK Trade Assoc.)

In a later interview the same person, in the same post, they responded to a question on 'big data' with:

And funny that you should mention data....it's clearly a big thing (no pun intended) for our industry and something on which I think we probably need to help guide our smaller members in particular. For that reason, we're about to announce that our next conference will major on this. It's a game of one and half halves, with an opening day on data and a second half-day on emerging technologies. (Senior Exec [1]: EU Trade Assoc.)

5.4.1 A different window.

It became apparent during the interviews that knowledge was perceived in its broadest sense as something bounded within the film industry. As the digitization process gathered pace, post-2008, a senior executive at the UK Film Council stated that one of the reasons that film production was doing so well, particularly in the UK was down to:

...the quality of the television drama has shrunk dramatically and the consumer will pay to watch a film in cinemas or rent it or buy it, if it's superior to his free television, and the reason that television drama's shrunk is because with digitalisation obviously with television, you've got a huge proliferation of channels.

(Sen Exec [2]: UK Govt Agency)

The question raised from such a position is, what happens if and when that situation is reversed? The notion of knowledge was being deliberately transformed to maintain a linear flow of US Studio owned content. The technology would not allow the film industry to be disrupted in the way that the music industry had experienced. The use of the DCI specification would erect walled gardens in which to keep out new entrants. However, while the US studios continued to erode their Windows Release patterns, 2015 saw Netflix, the one-time video rental firm purchase worldwide rights to, *Beasts of No Nation* for US\$12M and release it in US theatres, and at Curzon cinemas in the UK. In a Guardian Newspaper article (2015), Ted Sarandos, head of content acquisition at Netflix, stated that over three million people watched the company's original drama in its first two weeks. In the same interview, Sarandos claimed (while not disclosing actual figures) that the film had become the number one in diverse countries such as Japan, Brazil and Mexico places where these type films typically never open. This experiment furthers the streaming media company's strategy to release high profile, exclusive films. And as, Koljonen (2016) suggests, the experiment was not for the theatrical release to make money; it was to draw attention to the premiere, helped in Netflix's strategy to be recognised as an (online) studio and enabled the film to be eligible for awards.

Given that the UK alone released over 800 films in 2015, this new "global major" entering into day-and-date experimentation of traditional release patterns

demonstrates that films cannot be released in mainstream cinemas and nor should they be released the exact same way. The learning to take away here could lead to a bifurcation of the industry; one built on regions, one on global and platform availability. To conclude this Chapter, it is worth recalling Director and Actor, Kevin Spacey's talk at the Edinburgh Festival. He is clear in his view that the success of the Netflix model, releasing the entire season of House of Cards at once, proved one thing: The audience wants the control. They want the freedom.

So I predict in the next decade or two, any differentiation between these platforms will fall away. Is 13 hours watched as one cinematic whole really any different from a film? Do we define film as something being two hours or less? Surely it goes deeper than that. If you're watching a film on your television, is it no longer a film because you're not watching it in a theatre? If you watch a TV show on your iPad, is it no longer a TV show? The device and the length are irrelevant; the labels are useless, except perhaps to agents and managers and lawyers, who use these labels to conduct business deals. But for kids growing up now, there's no difference watching Avatar on an iPad or watching YouTube on TV or watching Game of Thrones on their computer. It's all content. It's just story. (Spacey, 2013)

5.5 Chapter summary

Drawing on the experience of leading figures from within the film industry and a statistical analysis of the European exhibition market (2005-2013), the chapter documented the impact of digital cinema from that of stakeholder perspectives and published market data. What this mix of qualitative and quantitative data indicates is that the diffusion of a high-tech breakthrough was largely managed as a sustaining process innovation, with little regard paid to the changing consumption patterns of audiovisual products. While it was extremely difficult to obtain an accurate picture of the value of costs extracted by the near-end of the process, wider marketing research indicates that US content owners benefitted from significant savings. The market data appears to suggest that none of the savings have been passed on to existing customers (cinema audience); nor have customers attending mainstream cinema witnessed an increase in product (content delivery).

What was evident was that the digitization process did not simply extract costs from a supply chain, which was a key driver for the US Studios. Of particular insight was

the fact that while incumbents focused on technology standards to deliver a sustaining innovation, entrepreneurial innovations have helped certain cinemas to differentiate themselves with the support of public intervention measures that recognize the contribution cinema could make to the well-being of a nation. In essence, we can view the digital cinema rollout as a case study of an increasingly mobile sector, in which technological factors retreat in importance behind entrepreneurial innovation as a key driving force in reaching audiences.

It is evident from the responses in this chapter that the digitization of cinemas has encouraged entrepreneurial firms, supported by a radically different reading of both national innovation systems enabled some countries (e.g. Norway) to reorientate their value chains in novel ways that ensure the cinema experience is made resilient, in an era of increased competition for society's leisure time. The growth of technology equivalence - between the cinema and the home - has particularly demonstrated the viability of a global production and consumption pattern to produce medium to high budget level films for international audiences, which have until today been the sole domain of US studios. As we have seen in the Kevin Spacey quotation and the experiments with *Beasts of No Nation*, Netflix has demonstrated a propensity to replicate Schumpeter's 'gales of creative destruction,' while the US studios focused on creating a walled garden to protect its profitable product line. In Brian Arthur's influential book, 'The Nature of Technology,' he states that 'Technology is what separates us from the Middle Ages; indeed it is what separates us from the way we lived 50,000 or more years ago. More than anything else technology creates our world. It creates our wealth, our economy, our very way of being' (2009:10). However, incumbents have a vested interest in maintaining consistency because their own identity is at risk, which as I have demonstrated can be seen in the response from the US studios and the larger cinema chains; the latter of which has been transformed by, and now dependent on the prequel, sequel and spin-off films. The higher the perceived risk, the longer incumbents will commit to the current. And, Arthur correctly predicts a period of hysteresis – a delayed response to a change – will ensure; the new delayed by the very success of the old,

makes changeover in technologies neither easy nor smooth (2009:140). The US studios appear to have a position appears to have taken little or no notice of the market conditions unfolding around them, arguably learning nothing from the digital impact on music and photography. The response appears to reflect the dominant linear view of technological change, one that has proved difficult to dislodge; driven or pushed by STEM-based innovation policies adopted and dare I say adored, by western governments. Drawing on findings from Chapter 2, I have also shown how one nation's innovation system (Norway) has benefited from recognizing cinema as a legitimate service sector innovation, which to date has been poorly served by the dominant technological product and process (TPP) approaches (Cunningham, 2014:38).

However, such opportunities will continue to be ill-served for entrepreneurial innovation in Europe if the policy narratives do not follow practice. In a recent major independent research report entitled, 'Building sustainable film businesses: the challenges for industry and government,' sponsored by Film i Väst, PACT and the Swedish Film Institute the report's author indicated that, '[F]or the purposes of this report a 'film business' is defined as an independent company undertaking feature film production as its core activity' (Olsberg, 2012:9). But, as Head of Industry Programmes, Marché du Film, Julia Bergeron reminds us, the majority of films produced are not finding their way to the audience, either in theatres or on the digital platforms. There are less and less theatres. In addition, if Europe wants, in five years, to have audience, it needs cinema education for the young as a counterpoint to video games, in order to experience film in a theatre and understand why it's different, why it's as powerful. It can be seen as a bigger opportunity than before for films, because there are more ways of presenting independent film today. And public institutions all over Europe need to support diversity and the creative initiatives of the exhibitors and distributors (Bergeron, 2016:15).

With respect to the European cinema system, the digital single market can also be seen as means to reinvigorate opportunities for national and non-national film consumption. This previously operated in a regional or national context, towards a

more integrated networked cross border industry supported by temporary clusters (e.g. Europa Cinema network) with links across the media entertainment landscape. However, while the implications of Brexit are beyond the parameters of this dissertation, the UK is unlikely to benefit from a DSM to the same degree, if at all across remaining member states.

Despite periods of change and potential, the overall technological evolutions have up until now been to the advantage of Hollywood (De Vinck & Lindmark, 2014:122; Hanson, 2007b). Rather than focusing on the destructive tone of Christensen's work, a path from Schumpeter to Mazzucato informs us how interactions between business, consumer and institutions (public and private) facilitate innovation and technology diffusion. Before its closure, the UK Film Council had started down this route. According to Doyle (2015) from 2007, the UKFC had begun to add to an existing array of commitments in order to demonstrate how it was progressively broadening its mandate and embracing a growing set of economic and industry imperatives, greater responsibilities for cultural aspects of the film remit, as well as a more sustained focus on digital technology (2015:60). Also, the Council had recognised the opportunity for it to 'help make the UK a global hub for film in the digital age, with the most imaginative, diverse and vibrant film culture, underpinned by a flourishing, competitive film industry (UKFC, 2007:2). Following its closure in 2011, the remit for supporting the UK film industry was handed over to the British Film Institute (BFI). In addition to acting as the lead strategic agency, the BFI is also responsible for certification of UK films (e.g. tax credit qualifying status) and dispersing National Lottery money to film production. A major criticism of the BFI, however, can be found in the fact that its role is unevenly split between film and TV. The BFI's remit cultural responsibilities include TV, whereby its industrial remit is confined to film. This was brought to the UK Government's attention on two separate occasions in work commissioned by the Department for Culture, Media and Sport.

The Film Policy Review Panel,⁵ stated that the BFI had failed to make headway in getting the Broadcasters to do more to support the industry, going as far as saying there had been, ‘no progress on the Film Policy Review recommendations concerning Memoranda of Understanding between broadcasters and an investigation into the UK film acquisition market (33)’ going further to remind the government that ‘it accepted and agreed these recommendations, and strongly urges the government to prioritise their implementation as a key strategic component of an effective UK national film policy’ (2014:17). The Panel also considered the role of hard evidence in policymaking in assessing the performance of public film bodies. In the Research and Knowledge section, the BFI was reminded of its duty (to implement the Panel’s 2012 recommendation) to establish a Research & Knowledge function, focused on creating knowledge and an evidence-base, as well as on the publication of statistics to create an industrial policy for the independent UK industry. While the UK’s innovation ecosystem is a complex, non-linear process, future film policy support mechanisms for research and development could recognise business engagement in collaborative activities, especially for entrepreneurial innovation. Further, a number of examples of the urgent need for research to support a national film policy included, research into the UK film acquisition market; the economic effect of VPFs as against traditional print fees and access to and analysis of international VoD data. The Panel also suggested that as BFI matures its role as lead agency for film in the UK, it needs to find an optimum balance between providing strong industry leadership and truly collaborative partnership working that allows partners the necessary licence to deliver against their remit (2014:24). The suggestion through the review process was that disquiet existed in the exhibition and education sector around the BFI’s tendency to be somewhat over-directive in its approach to partnership working. They may have a case, especially given that it was only in late November 2016 that the BFI

⁵ Following the closure of the UK Film Council, the Department for Culture, Media and Sport commissioned two independent reports from The Film Panel chaired by the former Labour Government Minister, Chris, now Lord Smith. First in 2012 came, *A Future For British Film It begins with the audience...* . And, in 2014 the Panel published, *It’s still about the audience: two years on* from the Film Policy Review (2014).

announced on its website⁶ that it ‘has begun the search for a partner to deliver a comprehensive research and statistics programme, providing quantitative and qualitative analysis of film and supporting an ambitious programme.’

This Chapter, combined with the papers, illustrates how the distinct characteristics of digital technologies are implicit in an evolution from stable to fragile product innovation and highlights the need for a dynamic approach to entrepreneurial innovation within national innovation systems. The wider implications of the findings build on the innovation literature in order to reassess the diffusion, adoption and use of knowledge in the rollout of digital cinema technology. These findings suggest a radically different reading of both disruptive innovations and national innovation systems than has been offered in previous accounts, Chapter six sets out to respond to the research questions raised in Chapter One.

⁶ <http://www.bfi.org.uk/news-opinion/news-bfi/announcements/bfi-boost-uk-film-research-new-4m-fund>

6 Conclusions

“Film matters. It matters because it is both a powerful engine of the creative economy, and a form of cultural expression, which reaches huge audiences and influences lives. Yet without a well-structured set of interventions by Government, the UK film sector cannot begin to realise its potential. The UK Film Council was set up to provide a framework [for such] intervention[s].”

Woodward (2004)

6.1 Introduction

When Mazzucato speaks of the Entrepreneurial State behind US entrepreneurial audiovisual endeavours, I have sought to demonstrate the parallels that can be drawn from the Norwegian approach to audiovisual innovations. However, apart from a short period when the UK Film Council reoriented film to be closer to a wider economic story, successive UK Governments have failed to create a strong narrative around a national or regional innovation system. The current Government has continued to back the scientific push model, despite the limitations identified in this dissertation. With the Brexit result all regions of the UK will be forced develop a new identity, free from the European Union, to compete globally. The conclusion to be drawn is, for the UK to compete, it must develop what Mazzucato refers to as a mission-orientated, as opposed to a market failure framework. One that sits outside the narrow finance-driven approach and enables regions to become active contributors to economic growth. However, as Berry (2016) argues,

...the Northern Powerhouse enables the current government to further demonstrate its apparent understanding of popular concerns around ‘place’. Place, and associated concerns around identity and belonging, has therefore become an important dimension of numerous political and policy dilemmas. It is, however, impossible to devolve powers that do not exist. Britain has no meaningful tradition of industrial policy, as it would be understood in a continental context. Its leadership of the industrial revolution meant it has never needed to develop tools by which to ‘catch up’. Industrial policy powers should be devolved, so that northern city-regions can support existing industries and develop new ones – but the centre will have to take the lead, in the first instance, in creating and fuelling adequately the means of doing industrial policy within the British state at all levels. (Berry, 2016)

6.2 From supply chain to value networks

What we can take from Berry is that context is crucial. Given the potential upheaval in markets caused by Brexit and the US Presidential election leading to an immediate shift towards nationalism in the US creates new contexts for policy-makers and practitioners. By comparing three countries diffusion and adoption patterns in this dissertation, I have demonstrated how different contextual factors can and do, influence the disruption process. Disruptions in markets can lead to development; it is happening in the audiovisual market in the US due partly in response to the conditions set by the US studios in the digital cinema rollout. The culture operating within the US Film Industry did not encourage entrepreneurial innovation. The disruption is taking place in parallel to the film industry, online and globally, across platforms, led by Netflix and Amazon. Such trading companies have built financing and audience-driven knowledge systems that are highly effective and efficient and are geared to support the development of disruptive ideas, globally. The economic conditions and entrepreneurial culture explained the distinctive results between incumbents and new entrants. Following Chesbrough (1999) these findings suggest that success in disruptive innovation depends on the variation in some contextual factors such as technology standards, entrepreneurial culture and economic conditions of different firms following similar strategies.

The Digital Cinema Initiative's primary purpose was to establish and document voluntary specifications for an open architecture for digital cinema that would ensure a uniform and high level of technical performance reliability and quality control within a completely digitised supply chain. The conclusion drawn from this dissertation follows Currah (2006) in that the US studios primary objective was to prevent unauthorised redistribution of digital media, retain control of the channels of distribution and thereby avoid an outcome similar to the music industry in which, "a partial collapse of the oligopoly of reproduction may free us.....from the industrialisation of music and encourage artists and listeners to (re)construct the direct relationship upon which music has always thrived" (May, 2007:1). A further

conclusion was that shipping a series of bits and bytes around the world instead of reels of 35mm film would also lead to significant cost reductions. In the next section, I demonstrate that these cost reductions did not find their way to the consumer in reduced ticket prices and were most likely extracted from the audiovisual industry, rather than developing the notion of a value network. As such, by 2012, both film and music supply chains had reached a tipping point. No longer dependent on atomic matter, computer bits had finally replaced vinyl and celluloid, and the traditional linear film industry value chain consisting of producer, distributor and exhibitor was now an industry at a crossroads. This scenario was foresaw by Negroponte (1995) in his book *Being Digital*, in which he predicted that all forms of information that were made of atoms (i.e. DVDs and CDs) would eventually be made into bits; and it is here – the outcome of a heady mix of cost extraction, value creation, piracy eradication and technological breakthroughs – that the US studios failed to take a leading role in the shift from producer-led to consumer-led value creation. Not only has this final piece of digitalisation transformed the entire film value chain, but it has also shifted the boundaries of the film sector and added additional layers of complexity to the film network structure, within the context of the knowledge economy. As De Vinck and Lindmark stated:

...digital technology in itself is not an independent influencing factor in this equation. Rather, the digitisation of the film landscape is the story of interaction between various elements including technological innovations, socio-cultural sector characteristics, economic-industrial business considerations and the political-regulatory framework. (2012:89)

In fact, such transformations consist of several parallel evolutions that are significant to entrepreneurs, institutions and policymakers alike, the outcome of which can impact on the national innovation system, especially in respect to a role the creative content industries might play in an increasingly knowledge-driven economy.

At the time of writing this chapter, and during the Screen Film Summit, Grater (2016) reported that close to 900 films would be distributed theatrically in UK cinemas in 2016. This is a record figure, equating to an average of 16 films per week and is, in part, a consequence of a financial innovation created under the Labour government

in 1997, in an attempt to stimulate investment in film productions. This in itself turned out to be an example of the classic, scientific-push logic to increasing economic productivity. Tax breaks were provided (e.g. rebate orientated fiscal incentives) to investors, in exchange for helping the industry to produce more films; as production costs were reduced, so were the risks for financial investors. The other driver was the digitization across all areas of film production and post-production, which accounted for a surge in micro-budget feature films production (budget up to £500,000) in the late 2000s. This effectively peaked in 2010 when 147 low budget films were produced or the equivalent of 60 per cent of all films produced in the UK (BFI, 2011:144). Despite an increase in worldwide gross box office takings, I assert that notwithstanding the potential offered by digital cinema, the current business model, which is supply chain driven has manufactured an indolent market with a growing number of films produced and released that simply do not correlate with demand from existing audiences.

There are country examples, such as Norway, that have developed their own value network, with the advent of national institutional support, which has led to an increase in cinema going. For example, in Norway GBO receipts increased by 11.7 per cent in 2016 over the previous year (NOK 1.375M), while admissions increased by almost 10 per cent (up to 13.1M, in 2016). According to provisional data released by UNIC (2017), in the UK the GBO figure was static, and admissions fell by just over 2 per cent. Also, there are small clusters of entrepreneurial innovators in the UK and beyond who, despite a lack of interest from national institutions represent one of two growth areas, outside mainstream cinema (e.g. Event Cinema and national films). The UK is now a global leader in event cinema, with 35 active distributors of content and the only trade body for the industry, the Event Cinema Association (Cogavin, 2016). In 2014 event cinema was worth over £35 million in the UK and accounted for over 3 per cent of total box office sales. In 2006, according to David Hancock (cinema analyst at IHS Technology), the entire alternative content sector accounted for just £200,000 of the UK box office, whereas by 2012 this had grown to £12.5 million. For comparison, that is more than the UK film ranked 9th at the UK box office - The Iron

Lady - which earned £9.9 million. Over the last 3 years, the compounded annual growth rate (CAGR) of event cinema in the UK has been 51 per cent while film stands at 0.1 per cent. In releasing the Event Cinema Report, Hancock (2016) stated, 'Now that the digital conversion has finished and the market understands what the technology can do, IHS forecasts event cinema revenues globally will hit US\$1 billion by 2019..[it]..has an integral part to play in re-defining the cinema experience, assisted by new experience-enhancing technologies'.

One final conclusion for this section is in findings on how alternative content can impact on industrial organization, and may lead to a reorienting of exhibition within the whole audiovisual value chain. This development addresses a gap in the service innovation literature, which I have examined through this dissertation, fails to adequately capture or explain the contribution of cinema to local cultural and economic growth. Accordingly, through the statistical analysis of the European film market, which has not, previously, been captured in the literature, I have demonstrated the viability of a research focus on alternative content. This dissertation can provide a springboard for further model building on the impact of alternative content on industrial organization in the cinema market. I would also contest that it will act as a companion following Barker (2012) whose analysis of audience responses to a range of alternative content employs the term *investment* to capture their effective engagement with a particular experience.

6.3 The disruption of markets

At the European level, the digital cinema rollout has failed to deliver on product or content availability to the audience. In fact, one can make a case that the mainstream audience is entering a period of contraction regarding the offer (e.g. growth of prequels, sequels and spin-offs). Also, the promise of flexible programming to a European audience has also failed to materialise. Anecdotally, one only need to look at the latest schedule for a 'tent-pole' release to see that it is available at most times of the day and evening, in 2D or 3D format, for at least the next seven days. About the disruptive impact of digital cinema, it was evident that certain indicators

exhibited a clear relationship with the Adopter clustering (following Rogers) after launch. Such findings indicate that certain characteristics within the cinema market have favoured the digital rollout. These pro-digital characteristics are the Screens per Site rate, the Admission per Person rate, the GBO per Screen and the Exhibitor concentration. Consistently, the digital conversation accelerated at the highest level in those countries that possessed the greatest number of Screens per Site; those that had the highest number of admission per Person and the largest Gross Box Office (GBO) returns per Screen. These indicators represent demand and business profitability of the cinema market(s), respectively; and, certainly suggests that the closer the country resembles an oligopolistic market, the easier the diffusion and adoption.

However, not only have two of the major delivery outcomes of digital cinema failed to materialise, certain negative behaviours among Adopter clusters were found to be attributable during the diffusion process. These differences are most apparent between the majority groups: the Early Majority and the Late Majority markets. Those countries that did not adopt the technology during the early phase suffered a decline in Screen Density and Admissions per Person rates, together with overall reductions in the gross number of Admissions, Screens, and Sites. This downward trend continued even after the Late Majority cluster joined the digital process between 2011 and 2013. The Early Majority countries took full advantage of the digitization process, underpinned by the (short-term) 3D phenomenon, and enjoyed the greatest improvements in Admission per Person and GBO per Screen rates. These conclusions draw parallels with the Double Jeopardy principle developed by Ehrenberg (1959; 1966; 1990). This principle holds that the smaller the brand is in market-share, the greater it suffers from the additional indignity of possessing less customer loyalty. Ehrenberg argued that repeat business is essentially, a function of how popular the brand is with consumers. One comparable conclusion to draw is the mission (concentration strategy) followed by the US studios and the largest cinema chains, is to increase market penetration at all costs.

Contrary to expectations, certain indicators were unaffected by the digital rollout, at aggregate and by Adopter group level. It was suggested that as digitization would pull closer together the studio and audience, one outcome could lead to a reduction in the number of film distributors. However, concentration among distributors remains stable based on the latest data (2013). Such an outcome could be due to a period of hysteresis – a delayed response to the process change – where new business models are delayed by the very success of the old, thus making purchasing changeover neither easy nor smooth. The other main indicator that demonstrated no change in the market is the Cinema Ticket at constant price, which remained stable at €5.30 – 5.60. The main conclusion to be drawn is while significant costs were extracted from production and distribution no price reductions were passed on to the market place, during this period under investigation.

Finally in this section, despite the opportunity to increase the range and diversity of film on offer, no changes in film market share of films exhibited could be found. Digital cinema has had no effect on Non-National and the Rest of World shares in mainstream cinemas. In fact, the gap between total European film and US Film Share has widened slightly, since the Early Majority Cluster phase in 2008. The success of 3D during 2009 and 2010 was a contributory factor here as almost all 3D films were US funded productions. However, the main conclusion to draw is the gap was first maintained, and then grown by the deals involved in the Integrator-VPF contracts, which have now ceased. Unfortunately, access to the actual wording in those contracts have been at best, anecdotal, so it is difficult to know the exact lengths of the operating agreements; consequently we do not know when the film industry will be a VPF-free market.

All of the above, suggests that the answer to the research questioned posed, ‘can a high-tech breakthrough approach deliver novel supply and demand solutions,’ is, in the case of the digital cinema rollout, no, certainly not in terms of the behaviour within the film market. The US Studios, through the introduction of the DCI specification and the inherent restrictions of the VPF financing model, have counteracted the disruptive effects of the digital cinema. Although the ten years

taken to complete the rollout of sustaining innovation has produced unintended consequences, which are usually measured across three criteria: positive effects, potential problems that may result in a reduction of quality, and negative effects. Maintaining quality was delivered via the threat of DCI non-compliance (e.g. US studios would withhold films from cinemas who did not own and operate using DCI V1.0 equipment). However, only 14 of the 34 specifications are in use in the market today, and the VPF model has now ended. As with all oligopolistic behaviour, incumbents keep quality thresholds high as a device to keep out new entrants. Maintenance of and compliance with the DCI standards will only be feasible if membership of the DCI itself is open to representatives from stakeholders. As of today, membership remains open to the US studios only, which appears to look remarkably like a ‘closed shop’. If entrepreneurial innovators, such as China’s Wang Jianlin, the former Red Army soldier who built the Dalian Wanda entertainment and real estate empire, continues to grow his cinema chain it will be difficult for the US studios to maintain their position. Wanda currently controls AMC (US chain with 5048 screens); Hoyts (Australian chain with 450 screens); and, the Odeon group in the UK (2202 screens) among others; this is in addition to being the largest screen operator in China as can be seen in **Figure 6.1** and follows the 2016 purchase of Los Angeles production firm Legendary Entertainment.

Fig. 6.1: Wanda cinema group timeline (Dec 2016)

| Cinema | Country | Founded | Year Purchased | Cinemas | Screens |
|-------------|-----------|-------------|----------------|---------|---------|
| Wanda | China | 2000 | | 311 | 2700 |
| AMC | US | 1926 | 2012 | 346 | 5048 |
| Hoyts | Australia | 1926 | 2015 | 50 | 450 |
| Carmike | US | 1982 | 2016 | 271 | 2917 |
| Odeon & UCI | UK | 1828 & 1989 | 2016 | 244 | 2202 |
| | | | | 1222 | 13317 |

Source: Various

Assuming Wanda's present trajectory continues, one possible conclusion will be that it extends the content channel with strong box-office potential, which may lead to it reorienting itself as an independent producer, much the same way as Netflix is seeking to do (e.g. *The Crown* and *Beasts of Burden*). Both firms have recognised the value of market (audience preference) data; they are, unlike their counterparts in US Studios, aggressive data aggregators and can deliver content to local markets in an effective and at a relatively low cost across a number of platforms (e.g. the cinema and Over The Top [OTT] services).

In the course of this dissertation, I would argue that Goldman's maxim of 'nobody knows anything' can be refuted. The existence of the data aggregators operating within audiovisual industries from entrepreneurial firms such as Netflix and Hulu providing sales estimates for film projects, and the statistical modeling skills of their internal analysts who can predict the returns on investment by title means they really do know where you live. In such a highly networked market, both firms will be able to produce content for local markets by working with creative talent and below the line freelance specialists to further extract production costs and ultimately displace the US studio system as global system integrators.

Given the situation in Norway, digital cinema does appear to have favoured those agents who did not operate alone under a VPF environment. As of 2013, the conclusion can be explained through the unique, in-country situation whereby the long-term presence of public institution activity enabled a diffusion and adoption process to take place in a shorter period and with less negative effects than many other countries. Certainly, the conclusion drawn from analogue to digital cinemas advertising conversion (24-hour switchover) must be likened to the gales of creative destruction; every cinema benefited, which meant the diffusion and adoption strategy followed for the digital cinema conversion suffered no evidence of hysteresis and enabled the country to retain its position as the 'best cinema system in the world'.

For a period (2005-2009) the UK Film Council appeared to have created a team that was capable of delivering similar successes to that of Norway. A considerable achievement given the different economic scales between the two countries. The conclusion drawn from this dissertation is that UK politics has impeded, as opposed to intervened, by maintaining the focus on a scientific-push world of innovation, which has allowed a narrative to exist whereby innovation is the sole preserve of new-to-market products or services. In essence, this has led to a situation whereby the UK has been slower than its competitors to adopt and deploy existing technologies, ignoring the opportunity for entrepreneurial bricolage: for example, the UK does not appear to recognize the wider benefits of independent cinema and the high growth potential of events cinema in the way that certain other countries do, in the European Union. Promoting broader deployment of technologies, especially those that enable smaller firms to build local consumer data would help to counter inequalities in competitiveness by raising productivity levels among less productive UK firms (Love & Roper, 2015). Innovation remains a two-edged sword. And, in a recent piece for the Enterprise Research Centre, Roper (2017) spoke that while innovation has the potential to drive growth and productivity, it can also fuel inequality.

If the recent Green Paper on Industrial Growth, embraces what Zehavi & Breznitz (2017) refer to as, 'Distribution sensitive innovation policies (DISP) then established government interest in innovation (e.g. R&D investment leading to patentable knowledge outputs; regulatory frameworks for competition) may be encouraged to shift attention towards new geographies and emergent networks of creative producers and consumers.

6.4 The disruption of learning

It has long been held that policymakers require an understanding of innovation systems to help identify leverage points for enhancing innovative performance and overall competitiveness. Such appreciation helps direct their attention to possible systemic failures that can accompany the more generally recognised market failures

in the development of technology (OECD, 1999). However, Schumpeter cautioned that neoclassic economics methods on which such learnings were based (e.g. treated technical change as an exogenous process) and accepted by market failure theory was insufficient to explain the real development of the economy (Schumpeter, 1912). From the work of Rosenberg, Dosi, Nelson and Winter in the 1980s, through to Mazzucato in 2013, evolutionary economists sought to view the black box of technical change (following Schumpeter) through a different lens, one based on historical analysis and empirical evidence, in order to understand the process that links technical change (innovation), economic growth and development. By embracing such notions as technological paradigms and technological trajectories, evolutionary economists have shown the inadequacies of market forces in providing a path to economic development. Technology development is a problem-solving activity, and a technological paradigm embodies strong prescriptions on the directions of technical change (Dosi, 1982:152). In turn, technological trajectory represents the direction of progress within a technological paradigm, which is why, according to Mazzucato (2015), market signals are limited in terms of providing direction to techno-economic development. Such signals only work within the parameters of the paradigm and thus influence more the rate of change than its direction (2015:14). This issue becomes problematic when a Government is seeking to change the trajectory; or in the case of the recent Green Paper on Industrial Growth, the paradigm itself, the first step to developing a national innovation system.

The generally agreed definition for national innovation systems is, “the set of organizations, institutions, and linkages for the generation, diffusion, and application of scientific and technological knowledge operating in a specific country” (Galli and Teubal, 1997:345) and they involve the creation, diffusion and adoption of knowledge. However, a lack of interaction between the actors in the system, mismatches between basic research in the public sector and more applied research in industry, malfunctioning of technology transfer institutions, and information and absorptive deficiencies on the part of industry may all limit innovation and the

diffusion of knowledge. In search of improved interactions, governments can provide the foundations for effective partnering among the elements in the system. At the heart of the NIS concept lies “the needs of policy makers and students of innovation” (Lundvall, 2002:215), which echoes an evolutionary development encompassing reflection on economic theory. Since the 1950s, “a linear model of science and technology ‘push’ was often dominant in the new science councils that advised governments. It seemed so obvious that the Atom Bomb was the outcome of a chain reaction: basic physics => large-scale development in big labs => applications and innovations (whether military or civil)” (Freeman, 1995:9). Despite the approach being reinforced through innumerable policy initiatives across the years, I have demonstrated it is incapable of accounting for differential rates of technological innovation and economic development experienced by industrialised countries (Dosi, 1982; Feinson, 2003; Mazzucato, 2013). Also, Freeman argued, “...evidence accumulated that the rate of technical change and of economic growth depended more on efficient diffusion than on being first in the world with radical innovations and as much on social innovations as on technical innovations” (*op.cit.*:10). Lundvall ventured that interest in NIS grew due to the fact that “mainstream macroeconomic theory and policy... failed to deliver an understanding and control of the factors behind international competitiveness and economic development” (2002:214). Implicit in this thinking was a need for domestic policymakers to focus their attention on emerging entrepreneurial innovations, the utilisation of current knowledge and strategies for novel solutions to strengthen their respective national innovation systems.

In maintaining the currency of its creative infrastructure inside a highly competitive commercial market, Norway has managed to embrace entrepreneurial innovation at all levels in the audiovisual industries. The most successful Norwegian films and TV programme are increasingly recognised at the international level. As a result, they contribute to the cultural heritage of the country and region. Also, it is difficult to imagine that without the continued - and some would argue unique - involvement of national and local public support has worked against the more laissez-faire policies in

Scandinavia and the wider European market. The Norwegian case does demonstrate the potential for interventionism at Government level to catalyse investment and encourage greater private entrepreneurial innovation to bring about technological and institutional change. While stakeholder conflict did provide a certain balancing act in this case, the learning built from the knowledge sources shortened levels of hysteresis to reflect constituent 1 of my Conceptual Framework, which purports, a state of entrepreneurial innovation whereby a sector is able to take on new paths of development or several paths at once without recourse to breakthrough technologies. It is resilient to change from outside and allows strong co-evolution between technological development and supportive institutions.

The Norwegian national innovation system acknowledges that the creative industries can deliver novel and supply and demand solutions to support economic growth. As a result, I see this dissertation as contributing to our understanding of the need for enhanced levels of interaction between institutions to facilitate new trajectories in industries, which are characterised by a high demand uncertainty, and a dependency on entrepreneurial innovation.

I would also wish to point out this dissertation's contribution to the empirical literature on the film and audiovisual industry itself. Here I want to highlight in particular the scope of the study, which has attempted to combine its own findings and that of previous research to describe developments that impact on the cultural and commercial exhibition system of a) the film industry and b) national innovation systems, which has not previously been captured academically in such a way.

6.5 Chapter summary

In this chapter I have sought to explain the primary objective, which is to perform a reflexive and future scenario analysis of what digitalization means for the distribution and consumption of film and audiovisual, taking up a three-fold assessment consisting of disruptive technologies, entrepreneurial innovation, and national innovation systems.

This chapter has considered the limitations of the market failure framework that continues to guide innovation policy. It has argued that putting innovation at the centre of growth policy requires an emphasis on shaping and creating markets rather than just fixing them. Market failure theory says little about cases in which the state is the *lead investor and risk taker* in capitalist economies. Having a vision of which way to drive an economy requires direct and indirect investment in particular areas, not just creating the conditions for change. Crucial choices must be made, the fruits of which will create some winners, but also many losers (Mazacuti, 2013).

Given the Brexit vote was soon followed by the US electorate deciding that Donald Trump would make America 'great again', perhaps it is worth reflecting on the following quote to finish.

In June 2016, Russian Minister of Culture Vladimir Medinsky asserted that Netflix is part of the US government plot to influence the world culture, "to enter every home, get into every television, and through that television, into the head of every person on earth". This was part of his argument for the increase of funding for Russian cinema, to pitch it against the dominance of Hollywood (Parfitt, 2016).

6.6 Limitations and future research

A limitation of the research has been timing in regard to political changes that have taken place recently in each of the three countries examined. As policy at supranational, international and national levels continues to evolve (post-Brexit and with a new US President in place) future research should be undertaken at regular intervals to assess these changes in light of the impact they will have on the audiovisual landscape.

A further limitation of the present study comes from the lack of data on screening alternative content, which makes it difficult to assess the expected diversification of programming and wide screening of alternative content brought about by the digital cinema rollout across the European market. At country level, one study on the Dutch market, 100 per cent digitalization since 2012, found that the digitisation of cinemas

leads to wider choice of content for the audience (Netherlands Film Research Foundation, 2014).

A final limitation revolves around the countries examined and whether they provided a global insight to the film and audiovisual industries. The original intention was to incorporate either China and/or India, as they represented regions that were not likely to fall into line with the US studios directives around DCI standards. However, given the resources available (in human and financial terms) that strand of work was not maintained and subsequently fell away during the early stages of the fieldwork.

Finally, this dissertation has suggested certain gaps in the literature and raised a number of ideas and questions for further research projects, which are briefly outlined below:

First, conclusions suggest further changes to the industry structure of the industry and the rise of the platforms will impose constraints on the strategic behaviour of the studios in this new borderless environment. Through the use of the DCI and DRM, the US studios sought to build a walled garden of innovation, which, can be regulated in a way that displaces rather than nurtures disruptive technologies. Now the digital conversion is 95 per cent complete we are in a position to test whether, (following Curragh, 2006) the results will lead to a bifurcation of the networked environment.

Second, most incentive schemes are production focused, thereby reducing production costs and the risk for financiers. It would be interesting to explore a scheme that rewarded producers to a) take a greater share of revenues generated from a successful film and audiovisual project and b) reinvest profits in subsequent projects via a randomized control test (RCT).

Third, courtesy of his speech delivered to BBC staff by its Director-General, Tony Hall (January 2017), an opportunity exists to test the integrity of C. P. Snow's 'two cultures' missive. This term has stood almost unopposed, in the corridors of power, since the 1950s. A term Cunningham claims has, allowed modern science to become so closely associated with, and regarded as the wellspring of, the advancement of

knowledge and technological progress so that the concept of innovation has been virtually soldered to science (2014:3-4). In his speech, Lord (Tony) Hall effectively provided five research projects that could be developed from this dissertation (See **Appendix 5** for full transcript of the speech). I have reworked certain parts of his speech to act as companions, or case-studies, building on my own findings for future research:

From Supply Chains to Value Networks

1. Hall wants the BBC to reinvent public service broadcasting for a new generation, so that it works for all audiences, so that everyone gets value from the BBC. He claims that audiences continue to value what the BBC does, in fact, they value it more than ever as Ofcom's research shows, young people value public service broadcasting as much as all of us. Increasingly, younger audiences and older audiences are consuming media in different ways. So the BBC has to respond in a media landscape that has changed beyond recognition. It is hugely more global and more competitive; one where Amazon, Netflix, and others are willing to invest huge amounts of money with no certain return in an attempt to capture market share where Facebook is looking at commissioning its own TV programmes, and where moves such as the Fox-Sky merger are making the very biggest players even bigger.

We have a major advantage that we have the stability of an 11-year settlement, and are sure of our budget for the next five years. And, we've also learnt over the last year that when we innovate online, we can have a similar impact.

Disruption of Markets

2. We need to reinvent iPlayer - It was the biggest revolution of the last Charter. It's been the number one video-on-demand service in the UK, reaching more people than any other. Now we need it to make the leap from a catch-up service to a must-visit destination in its own right. Our goal, even in the face of rapid growth by our competitors, is for iPlayer to be the number one online TV service in the UK. That will mean doubling our reach, and quadrupling the time each person spends on it every week. And we want to do it by 2020. I think we can do so much more with our world-class content. And, by the way, win new global audiences.

Disruption of Learning

3. Data is creating a flight to quality. It means audiences can find the best of public service broadcasting - but only if they sign in. Each month, we now have around three million active signed-in users. I want to make that 20 million. And I want us to get there as quickly as possible. And the thing that brings all these challenges together is personalisation. This is a major priority.

Entrepreneurial innovation

4. More than anything else, this is what our future success will depend on. By finding out more about our audiences and what they like, we can make better content, make it more relevant, and bring it to them more effectively. The closer and more personal our relationship with our audiences, the more I'm certain they will choose the BBC. I want us to examine what big technological changes - such as voice recognition, and virtual reality - mean for us. How can we push boundaries, do new things, in the way that we have done

so well with new developments in the past? The priority has to be that we're able to work together across teams, and work fast. Because, for me, the old way of doing things - working in silos - simply can't succeed. Nor can the traditional ways of delivering services - big project plans, with budgets allocated five years out. We've got to be much more entrepreneurial in our make-up.

5. My priority is to be much more ambitious for the BBC globally. We punch well above our weight worldwide. And, as one of the country's most valuable exports, we help the UK punch above its weight too. I believe that, right now in the post-Brexit world, the country needs us more than ever and we need to do more than ever for Britain. I believe there are two major factors that will be critical to our future global success. The first is BBC Studios - and now we have the go-ahead, which represents a true revolution in the way we source and make our programmes. It's a risk, but it is also an incredible opportunity. And there's one announcement we'll be making very shortly that will highlight just how great that opportunity is.

In both radio and television, we need to own intellectual property rights for the future. I don't want us ever to become a publisher-broadcaster. I'm convinced that Studios is the only way we will secure our future as one of the very best programme-makers in the world. But I don't want us just to be brilliant at making high-quality, distinctive British programmes. I want us to be truly brilliant at exporting them across the globe. That's why we need BBC Worldwide to thrive as a strategic partner for BBC Studios, making the very most of our global reach. My challenge to Worldwide is to look again at how we best grow our business to deliver more returns back to BBC public service - to reinvest in yet more great British programmes and services.

Fourth, in September 2013, the centre-left coalition that governed Norway since 2005 was replaced by a coalition of the Conservatives, junior partner, The Progress Party (and, as they don't have a majority) supported in parliament by the centrist Liberal and Christian parties. According to Sand (2016) in May 2015, the coalition government introduced a new film policy, 'En fremtidsrettet filmpolitikk' ('A provident film policy' - White Paper No. 30 2014-2015). It placed a much stronger emphasis on regional film than the previous government, arguing that that the distribution of power and regionalisation of film policy would increase competition, diversity, and the quality in Norwegian film (White Paper No. 30 2014-2015:65). Future research could focus on the impact of the policy from a single country perspective; across Scandinavia; a two-country perspective with the UK (post Brexit) and its impact on economic growth.

Finally, as discussed earlier, an empirical generalisation based on Ehrenberg's work that has had wide application in Marketing is Double Jeopardy, as described in

“Double Jeopardy Revisited” (Ehrenberg, *et al.*, 1990). A small brand not only has fewer buyers than a large brand but they also tend to be somewhat less loyal. A simple model will relate the number of buyers and the rate of purchase in a particular market. The Double Jeopardy effect, which occurs in practice in many different consumer choice situations, has implications for the future of cinema, given that if the medium is not film then the business is not one of screening movies but of crafting experiences and building relationships.

7 Contribution to knowledge

“[I see Netflix].....producing content all over the world, for the world.....evolving past the Hollywood enclave.....we have 87 million subscribers.....we’re going to focus on movies and tv shows on a global basis for the next 10-15 years.....no sports, no news.”

(Reed Hastings, 2016).

While the mainstream innovation literature has increased dramatically over the past 50 years, we still know less about why and how such innovations occur than what they deliver. Over the past 20 years, studies on discontinuous or disruptive innovation have focused on trying to provide explanations about change – primarily through a policymaker or innovation management lens. In both cases, the discourse has concentrated on the notion that the rate of technical change and economic growth depends on efficient diffusion i.e. a linear model of science and technology ‘push’; it is this thinking that has continued to dominate UK Science Council advice to government. Although this approach has been reinforced through numerous policy initiatives over the years, it has proven unable to account for differential rates of technological innovation and economic development experienced across many western economies.

As such, the film and audiovisual industry offered an excellent case study to demonstrate my first contribution to knowledge, specifically in the area of field research - a qualitative data collection method designed for considering, observing, and interacting with individuals in their natural environments. Over time, I established that digital cinema was capable of delivering novel supply and demand solutions - starting from a few unrelated scraps of data, through the establishment of personal networks with communities of practice in the UK, US & Norway) to building rich, and complex quantitative data sets that measured the whole diffusion and adoption phase of the digital cinema rollout. However, successive governments have artificially increased production capacity, via policy initiatives (incl. tax incentives) with little or no interest in how new content would reach audiences.

While mainstream innovation theory and policy failed to deliver an understanding and control of the factors behind international competitiveness and economic

development, we have seen the emergence of a research agenda in national innovation systems (NIS). A definition of an NIS is typically presented as the set of organisations, institutions, and linkages for the generation, diffusion and application of scientific and technological knowledge operating in a specific country. The NIS concept rests on the premise that understanding the linkages among actors involved in innovation (e.g. joint research, personnel exchanges, cross-patenting, purchase of equipment and a variety of other channels) is key to improving technology performance. The innovative performance of a country depends on how these actors relate to each other as elements of a collective system of knowledge creation and is employed, as well as the technologies they use. These actors are primarily private enterprises, universities and public research institutes and the people within them. As such, the novel field research, employed in this dissertation has delivered a better understanding of the role of entrepreneurial innovation for regional and national innovation systems. The impact of my work in this area can be seen in my agreement to write a Monograph on 'Brexit and its impact on entrepreneurial innovation,' though Emerald Publishing (final draft due Autumn 2017).

In this work I have sought to build on the NIS literature in examining the diffusion, adoption and incorporation of knowledge in the rollout of digital cinema technology. My findings also suggest a radically different reading of the national innovation system than has been offered by many previous accounts, seeing it as a case study for an increasingly mobile sector, in which technological factors retreat in importance behind entrepreneurial innovation as a key driving force in reaching audiences. Implicit in the contribution is that novel supply and demand solutions can be explained in the absence and presence of national or sector institutional activity as firms do not innovate in isolation but depend on extensive interaction with their environment. The impact of my work in this area can be found in an engagement with two leading industry bodies, to look at how cinema operators can work with universities to develop

As I have shown in this dissertation, there is a need for domestic policymakers to

focus their attention on emerging entrepreneurial innovations, the utilisation of current knowledge and strategies for novel solutions to strengthen their respective national innovation systems.

I have developed my argument by firstly demonstrating the importance of learning-by-doing in the deployment of digital cinema over a 10-year period, which in itself is now situated in a wider international entertainment value network. Based on a critical review of existing literature and empirical studies, I have proposed that to arrive at a satisfactory understanding of the digitalization phenomenon, it is necessary to look beyond technological factors associated with cost reduction and copyright protection, and examine, instead, the dynamics that impact on the industrial organisation of the value network.

Following indications from the literature, I have particularly focused on the crucial role entrepreneurial innovation plays in the distribution and exhibition process. Here I have found that in the context of incumbent inertia to find novel solutions as a contribution to the concept of national innovation systems, the research identifies differences in how the main actors responded to the digitisation of cinema in the international entertainment value network. In particular, the findings confirm the importance of learning-by-doing lies in a) managing the adoption of a potentially disruptive innovation and b) firm-level decision making and national innovation system thinking. The research also establishes the nature of entrepreneurial innovation in coping with diffusion, disruption and destruction in the entertainment industry.

Finally, I have argued that to explain the growth of novel supply and demand solutions empirically, it is necessary to understand that digital cinema was proposed (by incumbents) as a replacement technology for film projection. As digital cinema offered a new value proposition to distributors, and as the US studio system continue to rely on a highly developed value chain, the new technology was carefully nurtured into play to avoid the disruption faced by incumbents in the music industry. As part of a disruption avoidance process, the US studios subsidised equipment costs,

referred to in the market as virtual print fees (VPF) to ensure their objectives were fully met. This empirical evidence adds to our understanding of the diffusion and adoption literature and is therefore a contribution to knowledge.

Digital cinema did not create a new market; it only improved an existing one, and, in that, the improvement initially benefited only one side of the supply chain. Earlier in the diffusion phase, Hanson (2007a) speculated on the differing approaches to the deployment of digital cinema between Europe and the US.

In continental Europe, Europa Cinemas – supported by the European Union’s MEDIA Programme – have set up a series of initiatives to ‘assist theatres in their transition to digital cinema’..[e.g.]..financial support for the installation of digital projectors. Like the UKFC’s Digital Screen Network the continental European initiative aims to encourage and support specifically European film. These initiatives share a common feature: state intervention through subsidy. In the UK and continental Europe the strategies are bolstered by a desire to promote specialised and, by implication, domestic film cultures. (Hanson, 2007:379)

While Hanson’s insights recognise the obvious weakness in a broad continental Europe approach, they approach the phenomena from a traditional view of cinema. As such, they do not consider that all key stakeholders, on both sides of the Atlantic, were engaged in a subsidy war outside of a simplistic public vs. private debate. The US strategy was implemented across each link in the supply chain, an approach that reflected a more rounded understanding of the commercial and cultural opportunities, than their continental Europe counterparts. Had the digital cinema transition occurred as a disruptive innovation - encouraged by a similar approach from continental Europe - it would have been driven by new sources of content, opening up new markets for that content, and possibly introducing new and different venues for consuming that content.

Instead, in two markets (the US and UK), public institutional involvement in VPFs - designed to match the fulfillment costs of wide release films - was largely shunned. Although, as Olsberg points out, the UK system does combine tax credits that reward expenditure with lottery funding for projects deemed to have significant artistic or commercial potential. However, the largest proportion of public subsidy goes to Hollywood studio films using the UK as a production based (2014:50). I propose that

such systemic approaches, based on transactions and exchanges, do little to develop a domestic industry, as they do not focus on the market from an entrepreneurial perspective and should not, therefore, be considered a viable policy option. Despite the fact that the approach is grounded in the field of private sector development, such blunt (fiscal) instruments alone simply help to maintain a skilled workforce for US product, as and when it is necessary.

The twin approaches described above resulted in market-entry barriers being erected to new sources of content by raising costs for nonwide-release fulfilment. While, in Norway, which did operate with public institutional involvement, we saw a different pattern of diffusion and adoption, which delivered a novel supply and demand solution within an NIS. This insight advances our understanding of the diffusion and adoption literature, within the context of the NIS and is, therefore, a contribution to knowledge.

While digital cinema was not meant to be a disruptive technology in the UK and US, the seeds are growing for disruption to occur. New entrants are exploring low-cost techniques such as social networks and private platforms to market films to audiences they understand. So, the first part of the proposition was demonstrated to be wrong and has consequences for innovation theory and policy, which ignores the role of public engagement throughout the value network. The second part of the proposition delivered unforeseen consequences, which showed poor long-term decision making (path-dependent) strategies from incumbents. They appeared to learn little from consumption patterns in the music industry, post-Napster. Film today is more transportable across different platforms, not regions. Returning to Gabriel Tarde (1902) for one last time, he may have been predicting the aspirations of the entrepreneur Reid Hoffman, (or Tony Hall from the BBC), when Tarde wrote:

...when he predicts that the inequality of different nations will continue to diminish, he should have said social dissimilarity, and not inequality. For between the smallest and largest states the disproportion of power, of territory, and even of wealth, goes on increasing, and yet this condition does not stand in the way of a constant progress of international assimilation. (1902:xxiii)

8 Epilogue

The current state aid system predominantly supports film production, without sufficient corresponding emphasis on distribution. In 2009, European public film-funding bodies spent on average 69% of their budget on creation of works, while only 8.4% went to distribution and 3.6% to promotion. Katsarova (2014)

In 2016 the European Parliament report on EU policy for cultural and creative industries claimed that culture represented an extensive economic asset and a valuable source of creativity and innovation. To unlock the potential of these industries, and support cross-border activity between SMEs, the European Commission launched a series of support programmes, with a total budget of €1.46 billion. The question is will the Cultural and Creative Industries (CCIs) deliver economic growth, for the EU? It is claimed that the CCIs account for 11 per cent of all private enterprises and 7.5 per cent of all employed persons across the EU. Aside from their economic contribution, CCIs have also built a bridge between arts, culture, business and technology. Some of this €1.46 billion investment will invariably involve subsidised education and training programmes to support skills development in the CCIs. Despite the risks faced by incumbents in the CCIs brought about by digital technologies, in general, and the impending launch of the digital single market, some commentators argue that the EU should do more to support production, especially in film and audiovisual sector. They claim that since it devotes few resources to production and co-productions, a larger public engagement should invest to allow the planning of activities and at the same time, reduce fragmentation of projects (Zambardino, 2016:127). So, is the quote from Katsarova at the top of the page still relevant or not?

On November 29th, 2016, Johanna Koljonen gave the keynote speech at the UK film exhibition innovation conference, This Way Up. During her talk, Koljonen referenced her work on the Nostradamus Project, how audiences decide to spend their time, on what and where:

[W]hen we listen to actual humans discussing how to spend an evening, they very often decide to go to the cinema before even picking the film. The film is not irrelevant, but it *is* quite often a secondary consideration; and even when it is at the

core, the discussion is not about seeing the work in general but seeing it in a specific manner (because you could just pirate it and watch it for free at home). This all means we should think a little less about films and a little more about experiences. And if your business model involves repeat customers – as of course it must – you are also in the business of building relationships. In other words you are designing communities of people – who have a relationship to you; and ideally in fact also to each other. When people, even some exhibitors, talk about the challenges cinemas are facing, they often make it sound as though the service provided by movie theatres are exclusive access to the work. Or, if they're slightly smarter, they will say what especially arthouse cinemas offer is curation – which is indeed very important in an age of abundance.

In essence, Koljonen core message supports findings developed in this dissertation, in that, if the medium is not film but, in fact, cinemas then the business we are in is not one of screening movies but of crafting experiences and building relationships.

While the decision for the UK to leave the EU and the election of the 45th President of the United States was not to everyone's liking, it could prove helpful to the audiovisual industries of certain countries. If as appears likely, US antitrust regulations are relaxed under the Trump administration, this will have an impact on net neutrality rules. Netflix recently announced, in a letter to shareholders, that any weakening of net neutrality laws would not affect its business in any significant way, but stressed, as many advocates have done, that it would hinder competition across the board. However, at the same time, producing original content had proved successful; 600 hours of original programming in 2016 - and seeks to grow that to some 1,000 hours in 2017. It has allocated a budget US\$6bn to achieve this objective – an increase of US\$1bn over the previous year. Further proof that the strategy, built on creating relationships with its audience, had added 7.05 million new subscribers in the last three months of 2016. That's far greater than the 5.2 million they had anticipated, and left them ending the year with almost 100 million subscribers in total. In all, 2016 saw Netflix take in US\$8.83bn in revenue - with a profit of US\$186.7m (Lee, 2017). As Edström & Koljonen, (2017) most recently argued, changes in the US entertainment industry have global ripple effects. It is also likely that the cultural importance of US content specifically will diminish in the long term, a tendency that could be accelerated by isolationist policies and the media landscape is liable to consolidate dramatically during the next four years (2017:4).

As US content has always depended on high exposure levels across mainstream screens, the fact that a Chinese entrepreneur now controls AMC and Carmike Cinemas in the US and Odeon in the UK may well be a sign of things to come. As recently as January 2017, it was reported in the Financial Times that Wanda (through its subsidiary, AMC Entertainment) had entered into a definitive agreement to buy Stockholm-based Nordic Cinema Group for US\$929m from Bridgepoint, the private equity group, and Bonnier, the Swedish media company. Nordic owns 68 cinemas in seven northern European countries and is a partner in another 50 locations. It recorded box office revenues of US\$229m in 2015. In Fedor's report in the Financial Times, she quoted Leo Kulp, an analyst at RBC Capital Markets who said the deal was 'sizeable' and, combined with the Odeon acquisition, would give AMC 'greater leverage in negotiations with its partners....Odeon gives AMC not only an attractive platform to drive value through, executing its premium strategy, but also as a platform to consolidate the European exhibition industry'. Assuming that the European Commission grants antitrust clearance, Nordic will maintain its Stockholm headquarters but will also operate as a subsidiary out of London-based Odeon (Fedor, 2017). Equally important is the fact that AMC Entertainment and two other US cinema operators, own Fathom Events as a joint venture. Fathom was conceived as an experiment in 2002 and is today a major player in the alternative entertainment industry (including live, high-definition performances of the Metropolitan Opera). It also runs the live digital broadcast network (DBN), the largest cinema broadcast network in North America. As the founder of Cineuropa.org, Domenico La Porta was quoted in Edström & Koljonen's future scenarios report Nostradamus: Screen Visions 2017):

I was in Brussels moderating the European Film Forum and heard twice on stage that 'theatres are still the best place to watch a film'. The guy was saying that as if it was obvious. I'm sorry – it's not obvious. It depends on what kind of film, the time you have at your disposal, your family life, your level of film addiction, your culture, the communities you are part of... It's 2017 and that statement hasn't been proven [right] for a while now although it might have been remotely accurate 50 years ago.

(La Porta, 2017)

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Appendix 1: List of interviews, industry events, markets and workshops attended

Interviews completed

Interviews were undertaken with 20 senior executives, analysts and commentators in a mix of private and public institutions across the three countries. In light of my participation in a number of temporary cluster events gained me access to a further 25 global motion picture business people and cinema professionals.

Industry events attended

Foreign-language film in the UK: at the cinema and beyond: MEDIA Desk UK and the French Institute, UKFC. 23 April 2010. London

1 Overview

Moderator: Why do we need foreign-language film? - Dave Calhoun, Time Out

2 The landscape of foreign-language film in the UK

Sean Perkins from the UK Film Council Research and Statistics Unit will give an overview of the UK exhibition sector and foreign-language market share in comparison with other European countries.

3 This is the reality, let's deal with it!

Discussion by key industry figures on the current state of play, challenges and opportunities for foreign-language exhibition.

Speakers: Michael Gubbins (moderator)

Steve Perrin, Digital Funding Partnership

Alex Stolz, UK Film Council (P&A Fund, DSN)

Clare Binns, City Screen

Danny Perkins, Optimum Releasing

3 EU public funding for non-national film - Europa Cinemas

Ian Christie, Europa Cinemas

4 Europa Cinemas in the UK

Moderator: Ian Christie, Europa Cinemas

Rob Kenny, Curzon Artificial Eye

Guillaume Silvy-Leligois, Ciné Lumière

Mark Cosgrove, Watershed, Bristol

Catharine Des Forges, Independent Cinema Office

5 Innovative techniques and strategies for attracting cinema audiences

Discussion about how digital tools can help increase box office for foreign-language film, including cinema-on-demand and the building of online audience communities.

Moderator: Michael Gubbins

Pete Buckingham / Alex Stolz – UKFC Innovation Fund

Tobias Bauckhage, Moviepilot

Daniel Robey, Jam – digital promotion agency

Ross Fitzsimons, Curzon Artificial Eye

Michel Peters, Content Republic

6 Foreign-language film in the UK at festivals, on television, online, in schools

Moderator: Michael Gubbins

Steve Jenkins, BBC

Helen de Witt, London Film Festival

Mark Reid, BFI (member of Film: 21st Century Literacy)

Ian Wall, Film Education (member of Film: 21st Century Literacy)

CEA Conference: 23 February 2010. London

3D SYSTEMS: The technology. The costs. The in-cinema experience

1 Overview

Moderator: Phill Clapp, Chief Executive, Cinema Exhibitors' Association

2 3D Systems on the Market

Moderator: Anthony Williams, Specialist Cinema Consultant

Real D Richard Phillips, Vice President, Engineering, Arts Alliance Media

Dolby 3D Max Bell, Managing Director, Bell Theatre Services

Master Image 3D David Pope, Cinema Consultant

XpanD 3D (formerly Nu-Vision) Peter Hall, Managing Director, Future Projections

Technicolor 3D Tom Cotton, VP International Business Development, Technicolor

3 Cinema practicalities

Moderator: Anthony Williams, Specialist Cinema Consultant

David Williams, Managing Director WTW Cinemas;

Peter Hoare, Managing Director Scott Cinemas;

Gerald Parkes, Managing Director Parkway Entertainment

Andrew Poole, Director Pavilion Galashiels

4 Ask the Panel

Moderator: Steve Perrin, Chief Executive, UK Digital Funding Partnership

IBC Conference: 11 September 2006. Amsterdam.

1 The Good the bad and the ugly: technology to business

Moderator: Jerry Pierce, VP D-Cinema, Universal Pictures, USA

2 Creating the standards for digital cinema – the progress and the issues

Moderator: David Bancroft, Thompson, UK

Mark Kimball, The Walt Disney Company and DCI, USA

Wendy Aylsworth, Vice President of Engineering, Warner Bros & SMPTE, USA

Siegfried Foessel, Fraunhofer IIS, Germany

Thierry Delpit, CST, France

Patrick von Sychowski, Unique Digital, Norway

Curt Behlmer, Technicolor Digital Cinemas, USA

3 Global D-cinema report

Moderator: David Hancock, Screen Digest, UK

Zhu Zhu, Cinergy, Hong Kong

Kiran Reddy, Sathyam Cinemas, India

Michael Karagosian, MKPE Consulting, USA

Nico Simon, Utopia Group, Luxembourg

4 The business plans – who pays the bill?

Moderator: Steve Perrin, UK Film Council, UK

Chick Goldwater, AccessIT & Christie/AIX, USA

Bernard Collard, XDC International, Belgium

Curt Behlmer, Technicolor Digital Cinemas, USA

5 A look into the D-cinema future

Moderator: Bill David Monk, City Univesity, UK

Matt Cowan, RealD, Canada

Michael Kaye, In-Three, USA

Andrew Robinson, Harkness Hall, UK

Kevin Wakeford, Sony Europe, UK

Thomas Hoegh, Arts Alliance Group, UK

UK-wide programme of 11 digital roadshows 27 April – 08 June 2009

Organised by The Cinema Exhibitors' Association, UK Film Council and Screen Digest, to raise awareness and understanding amongst the exhibition sector of issues around digital cinema.

Digital Cinema Roadshow, Manchester (April, 2009)

Digital Cinema Roadshow, Hull (April, 2009)

Digital Cinema Roadshow, Cambridge (April, 2009)

Digital Cinema Roadshow, Wolverhampton (June, 2009)

Digital Cinema Roadshow, London (June, 2009)

Markets attended

American Film Market Conference: 2 November 2007. Los Angeles.

1 Film Financing - Year in Review

Moderator: P. John Burke, Head of Entertainment Group, Akin Gump Strauss Hauer & Feld

Morgan Rector, Regional Manager Beverly Hills and Los Angeles, Comerica Bank
Bob Hayward, Chief Operating Officer, Summit Entertainment LP
David Molner, Principal, Screen Capital
Roy Salter, Principal, Salter Group

2 Emerging Trends in Film Financing

Moderator: Benson Berro, Senior Manager, Federal Tax services, KPMG
Jeff Begun, VP Business Development, Axium International
Trevor Short, Chief Financial Officer, Nu Image
Christa Thomas, Managing Director, JPMorgan Securities, Entertainment Industries Group

3 Hong Kong: Your preferred destination for Asian co-production and gateway to China

Moderator: Patrick Frater, Asia Editor, Variety
Peggy Chiao, Producer, Arc Light Films (Taiwan)
Yu Dong, Board Chairman/President, Beijing Polybona Film Distribution Co., Ltd
Nansun Shi, Executive Director, Film Workshop Co. Ltd.

Workshops attended

Old Dogs, New Tricks: film and their audience: 17 October 2013. London

Presenter: Professor Ian Christie, Europa Cinema

European Digital Cinema: 25 September 2008. London.

Moderator: David Hancock, Senior Analyst, Film and Cinema Screen Digest
John Fithian, President, National Association of Theatre Owners (NATO)
Stewart Till, Chairman, UK Film Council
Howard Kiedaisch, CEO, Arts Alliance Media
Michael Karagosian, Digital Cinema Consultant, NATO
Bernard Collard, SVP and General Manager, XDC Cinema
Tim Richards, CEO, Vue Cinemas
Phil Clapp, CEO, Cinema Exhibitors' Association
Peter Seabrook-Harris, Regional Sales Director, Pearl & Dean

THE 9th DeSantis Center Workshop Summit in Motion Picture Industry Studies: November 02-03, 2007. Los Angeles.

Chaired by: Bruce Mallen

The 8th DeSantis Center Workshop Summit in Motion Picture Industry Studies: 10-11 November 2006. Fort Lauderdale.

Chaired by: Bruce Mallen

Film: The Once and Future Business Models: Gigi Johnson, UCLA

Robust Analysis of Movie Earnings: W. D. Walls, University of Calgary
Impact of Individual Critics: Suman Basuroy, Florida Atlantic University
Consumption of Motion Pictures: Morris B. Holbrook, Columbia University
Movie Star Salaries and Revenue Volatility: Amit Joshi, University of Central Florida
Knowledge Integration in Bollywood Film Production: Jamal Shamsie, MSU
An Empirical Analysis of the Platform Release Strategy: Xinlei Chen, UBC
Digital Cinema as Disruptive Technology: Nigel Culkin, UH
Uniform Pricing at the Box Office": Barak Y. Orbach, University of Arizona
How Box Office Revenue Cycles Influence Movie Exhibition Rivalry": Darlene Chisholm, Suffolk University

European Digital Cinema: 28 September 2006. London.

Moderator: David Hancock, Senior Analyst, Film and Cinema Screen Digest
Julian Levin, EVP, Digital Exhibition & Non-Theatrical Sales, Fox
Kurt Hall, President and CEO, National CineMedia
David Kerr, Vice President, Print and Related Services, UIP
Tony Chambers, Vice President of Sales and Finance, BVI Europe
Fiona Deans, Director of Digital Cinema, Arts Alliance Media
Tim Richards, CEO, Vue Cinemas
Etienne Traisnel, Director, CN Films
Edward Fletcher, Managing Director, Soda Pictures
Peter Wilson, Chairman, Technical Module, EDCF

European Digital Cinema Forum: 12 September 2006. Amsterdam.

Chaired by: David Monk, City University and MonkVision, UK
Participants included:
Patrick von Sychowski, Unique Digital, Norway
David Hancock, Senior Analyst, Film & Cinema, Screen Digest, UK
Steve Perrin, UK Film Council, UK
Olivier Hillaire, Manice, France
Rolv Gjestland, Film & Kino, Norway
Nico Simon, Utopia Group, Luxembourg
Bernard Collard, XDC International, Belgium
Siegfried Foessel, Project Manager, Fraunhofer, Germany
John Graham, EDCF, UK
Francois Helt, Doremi, UK
Peter Wilson, HDDC, UK

The 7th DeSantis Center Workshop Summit in Motion Picture Industry Studies: 11-12 November 2005. Fort Lauderdale.

Chaired by: Bruce Mallen

The Movie Rating System: Tino Balio, University of Wisconsin

The Consumption Characteristics of Film: An Historical Viewpoint: John Sedgwick, LMU

Industry Trends in American Film and TV: 1984-2001: Eli Noam, Columbia University

Global Hollywood and the Cultural Labor: Toby Miller, University of California

Cross-Country Analysis of Motion Picture Piracy: W. David Walls, University of Calgary

Prior Learning by Production Companies: Jamal Shamsie, Michigan State University

Movie Advertising and the Stock Market Valuation of Studios: Amit Joshi, UCF

Super Bowl Advertising for Movies Charles B. Weinberg, University of British Columbia

Improving Contract Design in the Exhibition Market: Darren Filson, Claremont University

When to Exit a Product: Evidence from U.S. Motion Pictures Exhibition Market: Darlene C. Chisholm, Suffolk University & George Norman, Tufts University

Is Silence Golden? An Inquiry into the Meaning of Silence in Movie Critics Evaluations: Suman Basuroy, Florida Atlantic University, Peter Boatwright, Carnegie Mellon University and Wagner A. Kamakura, Duke University

Impact of Critics on Movie Revenues and Returns: S. Abraham Ravid, Rutgers University

Measuring Word of Mouth's Impact on Theatrical Movie Admissions: Charles Moul, Washington University

European Digital Cinema Forum: 13 September 2006. Amsterdam.

Chaired by: Peter Wilson

Participants included:

Peter Walford, Plexipus Consulting, Netherlands

David Hancock, Senior Analyst, Film & Cinema, Screen Digest, UK

Peter Dinges, CEO, FFA, Germany

Olivier Hillaire, Manice, France

Rolv Gjestland, Film & Kino, Norway

Charles Flynn, Executive Director, DCinema Compliance Group, France

Kommer Kleijn, Freelance, Director of Photography - Stereographer, Belgium

Siegfried Foessel, Project Manager, Fraunhofer, Germany

John Graham, EDCF, UK

Francois Helt, Doremi, UK

Appendix 2: Research model, data and methodology

Table 1. Main descriptive statistics

| Variable | Repeated measures | n | Minimum | Maximum | Mean | Median | Std Dev. |
|--------------------------|-----------------------|-----|---------|---------|--------|--------|----------|
| Dig Screens % | 2005, 08, 11, 13 | 135 | .00 | 100.00 | 36.16 | 17.07 | 37.35 |
| 3D Dig Screens % | 2009, 11, 13 | 99 | 3.15 | 100.00 | 46.86 | 54.33 | 28.99 |
| Screen Density | 2005, 08, 11, 13 | 140 | .55 | 15.17 | 5.34 | 5.24 | 2.96 |
| Screens x Site | 2007, 09, 11, 13 | 141 | 1.00 | 6.74 | 2.89 | 2.49 | 1.33 |
| Admiss x Person | 2005, 08, 11, 13 | 140 | .04 | 4.92 | 1.54 | 1.37 | 1.00 |
| GBO x Screen | 2005, 08, 11, 13 | 134 | 20.90 | 347.41 | 181.09 | 168.63 | 86.26 |
| Ticket Price | 2005, 08, 11, 13 | 136 | 2.00 | 12.96 | 5.99 | 5.82 | 2.32 |
| Ticket at constant price | 2005, 08, 11, 13 | 134 | 1.73 | 12.02 | 5.22 | 5.16 | 2.20 |
| National Share % | 2005-06, | 125 | .00 | 52.25 | 14.30 | 10.38 | 12.38 |
| Non National Share% | 2007-08, | 110 | 1.45 | 44.20 | 14.63 | 13.49 | 7.19 |
| US Share % | 2009-11, | 113 | 31.50 | 95.00 | 67.65 | 68.19 | 12.52 |
| RoW Share % | 2012-13 (averages) | 112 | .17 | 24.30 | 2.27 | 1.74 | 3.07 |
| Top 5 Distrib % | 2005, 08, 11, 13 | 101 | 44.70 | 99.40 | 79.19 | 79.50 | 13.12 |
| Top 1 Exhib % | 2005, 08, 11, 13 | 117 | 2.10 | 86.11 | 25.26 | 23.44 | 14.93 |
| Top 5 Exhib % | 2005, 08, 11, 13 | 118 | 5.77 | 100.00 | 50.50 | 52.90 | 22.23 |

Notes: Maximum number of countries is 36. Main descriptive statistics of pooled repeated measures.

The complete model is formed by the two main effects and the interaction between them:

$$Y = f (BS_{\text{Factor}}, WS_{\text{Factor}}, WS_{\text{Factor}} \times BS_{\text{Factor}}) \quad (1)$$

The model underlying in (1) can be written as

$$y_{igj} = \mu + \alpha_g + \beta_j + \gamma_{gj} + e_{igj} \quad (2)$$

where the score y_{igj} of the i th subject belong to g th group and at j th assessment is decomposed into an overall mean (μ), a group effect (α_g), an assessment occasion effect (β_j), an interaction between group and occasion (γ_{gj}) and an error (e_{igj}); n denoting as usual sample size $i = 1, \dots, n$; g being the level of the between-subject factor $g = 1, \dots, G$, and m the repeatedly observed occasions $j = 1, \dots, m$.

The main between-subject factor (BS_{Factor}) tests for no overall group differences. The **level hypothesis** states that disregarding time, the group means are the same (i.e., the marginal means by group, averaging over all occasions). The main within-subject

effect (WS_{Factor}) tests for no change over time. The null hypothesis is the equal yearly marginal means (the **flatness hypothesis**), regardless of the rest of variables in the model. The interaction effect ($WS_{\text{Factor}} \times BS_{\text{Factor}}$) tests for no time-by-group interaction. This is also called **parallelism hypothesis** because the group-specific profiles (connecting the group means across time) would be parallel under the null hypothesis. The interaction effect is the most interesting one in this research context, since it tests a relation between the time evolution and the factor clustering that produces different means on the response variable.

Besides the usual ANOVA's assumptions, in the mixed design ANOVA the validity of the within-subject test is based on the special assumption of sphericity (Maxwell and Delaney, 2004). The sphericity condition implies that any two repeated assessments correlate to the same extent, an assumption that is not very likely in most longitudinal studies. When sphericity condition is not plausible, the *e*-correction procedure is then used.

Appendix 3: Country clustering according to the d-cinema adoption

Country clustering according to the d-cinema adoption

| Early Adopters (EA cluster) | | Early Majority (EM cluster) | | Late Majority (LM cluster) | | Laggard Adopter (LA cluster) | |
|--|-------------|--|-------------|---------------------------------------|-------------|---|-------------|
| <i>Country</i> | <i>Code</i> | <i>Country</i> | <i>Code</i> | <i>Country</i> | <i>Code</i> | <i>Country</i> | <i>Code</i> |
| Luxembourg | LUX | Denmark | DNK | Cyprus | CYP | Czech Republic | CZE |
| Belgium | BEL | Portugal | PRT | Sweden | SWE | Lithuania | LTU |
| Bulgaria | BGR | Netherlands | NLD | Germany | DEU | Bosnia & Herzeg. | BIH |
| Iceland | ISL | France | FRA | Hungary | HUN | Latvia | LVA |
| Austria | AUT | Finland | FIN | Malta | MLT | Turkey | TUR |
| Norway | NOR | Croatia | HRV | Slovak Republic | SVK | Slovenia | SVN |
| Romania | ROM | Switzerland | CHE | Italy | ITA | Greece | GRC |
| Ireland | IRL | Russian Federation | RUS | Spain | ESP | | |
| United Kingdom | GBR | Estonia | EST | | | | |
| | | Poland | POL | | | | |

Appendix 4: Two-way mixed ANOVA model

Two-way mixed ANOVA model

| | Variable | Years | Mauchly's test | | Time Effect | | Adopter | | Interaction | |
|---|--------------------------|-----------------------|----------------|----------------|-------------|----------------|----------|----------------|-------------|----------------|
| | | | <i>W</i> | <i>p-value</i> | <i>F</i> | <i>p-value</i> | <i>F</i> | <i>p-value</i> | <i>F</i> | <i>p-value</i> |
| 1 | 3D Dig Screens % | 2009, 11, 13 | .931 | .366 | 367.011 | .000 | .677 | .573 | 4.810 | .000 |
| 2 | Screen Density | 2005, 08, 11, 13 | .044 | .000 | .736 | .448 | 1.325 | .285 | 2.065 | .094 |
| 3 | Screens x Site | 2007, 09, 11, 13 | .162 | .000 | 11.727 | .000 | 2.384 | .090 | 1.577 | .167 |
| 4 | Admiss x Person | 2005, 08, 11, 13 | .175 | .000 | 1.648 | .206 | 2.254 | .054 | 3.366 | .011 |
| 5 | GBO x Screen | 2005, 08, 11, 13 | .244 | .000 | 11.607 | .000 | 5.824 | .003 | 1.362 | .243 |
| 6 | Ticket Price | 2005, 08, 11, 13 | .118 | .000 | 30.646 | .000 | 1.951 | .144 | .743 | .606 |
| | Ticket at constant price | | .171 | .000 | .934 | .387 | 1.973 | .141 | .825 | .541 |
| 7 | National Share % | 2005-06, | .539 | .020 | 2.801 | .046 | .585 | .631 | .751 | .661 |
| | Non National Share% | 2007-08, | .707 | .327 | 4.680 | .006 | 1.437 | .265 | .939 | .499 |
| | US Share % | 2009-11, | .369 | .003 | 4.003 | .016 | 1.203 | .336 | 1.034 | .423 |
| | RoW Share % | 2012-13 (averages) | .669 | .212 | 3.610 | .019 | 1.422 | .267 | .975 | .470 |
| 8 | Top 5 Distrib % | 2005, 08, 11, 13 | .732 | .354 | .138 | .937 | .719 | .553 | 1.259 | .279 |
| 9 | Top 1 Exhib | 2005, 08, 11, 13 | .233 | .000 | 8.407 | .000 | 2.201 | .114 | .270 | .964 |
| | Top 5 Exhib % | | .186 | .000 | 16.717 | .000 | 4.060 | .018 | .699 | .657 |

Notes: *Years* informs the time moments where the dependent variable is repeated measured. *W* test is the Mauchly's sphericity test. *W* and *F* statistic values, and associated *p*-values are reported.

Appendix 5: Speech by Tony Hall, Director-General of the BBC

Speech by Tony Hall, Director-General of the BBC, to BBC staff in Birmingham on 11 January 2017.

Check against delivery

Good morning, and - if it's not too late to say so - a very Happy New Year!

For me, and for the whole of the BBC, this new year is a particularly important one – because it's year one of our 11-year charter. It's a great moment: the beginning of a new chapter.

And that's why this morning I want to start a conversation with you: about where the BBC is going, what we want it to be, and what we're going to do - together - to get it there.

And what better place to talk about the future than in Birmingham?

I'm always pleased to come back here. I remember my first visit, a week into the job, and being shocked at how empty the place was. Sure, our news teams, the daytime drama village The Archers, and the Asian Network, were all doing great things... but I left determined that the BBC could do so much more for the midlands - and for you.

Three years on, and the Mailbox is now full - over 700 people. This building is now the centre for skills and development for the whole of the BBC, with HR and the Academy all based here. And we're preparing the place for BBC Three next year – working with our digital teams, universities and partners around the city to make the move a big success.

We're making this building one of the vital hubs for innovation and, in doing so, we are drawing on Birmingham's status as a diverse young city - one of the youngest in Europe, with nearly a third under 20, and home to some of the voices that most need to be heard around the UK. It's an outstanding turnaround, and I'd like to thank every one of you here today who's helped make it happen.

The BBC has a proud past in Birmingham, and what you've all been doing is making sure it's there at the heart of our future too. And this is my starting point today: how we build on the very best of our past, to create the strongest possible BBC for the years ahead.

Reinventing the BBC for a new generation

The start of a new Charter is a critical moment. It's the chance to set our sights high for the next 11 years, to mobilise the whole of the BBC behind a really clear, really ambitious goal.

So, this is my challenge: over the next few years, I want us to reinvent public service broadcasting for a new generation. Now, let me say straight away: this does not mean somehow forsaking our existing audiences - that would be stupid. As I've said many times before, we have to ride two horses: doing brilliant things on our existing channels and services, but also innovating in the digital space.

Our task therefore is to reinvent public service broadcasting so that it works for all audiences, so that everyone gets value from the BBC.

Why is this so important? During the hard-fought debates about the Charter, we learned something that we should draw a great deal of comfort from. The public believe that our mission is as relevant today as it has ever been.

Audiences continue to value what we do - in fact, they value it more than ever. And - Ofcom's research shows - young people value public service broadcasting as much as all of us - a really crucial point to remember.

But if young people value what we do, reaching them is a whole different matter. In fact, it's one of the single biggest strategic issues we now face. Why? Well, first, because there's so much competition for their time.

Adults spend eight percent of their media time on social media and messaging. For 16-24 year-olds, it's 25 percent. Across the whole of the TV market, time spent with young audiences has fallen by 20 to 30 percent. It's the same story with radio. Increasingly, younger audiences and older audiences are consuming media in different ways. So we have to respond.

I think the second big issue is that the media landscape has changed beyond recognition. It is hugely more global and more competitive. We're now in an environment where Amazon, Netflix, and others are willing to invest huge amounts of money with no certain return in an attempt to capture market share where Facebook is looking at commissioning its own TV programmes, and Twitter is buying up sports rights and where moves such as the Fox-Sky merger are making the very biggest players even bigger.

Real cause for confidence

But despite these challenges - and more - I believe we should be confident about our future. We may be financially small compared with some - but our impact can be huge. We are still, by far, the media provider that young audiences use the most, and with whom they spend the most time.

We are a powerful provider of programming and services to children - CBeebies is the top channel for the under-sixes, CBBC for the over-sixes... Bitesize is a necessity when it comes to revision at GCSE time. For the 16-34 age group, BBC One is still their top TV channel - the one they watch the most. Overall they spend 11 hours with the BBC each week - nearly four times more than they're on Facebook. It's also a major advantage that we have the stability of an 11-year settlement, and are sure of our budget for the next five years.

Now of course, we will have some hard choices to make to live within our means, I don't want to hide that fact from you. But at least we have certainty in an uncertain world. It's something most organisations would kill for - so we need to make it count. But perhaps the biggest cause for confidence is this: over the past year, we have proved yet again that when you provide real quality, audiences - young and old - respond.

That's why 51 million people of all ages came to us for our sports coverage last summer. Why, though we only have two percent of the total hours of sport broadcast, we have 37 percent of the audience.

And they don't just come to us for big events. Our programmes have become big events -

whether that's The Night Manager, Ed Balls on Strictly, or Sherlock at New Year. Planet Earth II ended up topping the Sunday night ratings. More 16-34 year-olds watched it than watched The X-Factor on ITV. And, we've also learnt over the last year that when we innovate online, we can have a similar impact.

Our children's apps have now been downloaded 11 million times, on YouTube, Radio 1 is the biggest radio station in the world and BBC Three is setting new standards for short-form content. Their Amazing Humans video about Gabi Shull - the dancer still doing ballet despite losing her leg to cancer - got 78 million views. We know that when we do things of quality, audiences - old and young - come to the BBC. Traditional values, delivered in traditional - but also innovative, new ways.

Three priorities for success

So, if our aim is to reinvent public service broadcasting for the next generation, I believe we need to concentrate on three priorities:

- Our creativity
- Our culture
- And our global ambition

1. Our creativity

First, our creativity... Or, to you and me, our programmes and services.

I want the BBC during this Charter to be defined by boldness, originality, and risk taking. I want us to have the courage of our convictions, to dare to do the things that others won't. To hear, again and again, "only the BBC would do that".

Not just doing what no-one else does, but breaking new ground and leading the way. This is something I care about passionately, and we must get right over the coming years because it's the true test of our creativity, and the true measure of our distinctiveness. Of course, we are already on great form - and many congratulations to The Night Manager team for their well-deserved gongs at the Golden Globes.

But we all know we can never stand still - we always need to generate new ideas, innovate further, and take greater risks. This is what has to motivate us constantly in all our traditionally delivered services but now we also need to look again to the online space, where competition is highest, new audiences are most present, and where I believe we can serve them in brilliant new ways.

We need to reinvent iPlayer - It was the biggest revolution of the last Charter. It's been the number one video-on-demand service in the UK, reaching more people than any other. Now we need it to make the leap from a catch-up service to a must-visit destination in its own right. Our goal, even in the face of rapid growth by our competitors, is for iPlayer to be the number one online TV service in the UK. That will mean doubling our reach, and quadrupling the time each person spends on it every week. And we want do it by 2020. That's tough, but I know we can do it.

We need to do the same for audio - or radio. Today we have the best speech and music radio in the world. I think we can do so much more with our world-class content. And, by the way, win new global audiences. There is a challenge for the news teams too. Many of you have

heard us speak about the distinction between 'fast' and 'slow' news services.

We're up there with the best in the world at telling people what's happening right now, and being where they come to find out what's really going on. But I want us to do much more to help our audiences understand what's happening in the world today. And the thing that brings all these challenges together is personalisation. This is a major priority.

Data is creating a flight to quality. It means audiences can find the best of public service broadcasting - but only if they sign in. Each month, we now have around three million active signed-in users. I want to make that 20 million. And I want us to get there as quickly as possible. More than anything else, this is what our future success will depend on. By finding out more about our audiences and what they like, we can make better content, make it more relevant, and bring it to them more effectively. The closer and more personal our relationship with our audiences, the more I'm certain they will choose the BBC. And one other point: I want us to examine what big technological changes - such as voice recognition, and virtual reality - mean for us. How can we push boundaries, do new things, in the way that we have done so well with new developments in the past.

2. Our culture

My second major priority is our culture – making the BBC a great place to work.

Let me say first that, as I go around the country, I see lots of examples of where things are going well and we have already made a start on simplifying the place:

- Cutting overheads to just six percent - better than most in the private sector
- Reducing layers in many areas
- Reducing divisions and boards
- Halving the number of senior managers

I know this has been very tough, and I really appreciate the way in which people have responded. I also know that different parts of the organisation are moving at different speeds, and we have plenty more to do.

The priority has to be that we're able work together across teams, and work fast. Because, for me, the old way of doing things - working in silos - simply can't succeed. Nor can the traditional ways of delivering services - big project plans, with budgets allocated five years out. We've got to be much more entrepreneurial in our make-up. What we did digitally last summer for the Olympics shows where we need to be every day. For me, the biggest triumph was how our technical and editorial teams came together to solve problems and innovate with the full trust and support of management, refusing to let internal barriers get in their way. Changing, responding, and adapting rapidly.

We have to understand: the big beasts we are up against are already working in a very different way. And we're not only small by comparison - but we can make ourselves smaller still when we operate in silos. That's why I attach such importance to making this a great place to work. By the end of the year, I want all of you to be able to say four things:

- That we are making things simpler
- That we value each other and celebrate success
- Challenging ourselves and each other to be bolder, more imaginative, more creative
- And that all of you feel your managers at all levels - including myself - are more visible and accessible

3. Our global ambition

My third priority is being much more ambitious for the BBC globally. Today, thanks to you, we punch well above our weight worldwide. And, as one of the country's most valuable exports, we help the UK punch above its weight too. I believe that, right now in the post-Brexit world, the country needs us more than ever and we need to do more than ever for Britain. That's why, last autumn, I was so proud to be able to announce the historic expansion of our World Service - the biggest since the 1940s. But beyond the World Service, I believe there are two major factors that will be critical to our future global success.

The first is BBC Studios - and now we have the go-ahead. I don't need to tell you that this represents a true revolution in the way we source and make our programmes. Yes, it means a degree of risk, with the contesting of current programmes, but it is also an incredible opportunity. And there's one announcement we'll be making very shortly that will highlight just how great that opportunity is.

In both radio and television, we need to own intellectual property rights for the future. I don't want us ever to become a publisher-broadcaster. I'm convinced that Studios is the only way we will secure our future as one of the very best programme-makers in the world. And, by the way, the first episode of Let it Shine - made by our in-house teams - showed just how creatively brilliant and warm-hearted we are.

But I don't want us just to be brilliant at making high-quality, distinctive British programmes. I want us to be truly brilliant at exporting them across the globe. That's why we need BBC Worldwide to thrive as a strategic partner for BBC Studios, making the very most of our global reach. My challenge to Worldwide is to look again at how we best grow our business to deliver more returns back to BBC public service - to reinvest in yet more great British programmes and services.

Conclusion

There is so much more I could say about the future. And I will have more to say. Between now and Easter, I will be in Scotland to talk about the Nations and Regions, and what more we need to do to represent the whole country and reflect a changing Britain to itself. I will be saying more about our ambitions for drama, about our plans to transform our services for children and I will be talking about our ideas in education and the arts.

By the time we reach our centenary year in 2022, I want a BBC that is irresistible to all our audiences. In a world of near-limitless choice I want people to carry on choosing us.

But above all by our centenary, I want us to have shown that public service broadcasting has even more to offer the UK and the world in the next century. Even more than it has done in its first hundred years. That excites me. And having spoken briefly yesterday to David Clementi, the preferred candidate for chair, I know it excites him too. Reinventing the BBC for a new generation is where I will be pouring all my energies. I want to ask each of you to do the same. Seeing you all and talking to you all, around the country, I profoundly believe that we can meet the challenge.

My thanks to Joe Godwin and the team for hosting me this morning. And to all of you for listening and for your support.

Thank you.

Appendix 6: P1 Digital Cinema: No Country for Old Entrepreneurs?

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Abstract

This paper reflects on current developments in the exhibition sector of the movie industry. It will examine why the adoption of an innovation (digital cinema), capable of revolutionising the movie industry, has stumbled in its attempts to cross Geoffrey Moore's 'chasm' (Moore, 1991) and will argue that despite numerous setbacks, d-cinema can now rightly be considered within Christensen's framework of disruptive technologies.

The author will examine the strategies of exhibitors at the forefront of the adoption process; describe some of the emerging business models being developed to facilitate change; and analyse how two different territories (the international markets of the USA and India) are realising the opportunities afforded by this technology.

Finally he will project the overall implications of the advent of d-cinema for the future of the global movie industry and how (private and public) entrepreneurs are already changing the basis of competition in certain sectors to create new markets.

Keywords: Retail entrepreneurship, standards, innovation, adoption policy

Introduction

In 1869 Charles Darwin wrote, "Natural selection acts only by taking advantage of slight successive variations; she can never take a great and sudden leap, but must advance by short and sure, though slow steps." In that same year celluloid was developed by John Wesley Hyatt; later to become the universal platform for delivering feature film across the world. By 1900 Hollywood had emerged as the home of the US film industry and soon after cemented the dominant position worldwide. Since then the major players have arguably followed Darwin's dictum to maintain a position of control both in terms of the content and revenues.

However, the operating business practices which have successfully underpinned the movie industry since the early part of the 20th Century are coming under increasing attack. Digital cinema - aiming to replace celluloid – makes use of digital technology to produce, distribute and project motion pictures. For digital prints to be created, a digital master is needed. This is already available for movies that have been edited digitally (*figure 1*). Movies, which do not go through a digital editing process, need to be scanned to create a digital master so that the digital prints can be made. The digital process converts each frame of the film into a digital image, composed of an array of millions of elements known as 'pixels' (*figure 1a*). Even today almost all movies create a digital master as this is required for TV and DVD masters and this master can be utilised to create digital prints. The final product can be distributed via hard drives, DVDs or satellite and projected using a digital projector instead of a conventional film projector.

>>>>Take in figure 1<<<<

Faced with this innovation and fully aware of how digital distribution impacted negatively on the major record labels, the US studios find themselves challenged by a new generation of entrepreneurs; armed with a combination of ever more affordable filmmaking tools, widening access to broadband networks and mobile communication devices operating on digital platforms. Such profound change in the way entertainment is being consumed across the globe has created a potential 'tipping point' in the movie business.

Independence Day

In this first part the author considers that the basic assumptions around the way in which audiences engage with movies need to be re-examined in light of three contributory factors. First, both cinema audiences and DVD sales have been in relative decline in a number of key markets over the past four years (Waterman, 2005). Although the UK reported box office receipts of £904M in 2007 (8% increase on 2006) this was driven by the release of three Hollywood sequels – Harry Potter And The Order Of The Phoenix,

Pirates Of The Caribbean: At World's End and Shrek The Third. These three 'tent pole' movies⁷ generated between them over £252M or just under 30% of total revenue. However, total box-office admissions in European Union countries, fell 2.2% in 2007 compared to 2006, (European Audiovisual Observatory, 2008).

Second, the creative and commercial barriers, which have kept cinema tied to the major US studios, are under threat through technological developments in the way movies are created, stored, distributed and exhibited. Replacing celluloid film with d-cinema technology will arguably provide enormous opportunities for the exhibitor market (Elberse & Eliashberg, 2003).

Finally, a recent phenomenon forces us to consider the possible collapse of the cinema industry through the demise of the 'release window' agreement between the studios and the cinema operators. Here, first run movies are shown in the cinema for up to six months before release in other formats. Hollywood itself broke away from its traditional release strategies several years ago with the introduction of global, single day release date for 'tent pole' movies, including Lord of the Rings, The Matrix and Pirates of the Caribbean, instead of sequential releases by country. In addition to reducing piracy, it is argued that a single, global release date also maximises the marketing impact of advertising spending for a film. This strategy not only helps to increase the opening weekend box office but also prevents negative word of mouth affecting audiences. The year 2006 set new standards for global single day release strategies with phenomenal starting box offices for X-Men and DaVinci Code, which were both savaged by critics afterwards (Culkin and Morawetz, 2007); in this scenario a lack of consumer insight had little negative impact on the all important opening weekend at the box office. If Hollywood studios take advantage of the interest derived from a successful marketing campaign by releasing a film simultaneously across several territories, why not release a film simultaneously across several platforms in one country to maximise marketing spending for a smaller film?

A recent study by Gerbrandt (2006) found that thirty-six percent of cinema audiences said they would skip theatrical releases altogether and rent the movie on DVD instead if a movie were released on both platforms simultaneously. The study also found that because of their lack of commitment to the cinema movie experience, younger movie consumers posed the biggest threat to the exhibition community and the greatest opportunities for those engaged in alternative platforms. The problem for the studios, as

⁷ A tent pole movie is considered the studio's major release in any given season – usually summer – which is accompanied by an enormously wide release. The theory is that the studio's other pictures will be "held up" by this tent pole and provide a profitable summer season. It is increasingly the start of, or an installment in, a franchise.

they seek to retain control of product distribution - and effectively profit - is that they face the same disruption as that of the music industry conglomerates when confronted by the social entrepreneur, Shawn Fanning who founded Napster - a decentralised, easily-distributed programme which allowed users to share music and other files directly from peer-to-peer over the internet. So, the studios recognise the enormous cost savings afforded by the adoption of d-cinema but cannot ignore the damage caused in the early part of the twenty-first century to the intellectual copyright holders in another part of the entertainment industry. We now move on to consider how that disruption is being played out in the movie market before reviewing the research methodology employed in this study.

Paths of Glory

This section places digital cinema in the context of localised technological change, which draws together innovation, adoption and diffusion focusing the analysis on the determinants of the adoption process (Rogers, 2003). Here adoption is viewed as a complementary component of a broader process of adjusting the technology when unexpected events in the product and factor markets push firms towards a creative reaction. An early observation of this phenomenon came from Zvi Griliches (1957) whose research into hybrid corn found that the adoption of a new technology was not a single event. Instead it was influenced by a series of developments that occurred at different rates across geographical space. His work demonstrated the numerous individual decisions and economic calculations that drove new hybrid corn technology forward. Antonelli (2006a) has argued that this is important for European Economists who, consider growth and change rather than equilibrium as the relevant object of analysis and, hence, values historic time and philological investigation as basic tools to study the dynamics of social events (p51). This is in sharp contrast to Friedman *et al* from the Chicago School of Economics who would contest that the purposeful, rational behavior of forward-looking, profit-seeking economic agents will inevitably override the effects of events in the past and avoid 'lack of foresight' situations which lead to outcomes that offer lower payoffs than some hypothetical - but unattainable - alternative (Liebowitz and Margolis, 1995).

Anotelli's argument draws heavily on the notion of path dependence elaborated by the work of David (1985) and Arthur (1989). The general theory of which assumes, that, buyers rarely have access to perfect information with which to make rational decisions. It further purports that, current choices are influenced by earlier decisions which in turn limit later choices, channeling the sequence of economic outcomes along one possible path rather than another (Anotelli, 2006a). In part, the difference between path-dependent and "path-independent" processes can be explained by the fact that foresight doesn't matter for path-independent processes (Purfett, 2008). Regardless of the

journey, path-*independent* processes will invariably lead to a set of predictable outcomes - those that lead to the most efficient and produce maximum payoffs. However, path-*dependent* processes have multiple potential outcomes, and the outcome selected is not necessarily the one producing maximum payoffs. This contrast, to the results of standard economic analysis is part of what makes path dependence interesting in this present study as is discussed shortly.

In Arthur's (1989) basic analytical framework, "small events," which he treated as random, lead to early fluctuations in the market shares of competing techniques. As Purfett (2008) goes on to argue, *these fluctuations are magnified by positive feedbacks, because techniques with larger market shares tend to be more valuable to new adopters. As a result, one technique grows in market share until it is "locked in" as a de facto standard.* Within this context the role of private and public sector agents is interesting in that they are both seeking to influence the adoption of competing technologies as a way of developing local markets. And, in this respect they exhibit Schumpeterian tendencies in that, *'every social environment has its own ways of filling the entrepreneurial function'* (1949:70). Thereby supporting the notion that one outcome of a market disruption is that it brings with it multiple and mutually exclusive solutions. This in turn leads to the development of many different standards if no supplier can achieve early market leadership, which can lead to 'lock in'. Multi-standards in digital cinema is not a desired outcome for the studios that have made a significant investment over 75 years to ensure a single standard (35mm film) operating globally (David, 1987).

Whilst path dependence provides a framework upon which to base this study it requires a dataset on which to test the hypothesis. D-cinema technology is a new and unproven product in a relatively stable market and has yet to cross Geoffrey Moore's 'chasm' (1990) as is shown in *figure 2*.

>>>>Take in figure 2<<<<

Consequently, the author has turned to the work of Clayton Christensen (1997, 2003) who has written on the impact of disruptive technologies in seemingly stable markets; he states disruptive technology is in essence, simpler, cheaper, and more reliable and convenient than established technologies (Christensen, 2003:192). In this context, low-end disruptions are similar to what Schumpeter referred to as *'creative destruction'* (1942:82-83) in so much that low-end disruptions create a step-change cost reduction within an industry. However, this is achieved by entrant firms destroying the incumbents. New-market disruption, in contrast, entails a period of substantial creative creation - new consumption - before the destruction of the old occurs (Christensen, 2003:70). Based on their ability to see opportunity from a fresh perspective, new entrants are able to develop disruptive innovations that appeal to emerging market segments and to eventually supersede prior industry leaders (Slater & Mohr, 2006; Culkin & Smith, 2000). In line with

previous studies (Stoneman, 2002; David, 1985) the existence of two key drivers in technological change - bias and rivalry between competing technologies – are evident in the digital cinema adoption process. Bias, in terms that adoption favours the large American studios by reducing costs significantly. Rivalry, not only as it exists between old and new technologies (celluloid vs. digital) but also in the attempted imposition of a minimum operating standard for the new technology itself (1.3k [low end digital projection] vs. 2 or 4k (high end digital projection)).

To provide some background on the technical issues involved in Digital cinema there is basically one projection technology, several server solutions, but no one global standard. All digital cinema projectors currently deployed are built using Texas Instruments' DLP Cinema⁸ which can display 2,000 horizontal lines of resolution (in a 2,048 x 1,080 chip), compared to its m10 and m15 chips that had 1,280 x 1,024 resolution (roughly 1.3K). In July 2005 the DCI⁹ published its final overall system requirements and specifications for digital cinema, opting for a scalable solution from 2K to 4K (4,000 x 2,000); thereby leaving the decision to which projector technology will be used in theatres to the market. Whether or not Digital Cinema will provide new entrants with the opportunity to create a 'new value network' in the movie industry will depend ultimately on their ability to augment their skill set with the capabilities to serve mainstream customers as well. This paper is part of a global study of digital cinema and in this next section the author briefly describes the research methodology employed in this study.

The Third Manin the research methodology debate

This study embraces a mixed methods approach which provides the potential to reduce some of the problems associated with singular methods especially in analyzing the early (and current) stages of the technology adoption cycle. This pragmatic approach does not sit well with purists who would argue "accommodation between paradigms is impossible . . ." (Guba, 1990:p81). However, embracing the strengths and weaknesses of quantitative and qualitative research puts a researcher in a position to mix or combine strategies and to use what Johnson and Turner (2003) call the *fundamental principle of mixed research*. According to this principle, researchers should collect multiple data using different strategies, approaches, and methods in such a way that the resulting mixture or combination is likely to result in complementary strengths and no overlapping weaknesses. In complex or emerging (international) markets mixed methods research

⁸ TI's projection technology gained widespread approval when it unveiled its so-called 2K chip (called the m25 by TI).

⁹ The DCI (Digital Cinema Incentive) was formed in 2002, a joint venture of the seven major Hollywood studios (Disney, Fox, MGM, Paramount, Sony Pictures Entertainment, Universal and Warner Bros) it effectively dwarfed the importance of the other institutions to establish guidelines for digital cinema into.

frequently results in superior research compared to a single method approach (Johnson and Onwuegbuzie, 2004). A mixed method approach provides opportunities to react to, reflect upon and incorporate emerging themes in a dynamic system, which requires the researcher to embrace expansive and creative lines of inquiry. Research into the movie industry is fraught with difficulties. First, there is the secretive nature of deal making at all stages of the value network from script development, through green-lighting a project to sales and distribution across many territories (Daniels *et al*, 1998); and finally audience measurement; as a consequence there is little published data available to analyse. The fact that this is part of a four-country study poses a challenge in terms of interviewing key players. This is further exasperated when there are both private and public players engaged in the process.

One of the ways that the author and other colleagues working in this field (Hardy *et al*, 2007) has found to overcome part of this problem is to take advantage of what Maskell *et al* have referred to as *temporary clustering* (2006:997). This approach recognises that movie business people and cinema professionals regularly meet at conventions, festivals and conferences. Here, their latest and most advanced findings, inventions and products are demonstrated and evaluated through a mix of exhibitions and seminars. The benefits are clear if one makes the most use of the networking opportunities - the existence of local buzz of high quality and relevance leads to a more dynamic cluster (Bathelt, 2004:45), which for the researcher provides follow up interviewing opportunities. As such the existence of temporary clustering in the movie industry is particularly well-suited to research into d-cinema and the next section will provide a snap shot of the journey, examining the emerging strategies amongst actors in response to this disruption focusing on three territories, the UK, USA and India.

Around The World in 80 Days

The first commercial digital screening (Star Wars) took place in May 1999; since when there have been a number of false dawns for entrepreneurs. As with any technology adoption process conversion has created unforeseen problems and opportunities. The US movie studios have tried to control roll out through a 'stick and stick' approach - the imposition of minimum standards by which to exhibit their product linked to a threat of withholding digital product if the technology does not meet this standard. This attempt to control the route through the adoption and diffusion stage has elicited interesting responses (Culkin & Randle, 2003). In some international markets the response has been to ignore the standards issue altogether, which is understandable if you are not dependent on Hollywood product (China and India). In other markets entrepreneurs have sidestepped the issue altogether and found early success in developing a product not

considered important and therefore not covered by the standards, 3D or stereophonic cinema (USA and UK), whose original golden era ran from 1950 to 1953¹⁰.

Whilst it still only accounts for less than 5% of screens worldwide, the number of digital screens is rising and stood at 5,500 as at December 2007 (*table 1*) with North America accounting for more than half of the total (Hancock, 2007). In terms of screens, the dominance of North America is even more marked because of a different pattern of adoption. A number of exhibitors in the United States have opted to substantially or completely convert their cinemas to digital projection, whereas in the rest of the world most installations in the pilot phase covering one or perhaps two screens per complex.

>>>>Take in table 1<<<<

As the major studios have been unable to enforce a global standard we should not be surprised to see that differences between adoption patterns across territories are taking place, not only in line with the finding of Griliches (1957), but also with the primary objectives of the adoption itself. In Japan we find that exhibitors seeking to differentiate themselves from the competition are the main drivers of the adoption process; this is in parallel with the country's manufacturers desire to lead in the technology race¹¹ (e.g. Sony and their development of 4k projectors). A similar situation to this exists in South Korea.

However, as Hancock (2007) claims, adoption in China is being driven by the Chinese Government's desire to bring cinema to a wider population than that of the big cities where multiplexes are concentrated. Although some 2K installations exist, digital cinema using lower resolution projectors (1.3k) is more widespread, providing the opportunity to leapfrog the need to modernise 35mm cinemas at a relatively low cost. This follows Christiansen's work on *disruptive technology* where simpler, cheaper, new technologies are more reliable and convenient than established technologies. As the Chinese state is mostly concerned with reducing piracy and to limit the availability of Hollywood movies DCI compliance is less of an issue than in other territories.

Case Study 1: USA

As one might expect, the USA has taken the global lead in adopting digital cinema with over 4,000 screens converted by the end of 2007. Although a large territory North

¹⁰ Amongst other things, the decline in popularity for 3-D stemmed from the fact that two prints had to be projected simultaneously and they had to remain exactly alike after repair or synchronization would be lost. This is not an issue with d-cinema.

¹¹ The growth of 3D-related technologies provides Japan's manufacturers with an opportunity for future innovations. Sony's new 4K 3D projectors, which compete with what DLP offers, are currently being tested. Their focus is on the development of competitive systems that only require a single projector.

America is a very homogenous one, meaning that once an innovation is adopted and business models emerge the move to diffusion where one technique grows in market share until it is "locked in" as a de facto standard is arguably less difficult than in a heterogeneous market (Scott, 2005). Historically, there has been little public agency intervention in distribution and exhibition sectors and as the home of Hollywood exhibition has been forced to follow the product.

The larger exhibition chains (or circuits) are financing the change through a mix of subsidy and the identification of new revenue streams. The subsidy, which is known as the Virtual Print Fee (VPF) model is a means of financing the conversion of the industry to digital cinema. A new player in the movie value chain, a third party¹² purchases the equipment, and then recoups the cost of the equipment over time, through payments from distributors (who pay the majority of the cost) and exhibitors. An example of how the VPF model would work over the life of an agreement can be seen in *table 2*. However, such a scheme will only work for those exhibitors who are dependent on studio product. The smaller exhibitors recognising the risk of being isolated created the Cinema Buying Group (a semi-autonomous programme of the National Association of Theatre Owners [NATO]), which represents almost 9,000 smaller screens in the USA and Canada. The Group has yet to announce how its model may differ from the VPF scheme.

>>>>Take in table 2<<<<

A further development, announced in the spring of 2007, which arguably sails close to the 'anti-trust law' wind, saw the formation of a venture called, the Digital Cinema Distribution Coalition delivery system. This purports to represent the first collaboration between studios and exhibitors to develop the most cost-effective form of digital content delivery through technologies such as satellite or digital terrestrial distribution. The coalition claims that it would be open and available to any content provider, vendor and exhibitor, including the owners, Warner Bros. Entertainment, Universal Pictures and DCIP, which is owned by Regal Entertainment, AMC Entertainment and Cinemark USA and represents 14,000 screens (Hancock, 2007). As the DCIP venture – which is close to announcing its deployment methodology shows - the US exhibitor market is fully recognising the potential benefits of digital, which is moving it closer to the mainstreaming phase through a mix of studio product, alternative content and digital 3D, which saw close to 1,100 systems installed in the territory by end 2007.

¹² A ruling handed down by the Supreme Court on May 4, 1948 declared that the five major studios of the day were guilty of violating antitrust laws through their subsidiaries or affiliates, owning or controlling theatres. Therefore the studios would be in breach of the ruling if they were seen to be directly involved in the process (Christopherson & Storper, 1986).

While digital cinema offers a brilliant picture quality (equal to first run 35mm), excellent repeatability, higher security and lower distribution costs, these factors do not excite American audiences offering little visual differentiator from 35mm film. The panacea for declining cinema receipts and movie-piracy-hysteria could therefore be digital stereoscopic (originally known as 3D) cinema. Prominent supporters of 3D digital cinema are directors James Cameron, George Lucas and Robert Rodriguez. Cameron believes that, in the near future, studios will release 4-5 big tentpole pictures a year in 3D, making it the format for must-see films that can only be experienced in a cinema. The first films that will take full advantage of the new technology are 3D animated films, which can easily be adapted for 3D projection – although a documentary of the pop group, U2 during the South American leg of the band's “Vertigo” tour is currently on release and receiving excellent critical reviews. Paramount and has predicted that by 2009 there will be enough digital 3D content to keep at least one screen in a multiplex occupied full time (Toumarkine, 2007).

Paramount-distributed Dreamworks Animation has also pledged that all of its animated titles will be in digital 3D as of the same year. From distributor and exhibitor perspectives, there seems to be a strong financial case for digital 3D cinema. For example, The Polar Express, which was released in flate screen (2D) on 3,500 screens in the US in 2004, generated \$121 million during the holiday season. When the film was released in 3D the following year, it earned \$40 million on just 68 IMAX screens, greatly outperforming the 2D release. Analysis of box office data for Chicken Little, Monster House, Meet the Robinsons and Beowulf has shown that digital 3D screens generate on average three times more revenue, driven by a 2.4 times higher attendance ratio per screen when compared with 2D screenings for the all important first weekend (see *table 3* below). Moreover, the introduction of a premium pricing strategy has opened up a new profit share structure in which exhibitors share the resulting ‘surcharge’ revenue from higher ticket prices with the Studio, an incentive for both sides of the industry alike (Culkin & Morawetz, 2007).

>>>>Take in table 2<<<<

Case Study 2: The United Kingdom

Through direct government intervention the UK now has the second largest number of digital screens after the United States. The UK Film Council (UKFC) - part of the Department for Culture, Music and Sport - contracted Arts Alliance Media (AAM) to install and operate its network of 240 digital screens. The Digital Screen Network (DSN) is a core element of UKFC’s strategy to broaden the range of films available to audiences across the UK and to support specialised films. The network is designed to operate in conjunction with other UK Film Council distribution and exhibition initiatives, such as the Print and Advertising Fund, for specialised films, and the Audience Development Scheme.

The DSN was conceived as a 'virtual network' of 240 screens, located in approximately 200 cinemas across the UK. Screens are installed at multiplexes, independent cinemas and single screen venues. AAM completed the first round of installations (50 cinemas) in February 2006, with the rest of the screens installed by August 2007. In return for the UK Film Council's financial contribution towards the equipment, network cinemas are contractually obliged to devote a (self-imposed) set percentage of playing time to specialised programming (e.g. educational orientated content, archive material and short films). Outside of these required slots, exhibitors can operate their digital projectors independently, and the existing business model of film acquisition through distributors will be the same (Culkin & Morawetz, 2007). The DSN will arguably enable local filmmakers to show their films on a regional basis within their own communities. However, with only 7% of its screens converted the UK still remains stuck in Moore's chasm and until an alternative or amended version of the VPF model is agreed – most likely with Arts Alliance who recently signed up four studios to a European digital cinema roll-out – it is unlikely that the Government will offer any further subsidies to the market.

Case Study 3: India

The Indian market for digital cinema is developing rapidly although they are going their own way in terms of standards and systems being installed. The country is virtually self-sustaining in its content producing over 1,000 feature films a year. However, unlike the USA, India is not one but many territories. Of the 1000 films produced only around 250 are Hindi or Bollywood films, of which around 30% is exported to North America and the UK; Mumbai and the North Indian circuit account for rest of the Bollywood product. The other 750 movies are shot in local languages, which can have a fanatical following in the south (Tamil/Telugu) but rarely travel in India.

Before the advent of digital cinema only tier I cinema centres, located in large metropolitan areas would receive first release prints. A typical Bollywood movie may be released to 150-350 cinemas, including overseas release. Tier II & III cinemas located in outlying areas then wait 5-8 weeks to receive the worn prints from the Tier I cinemas, creating several problems. In line with many other territories marketing support tails off after 4 weeks and with demand; this makes it difficult to make a return on investment.

In addition, presentation quality suffers when working with worn prints. The distributor suffers, too, as the limited availability of the movie in the opening weeks encourages the rampant sale of pirated copies. Thus, the current film distribution model in India has created a downward business spiral for the owners of tier II & III cinemas. Electronic movie distribution would benefit these cinemas, making it possible to participate in the first week of movie release, increasing revenues not only at the door, but also in ancillary operations such as concessions and parking. In a move not dissimilar to that of the UK

Film Council, a number of companies are also acquiring and converting traditional single screen venues to create digital screen networks with lower resolution 1.3K or HD projectors, ignoring the DCI 2K/4K business model. This means that cinemas are able to show getting hit films into cinemas faster at a better quality.

Increased investment in the Indian exhibition sector could also see the territory's box office gross increase by 30% in the next five years, linked to a strong economy, retail boom and rising middle class disposable incomes in addition to expansions in the downstream exhibition business should boost industry revenues. While multiplexes in India currently account for only 4% of the country's cinema screens, certain films generate up to 40% of their box-office revenue from them due to higher ticket prices. Six companies – Adlabs, PVR Cinemas, INOX Leisure, City Ventures, Shringar Cinemas and Cinemax Cinemas – have plans to fund ambitious nationwide multiplex circuits and between them, are set to open 1,500 screens (Grummitt, 2007).

PVR is taking this a stage further with a recent announcement that it is making a strategic foray into smaller towns through digital theatres under the "PVR Talkies" brand. The company is investing Rs 2 billion to support this roll out. The first cinemas to benefit were in Aurangabad and Latur each with three screens that were digital ready, where computerised tickets are priced at Rs 40 and Rs 60. The company aims to have 200 PVR Talkies across 13 states and over 70 cities in the first phase.

According to PVR Cinemas chairman Ajay Bijli, *"In 1997, we enhanced the way India went to the movies.....With PVR Talkies, the people's cinema has arrived. It is my fervent hope that PVR Talkies will induce people to come back to the big screen and rediscover the true magic of the movies."* (Bijli, 2006). Bijli went on to state *"the digital theatres in the tier II and tier III cities will work on the principle of digitised content being distributed to theatres through satellite or fibre. They will be uploaded to a digital cinema server. Digital projectors will be used for screening, enabling the entire system to have wide releases of a movie across the country."* Driven by the need to reduce significantly the amount of piracy - which has been taking business away from the tier II and II class cinemas – it is argued that nationwide screenings, will also increase the return on investment for producers and distributors. It is interesting to note that PVR has also recently ventured into the business of film distribution and set up PVR Pictures, a fully owned subsidiary of PVR Ltd. PVR.

This initiative will potentially solidify PVR's exhibition growth whilst strengthening its content creation space as a part of a backward integration strategy along the movie value chain. To date, PVR Pictures has successfully released films produced by US-based production house Miramax such as Chicago.

Conclusions

It was suggested at the outset that digital cinema has reached a 'tipping point' and the process is irreversible in several territories. It has been stated that those territories, led by the USA, now have the momentum to carry other major territories through and beyond Moore's 'chasm' despite the fact that the number of digital screens is rising, and stood at around 5,500 as at December 2007. However, the fact that the global exhibitor industry has now not fully recognised a preferred single standard - driven by the US studios - suggests an adoption model that espouses a Schumpeterian view that, '*every social environment has its own ways of filling the entrepreneurial function*' as opposed to a path-independent processes leading to a set of predictable outcomes (e.g. one global standard).

Global standards may yet be set but that would require (large and largely self sufficient) territories such as China and India decide that the DCI standard has benefits above and beyond the technology they are currently employing - one which recognises the value Christensen deemed important in the adoption process - simpler, cheaper, and more reliable and convenient than established technologies. Unlike TV technology, it has been argued that the market for d-cinema is not large enough to support more than one standard. Furthermore, multiple standards would require multiple inventories, and a primary advantage of film - one standard, namely 35 mm - would be lost (Culkin & Randle, 2003a). Territories such as Europe which are trying to follow their own path run the risk of being forced to change direction as their position becomes potentially untenable without direct government involvement.

In certain territories a combination of the studios and exhibitors are funding the change (Adner, 2002). Therefore they are likely to have the final decision on any particular aspect of d-cinema and will determine standards locally as in the USA. It has been argued that it would be uneconomic for others to establish alternatives. However, 3D lies outside the current standards and Sony, in particular, is focusing on the development of competitive systems that only require a single projector for 2D and 3D.

One consequence of reduced distribution costs is a greater degree of flexibility providing improved choice to the consumer, in terms of scheduling and content. It may also lead to an increase in smaller local cinemas showing a greater variety of films to smaller audiences. Entrepreneurs are already noting that such developments will create a need for more sophisticated customer relationship management techniques, as well as better marketing, in the cinema business.

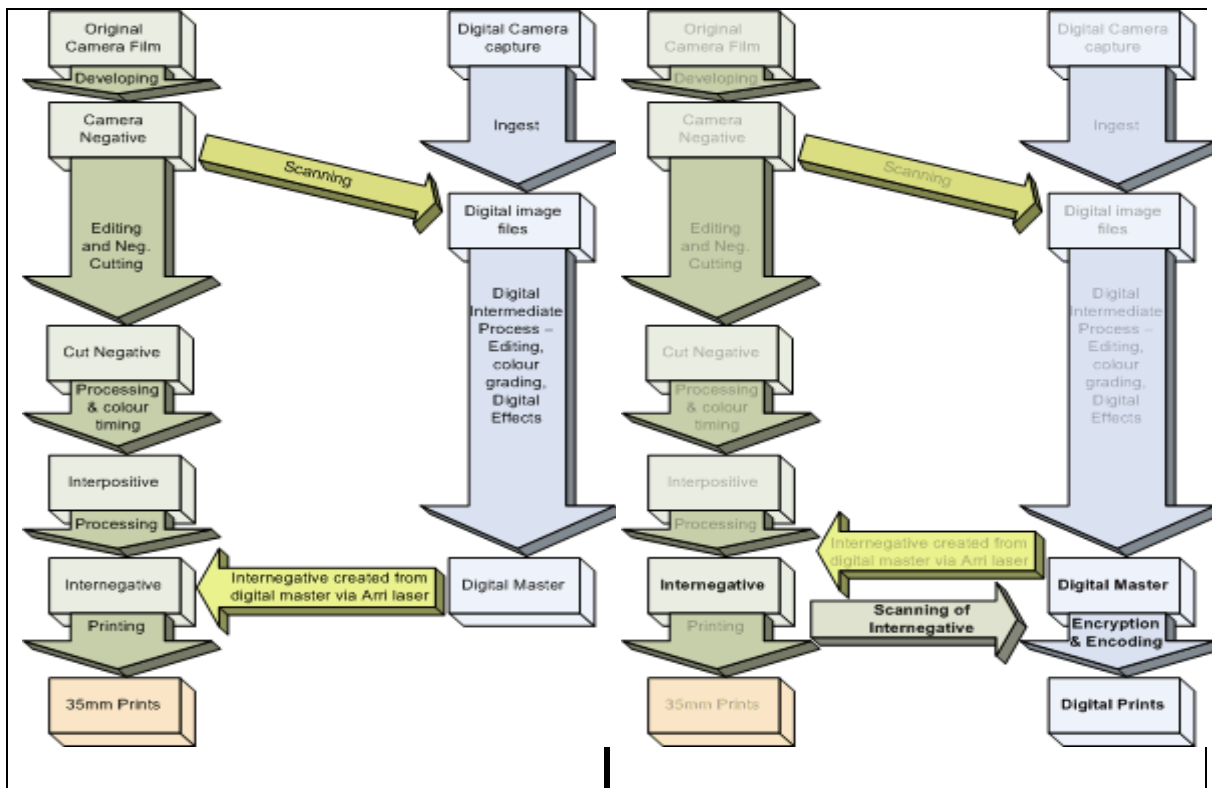
The final word should perhaps be left with an entrepreneur operating in San Francisco, not far from Hollywood. In a recent interview Gary Meyer, a co-founder of Landmark Theatres said. "I have hope that in a couple of years, when digital becomes more

available....With film, there are \$150 shipping costs, and I have to pay a projectionist \$16 an hour to work from noon to 11. Digital would reduce the cost and make it feasible. There are creative ways. Exhibitors can either go to bed angry or wake up and change...." (LaSalle, 2008). The change may just not be what the studios were hoping for or expecting.

Figures and Tables

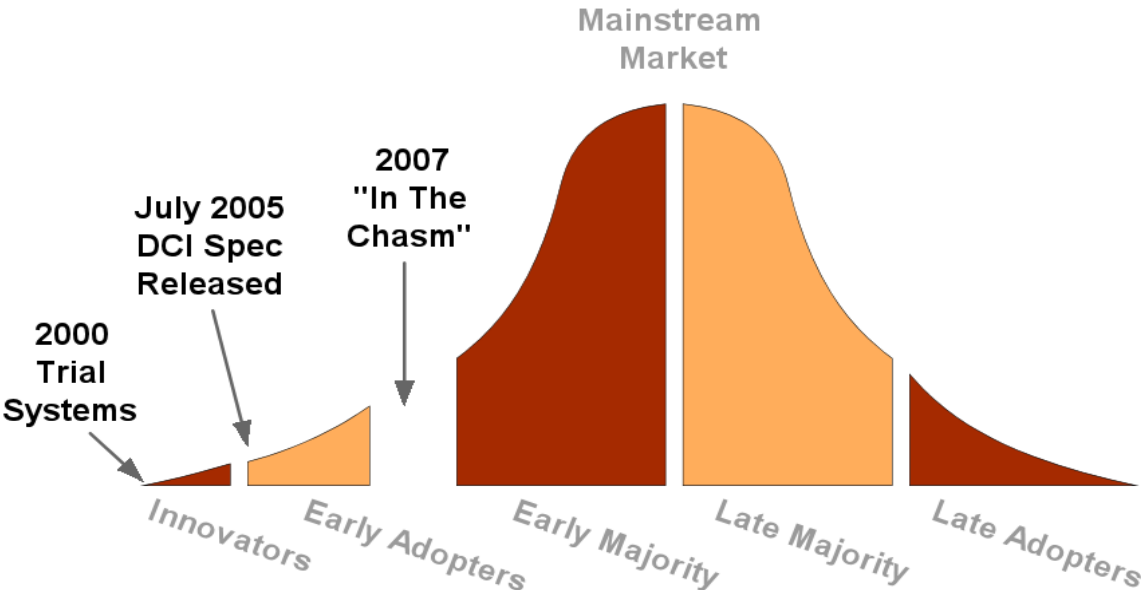
Figure 1: The 35mm Process

Figure 1a: The Digital Process



Source: Arts Alliance, 2008

Figure 2: The Path to Mainstream Digital Cinema 2007



Source: MKPE Consulting LLC

Table 1: D-Cinema Screens by Region

| Table 1: D-Cinema Screens by Region | | | | | | | | | |
|-------------------------------------|------|------|------|------|------|------|------|------|-------|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007* |
| Europe | 0 | 11 | 8 | 22 | 30 | 52 | 229 | 532 | 747 |
| North America | 0 | 15 | 23 | 80 | 82 | 90 | 332 | 2014 | 3536 |
| Central and S America | 0 | 1 | 2 | 7 | 10 | 12 | 13 | 16 | 20 |
| Africa Middle East | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 5 |
| Asia-Pacific | 0 | 4 | 8 | 50 | 66 | 180 | 272 | 430 | 561 |
| World | 0 | 31 | 41 | 159 | 188 | 335 | 848 | 2996 | 4869 |

* Jan – June 2007

Source: ScreenDigest, 2007

Table 2 Example of the Virtual Print Fee Model

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| System Cost* | 80,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Financing cost | 5,836 | 5,556 | 5,006 | 4,416 | 3,739 | 3,011 | 2,229 | 1,389 | 485 |
| Total Annual Cost | 85,836 | 5,556 | 5,006 | 4,416 | 3,739 | 3,011 | 2,229 | 1,389 | 485 |
| | | | | | | | | | |
| Average Turn rate | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 | 3.25 |
| Number of Pictures | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Utilisation Rate (%) | 80 | 90 | 90 | 95 | 95 | 95 | 95 | 95 | 95 |
| VPF per booking (\$) | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 |
| Total Distrib VPF revs | 8,960 | 10,080 | 10,008 | 10,640 | 10,640 | 10,640 | 10,640 | 10,640 | 10,640 |
| | | | | | | | | | |
| Exhib contribution | 1,600 | 1,600 | 1,600 | 1,600 | 1,600 | 1,600 | 1,600 | 1,600 | 1,600 |
| | | | | | | | | | |
| No of alt cont bookings | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| VPF for alt cont (\$) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Total VPF for alt cont | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 | 1,200 |
| | | | | | | | | | |
| Total Revenue | 11,760 | 12,880 | 12,880 | 13,440 | 13,440 | 13,440 | 13,440 | 13,440 | 13,440 |
| | | | | | | | | | |
| Amount unrecouped | 74,076 | 66,752 | 58,878 | 49,854 | 40,153 | 29,724 | 18,514 | 6,462 | -6,493 |

* Does not include maintenance and installation

Average Turn Rate = Average time a movie stays on screen

Number of pictures per year = Films played on a screen per year

Utilization rate = Depends on number of distributors signed up to VPF system

Source: Screen Digest

Table 3: Box Office per Screen results 3D vs 2D

| Title | Digital 3D screens | 2D (\$) | 3D (\$) | X Revenue |
|--------------------|---------------------------|----------------|----------------|------------------|
| Chicken Little | 86 | 6,760 | 24,419 | 3.6 |
| Monster House | 178 | 4,798 | 13,483 | 2.8 |
| Meet The Robinsons | 581 | 4,713 | 12,220 | 2.6 |
| Beowulf | 766 | 3,882 | 10,782 | 2.8 |
| Average | 403 | 5,038 | 15,226 | 3.0 |

Source: Screen Digest

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Appendix 7: P2 Digital Cinema: Opportunities and Challenges.

Convergence: The Journal of Research into New Media Technologies 9(4) winter. pp. 79-98. (with Randle: 24 citations)

Abstract

While the process of distributing and exhibiting a film has changed a little over the past century, Digital Cinema, the process of using digitally stored data instead of strips of acetate, has arrived. With technology continuing to develop, it is expected that d-cinema will overtake the quality of conventional cinema within the next two years.

This paper considers how the film industry might affect the transition from film to digital products. Rather than contributing to the continuing debate about the qualities of the competing technologies or the creative merits or demerits of digital product, this paper focuses on the search for new business models in an industry wedded to an analogue process.

It considers the strategies of implications associated with change; and how different territories might adapt in order to accommodate to this transition.

INTRODUCTION

Cinema can be considered as one of the success stories of the early 21st century, with more people currently going to see films at the cinema than at any time in the last 30 years (Hubbard, 2003). Turning cinemas into destination venues, improving the quality of the movie-going experience, and supporting the release of films with high marketing budgets have revived the industry.

In the exhibition sector, Multiplex cinemas have revolutionised the pattern of cinema visits. Offering easy car access for families and comfortable seating, multiplex cinemas are a world away from the old-fashioned, run-down cinemas they superseded (Thomas and Bromley, 2000).

However, the distribution and exhibition of motion pictures are at a crossroads. Ever since the medium was invented in the 1890s (Huettig, 1944) the 'picture' has been brought to the spectator in the form of photochemical images stored on strips of celluloid film passed in intermittent motion through a projector. Now, with the advent of Digital Cinema (that is using digitally stored data in place of film), new changes lie ahead for the film industry. In the following section we will briefly explain the advantages of digital cinema over film-stock based cinema.

Time for Change

The traditional photochemical process of analogue movie making is capable of producing images of great beauty and expressive power. However, the traditional viewer experience is often diminished by the use of third generation (release) prints, manufactured on high-speed printing machines, and by the wear and tear of a mechanical exhibition process with frequent scratching resulting in a dirty, faded, ultimately degraded presentation. Furthermore, in a world ever more pre-occupied with the impact of industry on the environment, the continuing reliance on a technology (film manufacturing), which involves environmental risks, is harder to justify in the presence of a cleaner alternative.

In contrast to film the image quality of a digital cinema intermediate does not deteriorate with each subsequent showing, its delivery is non-physical and each copy a perfect clone ensuring excellent image quality at every cinema. Because the movie is stored digitally, its physical size is no longer an issue and once loaded into the server and the movie calibrated, it does not require the attendance of the projectionist to do any more than start the show.

A 'digital print' can also contain multiple subtitled and dubbed language versions. Furthermore, the potential savings on the (at least) \$1 billion spent annually on manufacturing and shipping prints, should in theory provide a powerful impetus for change (Culkin *et al*, 2003).

This paper considers how the transition from film to digital product is likely to affect the global film industry. Rather than contributing further to the debate about the qualities of competing technologies or the creative merits or demerits of digital product, this paper will focus on the development of potential new business models in an industry wedded for over one hundred years to an analogue process. The authors will examine the strategies of the companies at the forefront of the technology; the financial implications associated with change; and how different territories are adapting in order to accommodate this transition.

D-cinema – An idle revolution ?

Ever since 1999, when George Lucas launched *Star Wars – Phantom Menace* on four digital screens in America, prophets of digital cinema have proclaimed that it will change the film industry forever. Six years later d-cinema is still far away from wide implementation.

Belton has even declared digital cinema to be a “false revolution” because it does not transform the nature of the motion picture experience for the audience, stating that “One obvious problem with digital cinema is that it has no novelty value, at least not for film audiences” (Belton, 2002). He argues that in a marketplace in which the word “digital” sells consumer products, “it is digital sound (and not digital projection) that marks for consumers the entry of motion pictures into the digital era”.

His arguments can not be easily dismissed especially when considering the explicit goal of digital projector manufacturers to produce an image quality that *equals* that of traditional film prints. Slater has compared the cinema exhibition chain of traditional film and electronic/digital cinema. When looking for an answer to the question what problem electronic/digital cinema is trying to solve, he could not find “one single good technical or operational reason why the whole system should be replaced” (Slater 2002:43), with film being high quality, flexible and most important future proof.

Still key players in the industry seem to be determined to make digital cinema happen, such as John Filthian, president of the National Association of Theater Owners (NATO) in America, who has said that “digital cinema will be the biggest transition technology in the history of the movie industry” (Baird, 2004).

The dilemma

However, with just over 120.000 screens worldwide, the cinema market has been deemed too small to support any major technological innovation by itself (Screen Digest, 2003). This means that no manufacturer is currently in the position to produce a digital projector at such a competitive price, that exhibitors could afford to pay for the switching costs themselves. Consequently the matter of financing the conversion to d-cinema has

been passed on to distributors, who are claimed to benefit the most from digital cinema by saving on print costs.

The problem is further intensified, when more than one company for d-cinema equipment tries to serve the market, and more than one standard exists. For distributors however, it does only make sense to fund digital cinema conversion, if a single standard exists (similar to the 35mm standard) otherwise the cost savings of digital are offset by producing several masters for different standards.

Thus the need arises for a clearly specified standard – an issue that took the participating players more than six years to resolve. These players can be categorized into three basic groups: equipment manufacturers, institutional players and distributors. In the following the major players and their stakes in digital cinema will be introduced briefly while reflecting on their role in the search for a single standard.

Setting a standard, shaping the market

The earliest attempts to gain a dominant market position and to set standards have been made by the main competitors in digital projector manufacturing, Texas Instruments (DLP Cinema), Sony (GLV) and JVC (D-ILA).

While JVC's position in the market has been marginalized, Texas Instruments has licensed its DLP Cinema technology to projector manufacturers such as Barco, Christie Digital and DPI/NEC and has by doing so gained an early advantage for its standard over Sony. It soon became evident however, that a working business model for d-cinema has to include not just a projector, but must consist of a bundle with digital distribution and server hardware. The main competitors in this area are companies such as QuVis, GDC, XDC and AccessIT.

As technology companies are clearly wedded to their own solutions, pointing out flaws in competing technologies while downplaying the shortcomings of their own, institutional players stepped in to help specify a single standard and support the development of digital cinema. In the USA the institution in charge is a special commission (DC-28) of the SMPTE (Society of Motion Picture and Television Engineers) in Europe it is the EDCF (European Digital Cinema Forum) in Japan the DCCJ NPO (Digital Cinema Consortium of Japan) and in China the SARFT (State Administration of Radio, Film, and Television). The power of these institutions has however been limited, as they tend to avoid taking sides and promote all solutions equally.

In 2002 the DCI (Digital Cinema Incentive) was formed, a joint venture of the seven major Hollywood studios (Disney, Fox, MGM, Paramount, Sony Pictures Entertainment, Universal and Warner Bros) that has dwarfed the importance of the other institutions to establish guidelines for digital cinema into insignificance. Although it still is the SMPTE

that ratifies technical standards for cinema and television in America, even Peter Symes, vice president engineering at SMPTE has to admit that “the DCI represents a significant party of interest” and it was very unlikely that the SMPTE could reach consensus on something if the DCI was in favour of something else (Crabtree, 2004).

In July 2005 the DCI has published its final overall system requirements and specifications for digital cinema. In their “guidelines” they have opted for a scalable solution from 2K to 4K and have therefore left the decision which projector technology will be used in theatres to the market.

They have however selected JPG2000 as the image coding system to be used in the delivery of digital motion pictures. This decision is very likely to eliminate competing systems, such as various MPEG standards or newcomer eTreppid from the market and forces all major manufacturers to comply with the standard (Crabtree, 2004).

DCI specification have consequently been branded to be synonymous with the term “digital cinema”, as Tim Partridge, senior vice president and general manager of the professional division for Dolby Laboratories has explained: “I think we [Dolby Laboratories] use the terms in what has become the standard way. D-cinema to us means DCI standard equipment, E-cinema is everything below that” (DCR, 2005b).

The question arises, why the “digital cinema revolution” still has not fully begun, when the dominating market forces (The Hollywood studios) can so easily safeguard their interests. One might argue that all they have to do, to continue their international market supremacy, is to replicate the existing power structure and apply it to the digital cinema market. What does stop them? Can the hesitancy of the Majors to move along with d-cinema quickly be interpreted as an indication of concern about the impact the digital transition will have on the industry?

DIGITAL CINEMA – A DISRUPTIVE TECHNOLOGY?

„Digital cinema [...] is perhaps the most significant challenge to the cinema industry since the introduction of sound on film. As with any new technology, there are those who want to do it fast, and those who want to do it right. As we move down this path, let's not forget the lesson learned with the introduction of digital audio for film in the '90s. Cinema Digital Sound, a division of Optical Radiation Corporation, was the first to put digital audio on 35mm film. Very, very few remember CDS, who closed their doors long ago. Such are the rewards for being first.“ (MKPE Consulting LLC, 2005)

As the above statement shows, there are considerable risks attached with moving into a market too fast. Indeed some of the companies who tried to find an early foothold in d-cinema have already closed their business in this field (most notably Boeing). However as

the literature on “disruptive innovation” and “disruptive technology” has pointed out, one of the biggest risks for incumbents in any market is to move too slowly.

Disruptive innovation and disruptive technology are emerging and increasingly prominent business terms describing a revolutionary change in an industry (Thomond et al, 2003). The term disruptive technology was first marked by Christensen (1997) to describe a technological discontinuity that causes the failure of incumbents in a market. Danneels (2004) defines disruptive technology as a technology that changes the bases of competition by changing the performance metrics along which firms compete. Customers seeking certain benefits determine which attributes they value in a product, with different customer groups valuing different attributes. New products based on a disruptive technology have different attribute sets than existing products. They tend to have initially a lower level of performance on dimensions relevant to mainstream market segments but have higher performance on dimensions valued by remote or emerging market segments. Christensen has characterized disruptive technologies as typically “simpler, cheaper, and more reliable and convenient than established technologies (2000:192).”

When the disruption has established itself in an underserved customer segment, major players may be displaced as disrupter’s develop new wealth opportunities. The consequences of not securing disruptive innovations can be “far more devastating than simply lost opportunities or lost market share” (Thomond et al, 2003:6).

Following these definitions d-cinema can easily be identified as a disruptive technology. In the following sections we will map out current important issues stopping incumbents from embracing the technology and exploiting its full potential. We will show how d-cinema changes the basis of competition in the industry and helps new markets to emerge. We will also show how incumbents can slow down the development to their advantage, and in doing so deliberately risk losing niche markets.

Single standard vs Consumer Market

One of the prerequisites for a wide roll out of digital cinema has been the readiness of tested equipment. There is a broad consent among industry experts that the problems of digital projectors with image quality have now been solved. However the availability of technology that meets the requirements has not propelled the number of installed digital cinema projectors tremendously. Walt Ordway, chief technology officer for the DCI, does not see a wide implementation of digital cinema before at least four to six years, although an initial roll out could take place “in the next year or so”. Ordway notes that one problem with the systems that are currently fielded is their lack of security constraints and a common standard (DCR, 2005a).

On an exhibitor's wish list for regulators of digital cinema, a common global standard would rank among the top objectives. There are two rivalling technologies in the projector market, namely Texas Instrument's 2K (DLP) standard, and Sony's 4K (GLV) standard. Texas instruments has invested an "unspeakably large amount of money" (ScreenDigest, 2003:30) into its DLP technology, revealing the exact amount not even to its shareholders, and currently controls the market. Sony on the other hand keeps announcing its 4K projector and plays on the preference of studios for a 4K solution. Despite Sony's de facto zero market share, the DCI (in which Sony is a member) has endorsed both 2K and 4K standards when choosing the JPEG 2000 codec for studio d-cinema release masters.

Although the revenues from the high end digital cinema market can be substantial, the real market to be won is the home cinema market. For both companies the market for d-cinema is therefore a kind of branding exercise for reaping rewards in the consumer electronics (CE) market. The underlying logic (e.g. for Texas Instruments) is the following: "Cinema audiences will see the DLP logo before the start of every film in a digital cinema and come to associate it with the highest quality of picture viewing. They will then seek it out or opt for it in their local CE market." (ScreenDigest, 2003).

The situation is similar to the introduction of digital sound into cinemas, which was also seen as a preliminary battle "for the potentially much more lucrative market for digital sound in the home" (Belton 2002: 101). During the 1990s three different companies tried to establish their proprietary technology as a cinema standard, namely DTS (Universal/MCA), SDDS (Sony) and Dolby digital (Dolby Laboratories). Since each standard was able to capture a sufficient market share, multi-standards in cinema sound continue to exist.

Multi-standards in d-cinema are certainly not a desired outcome for film distributors as well as exhibitors. Still, as long as d-cinema is only considered as a prefacing market for the companies who actually develop the technologies in use, standards will be an issue.

A market with network effects

One of the reasons why a common standard is so desirable is that the market for digital cinema exhibits positive consumption and production externalities. Positive consumption (network) externalities exist, when the value of a unit of the good increases with the expected number of units sold (Economides, 1995).

If both Texas Instruments (2K) and Sony (4K) establish their incompatible projectors in the market, the market is split into two different networks, one for 2K projectors and one for 4K projectors. Each of these networks consists of sellers (the Hollywood studios + independent content producers) and buyers (exhibitors). If an exhibitor installs a 2K

projector he joins the 2K network, and the utility of this projector increases with each other exhibitor to join this network because the increasing size of the (2K) market, increases the expected utility of all participants as they have more partners to trade with. This is especially true for the Hollywood studios, as for them the utility of the market is at a maximum, when there is only one standard (either 2K or 4K) and they can trade with all the exhibitors without incurring any additional costs.

Charles Swartz, CEO of the USC Entertainment Technology Center, has stressed the importance of a single, global, interoperable standard for d-cinema by referring to 35mm which had all these characteristics; the single standard ultimately enabled film to become a “medium of tremendous power” (Crabtree, 2003). A situation with a double standard would therefore be not a progress but a step backward for the industry.

Waiting for Sony

As a vertical integrated corporation Sony faces competition on each stage of the value chain, with contradicting objectives adding to the complexity.

Being a member of the DCI, Sony, the studio, has been able to secure that the DCI agreed on scalable format standards from 2K to 4K, and has thereby strengthened the position of Sony, the projector manufacturer. On the other side however, it has also agreed to accept rival technology as a standard.

There is a strong and compelling argument that says that since the studios are the real beneficiaries of digital cinema (through print savings) they should also fund the projector installation (Baird, 2004). One possible way to realize this funding sees the majors setting up an independent financing entity that allows cinema owners to decide on their own on how to use the funds to upgrade their cinemas along DCI standards (Kilday, 2004).

If this happens, Sony will find itself in the contradictory situation, where as a member of the DCI it will have to (directly or indirectly) subsidize its competitors in equipment manufacturing.

As an equipment manufacturer Sony competes against Texas Instruments and its licensees Christie Digital, Barco and NEC. It has to do so because it wants to protect its market prospects in consumer electronics, where it again competes against TI licensees, eg. Samsung, Sanyo or Marantz.

On each stage of the value chain Sony has more to lose than its competitors (the subsequent market) but it is also the only player that can exacerbate power at a higher level by participating in the DCI. Although Sony has not even proved yet that its 4K projector is more than a functioning prototype, it is therefore still a market force one has to take into account.

Sony's strategy clearly is to play on time and by cleverly doing so, it has managed to stay in a race that otherwise would have been long over. Through repeatedly announcing its 4K projector it has raised industry uncertainty and stopped investments. As Travis Reid, president of the cinema chain Loews Cineplex said "the fact that (a 4K projector) exists is making everyone stop to think", and admitted that if there was no deployment (of 4K), then 2K would have been the initial rollout.

An exhibitor quoted in Hollywood Reporter said that: "They [Sony] are clearly trying to slow down the forward momentum of 2K being adopted and rolled out. It will be interesting to see how they've come along to being a real live projector; there are a lot of studios saying, 'If this is close, then let's wait.' TI [Texas Instruments] can't be happy about it." (Sperling, 2004)

Doug Darrow, project manager for digital cinema at TI challenges Sony with the strong argument that it has not demonstrated that 4K projectors actually work in theatres for a few years in contrast to TI. However this argument could backfire. If there is no pressing economic need (and there is none) to switch to digital projection immediately, then exhibitors and studios might well postpone their investment decisions and wait to see if Sony's 4K projector can deliver.

Texas Instruments has expressed little interest in the race to 4K and focuses on the commercialisation of 2K, with "the biggest challenge not lying in resolution but in costs" (Kaufman, 2004).

A complex transition

For John Fithian, president of the National Association of Theatre Owners (NATO) "it is fairly clear that studios will fund the transition," since "they will save a tremendous amount of money from the conversion (Baird, 2004).

The modus operandi of this transition is far away from being "fairly clear", though. The rollout plan that determines which cinemas will get converted first must be consensual negotiated with all interest parties. Should the transition start only in North America or internationally, by state, by exhibitor, by market or where low technology and penetration allow for fast entry? (Fuchs, 2004b)

The Board of directors of the NATO (2004) has formulated a resolution of requirements that need to be fulfilled for the transition to be a success. A key point for them is that interoperable, reliable equipment is in place (both NATO and DCI have pledged for a beta testing phase) that at least equals the image quality of 35mm. The equipment must further be easy to upgrade at reasonable cost, as technology advances, must be built around clearly defined standards and has to be produced by competing multiple vendors.

For exhibitors a desirable financing plan for the transition has to ensure that all movie complexes and auditoriums, regardless of size or geographic location can participate within reasonable time, studios are committed to provide digital content, and exhibitors can independently select the equipment, and own it at the end of the financing period. Furthermore they ask for a “no dark screen” policy, meaning that films play in a non-repudiate manner unless the exhibitor attempts to play the film in a completely different venue and that they can decide on their own about schedules, advertisements, trailers and other content (NATO, 2004).

From a studio point of view, subsidising the full cost of the equipment without any obligations to exhibitors does not seem to be a very healthy economic proposition. A solution that does not contain any obligations to exhibitors to show content is a de facto cross-subsidisation for independent filmmakers, as they will benefit from the installation without contributing to the costs. The question of ownership therefore rests a crucial point in the transition to d-cinema. The immense undertaking to convert thousands of screens in America and internationally is not an “everyday” logistic and organizational challenge. To resolve the major issues will take time. For the moment this will delay the “d-cinema revolution” further, as exhibitors have little incentive to enter the market on their own before the studios have come to a decision.

THE NEW DIGITAL DEAL

The paralysis that results from the funding problem has left the market for the moment to third party players. A first wave of third party players proposed to pay the upfront costs for digital projectors in return for a fee (per print, per-screening, per-ticket or an annual contract) and promised to ensure that there is no shift in the balance of power between distributors and exhibitors (ScreenDigest, 2003). The success of these companies (with some exemptions such as Kodak) has been very modest so far. In 2003 Boeing Digital Cinema closed its d-cinema business that was once projected to bring \$ 1 billion a year in revenue (Gates, 2003). At the same time, Technicolor has scaled down its ambitions and based on latest reports, Elsacom is still in the “testing phase”.

A new wave of investment into d-cinema comes from state initiatives and independent film distributors. By targeting niche markets these players fragment the market and can then gradually expand their business into the mainstream. These dynamics are reflected in Christensen’s (1997) disruptive technology framework. He argues that incumbents are resource dependent (Pfeffer and Salancik, 1978) on their most demanding customers and focus their investment towards innovations that are valued by their mainstream customers. In contrast to this, new entrants are not constraint by and can not rely on an existing customer base, thus they are “forced to identify consumers who value the new features offered by the new technology and support its further development” (Adner, 2002).

In this regard, it seems as if the first wave of new entrants into d-cinema failed to correctly identify these “new customers”. Most of these ventures were aimed right from the beginning at the mainstream market, ignoring the importance to segment the market that has been strongly underlined by Moore (1991). This is in stark contrast to the new wave of entrants, who are very focused on niche markets, namely the distribution of independent content.

It is remarkable in this context that major new initiatives (e.g. the UK Film Councils Screen Network) are state driven. So far government support for the film industry was mainly aimed at subsidising film production, often resulting in the so produced films not finding exhibition and reaching only a very limited audience. The idea to provide distribution and exhibition for this content through installing digital screens is a strong shift away from the traditional production oriented subsidy logic to a more market oriented one. It directly addresses a market failure in exhibition that provides only very limited “screen space” to “art-house” films.

In the following section some of these initiatives shall be introduced:

The UK – The beta tester for the world

Despite Screen Digest’s predictions in 2002 (in a report commissioned by the British department for Culture, Media and Sport) that “no country is expected to ‘go it alone’” this is exactly what has happened, with Britain leading the digital front. In February 2005 the UK Film Council announced that it has chosen the Arts Alliance Digital Cinema (AADC) to install and run the world’s first digital screen network. In a contract worth around £11.5 million AADC will provide a network of up to 250 screens throughout the UK, with each cinema guaranteeing to show a minimum number of specialised (arthouse/foreign language) films a week in return for the equipment. The UK Film Councils strategy is to improve access to specialised films especially in areas outside metropolitan areas and to broaden the range of films available to audiences throughout the UK (UK Film Council, 2005).

By choosing a combination of Christie Digital System and NEC (supported by Digital Projection Ltd) 2K DLP Cinema Projectors, and QuVIS supply servers, the UK also influences the whole market, as investment decisions by other parties are likely to be directed towards equipment that already has a “track record”. One might argue that the UK is an independent beta tester for digital cinema.

DocuZone

Another initiative is the European DocuZone (EDZ) which plans to transform 180 independent cinemas in nine European countries into digital cinemas. EDZ will use a range of Panasonic projectors with up to 1.4K resolution. According to Kees Ryninks,

managing director of EDZ, the typical EDZ screen is up to 250 seats and the audience will have the same viewing experience with a mid-range 1.35K projector as a 2K projector in a mainstream multiplex cinema with 600-800 seats. The savings through digital distribution for a smaller documentary projects can be quite substantial, as the average costs for just three celluloid prints varies between €60,000 to €70,000. Ryninks further states that “with over 180 cinemas in a single network” EDZ is “already gaining such substantial economies of scale in distribution” that they can now offer “a new way for small specialised European films to hit the big screen and reach a new audience.” The cinemas will also cooperate on joint audience research, marketing and publicity to reduce costs. Further to that films will be able to open simultaneously across all EDZ cinemas as a pan-European premier with a satellite-linked Q&A with the director, taking advantage of interest when film reviews are published (EDZ, 2004). This appears like the “dream come true” for European independent cinema, since ironically up till now, only the American majors had the distribution structure to release feature films simultaneously in Europe.

Besides economic ratio EDZs choice for a 1.35k projector also demonstrates that it is not technology that will attract audiences but its content. As Ryninks states: “although there are debates raging over the technical merits of d-cinema over e-cinema, we like to call our solution c-cinema - it is about content, culture and communities.”

China

The government of China has mandated the China-wide conversion of cinemas to digital projection to be completed by the year 2015. According to Fung Sien, chairman of the Chinese entertainment company Spacecom Inc. this could mean the conversion of up to 100,000 new screens (the worldwide screen count is approx 120,000). The government has granted Spacecom Inc. the exclusive licence rights for all media entertainment transmission to digital cinemas in China for 30 years (Spacecom Inc, 2005). China’s plan is to overtake the USA in the number of installed digital cinema sites in the next few years. According to Bill Nemtin, a consultant for the Canadian National Film Board, one of the reasons China is facilitating digital cinema installations to such an extent is as a means to control the cost of importing films into China. The China Film Corporation is the exclusive importer of foreign films into mainland China. Its strategy is to introduce foreign films at first into digital cinemas, thus saving the costs of 35mm prints and if they are a "hit", then and only then, 35mm prints to serve the 35mm cinemas are imported (Nemtin, 2003). The emerging Chinese market has a potential box office that could exceed western territories by far.

Brazil

In Brazil Rain Networks has developed a low-cost distribution system, with built-in anti-piracy measures that supplies over 100 cinemas. Using a self developed compression

software based on the MPEG-4 standard, films are beamed by satellite from Rain's central computer in Sao Paulo to cinemas in the hinterland that are inaccessible by road. Again the beneficiaries are independent distributors and low-budget filmmakers who otherwise would be unable to afford a celluloid master and who are less likely to be victims of piracy. (Downie, 2004)

A strong argument for d-cinema, which is reflected in the case studies above, has been that it helps independent filmmakers to overcome the market entry barrier to distribution. On this ground state intervention has been justified. One has to acknowledge though, that d-cinema does not help to overcome the even bigger barrier of consumer habits and tastes. The American film industry has shaped audience tastes for generations resulting in a market share of up to over 90% in western countries. Although this domination might be a portrait of distorted consumer preferences, resulting from restricted consumer choice offered in local cinemas, the majority of mainstream audience taste is unlikely to change overnight. It will take more than access to the market to re-win significant audience shares for independent (European) cinema. Nevertheless higher exposure to content is an essential first step to alter cinema goer's habits in the long run.

IMPLICATIONS FOR THE CURRENT STRUCTURE OF THE FILM INDUSTRY

As the above examples clearly show, digital cinema not only allows smaller competitors to carve out viable market niches but can bring completely new markets into existence. Remote areas whose access to audiovisual content has been limited so far will now be as easily reached as regions with developed infrastructures. Both developments will increase competition: Firstly through players who fragment the market and then try to expand their strongholds into the mainstream market, and secondly through companies who operate from new strong domestic markets.

Without additional costs in supplying additional "prints" for screens, economies of scale that have shielded Hollywood studios from low budget competitors for nearly a century are eradicated. Consequently the release of a film will become "less of a financial decision and more of a marketing decision" (TI, 2003). If this will truly give independents leverage remains to be seen. The majors themselves have hardly ever regarded printing costs as an obstacle to distribution. With "ultrawide releases" (3000+ prints) on the rise (Screen Digest 2003), digital cinema opens the door to an ever higher pervasiveness of Hollywood product.

The studios have recently shortened the time lags between release dates in international markets and global simultaneous film starts have become a trend (e.g. The Matrix II, III, Star Wars, Harry Potter, Lord of The Rings, Narnia). One reason for this might be that the Internet has facilitated the development of a global film audience with increasingly convergent tastes. This audience readily turns to pirated copies of films if time lags

between national releases are too long. The combination of digital cinema and global simultaneous film starts is likely to propel this trend further with studios staging and marketing their productions as global events for a global box office.

Furthermore, the recent, unexpected success of *Alexander* (directed by Oliver Stone, 2004) in international markets, compared with its weak performance in America, has led to a rethinking of traditional release strategies. It might e.g. become reasonable to open a film first in international markets and treat the US only as a secondary market. Moritz Borman, head of Intermedia, the sales and production house that put *Alexander* together, has noted. "For the first time in 50 years, the US is not really in step, culturally and politically, with the rest of the world" (Schilling et al., 2005). On this score digital cinema could widen the spectrum of alternative release strategies significantly.

Another advantage studios will take along into the era of digital cinema will be their business model of a portfolio approach to film production and distribution. The strategy to spread risk onto a slate of films is even more effective with digital cinema: if a film is a success, studios can immediately supply additional screens at virtually no costs, if a film is a failure, it can be withdrawn without bearing the sunk costs of film prints.

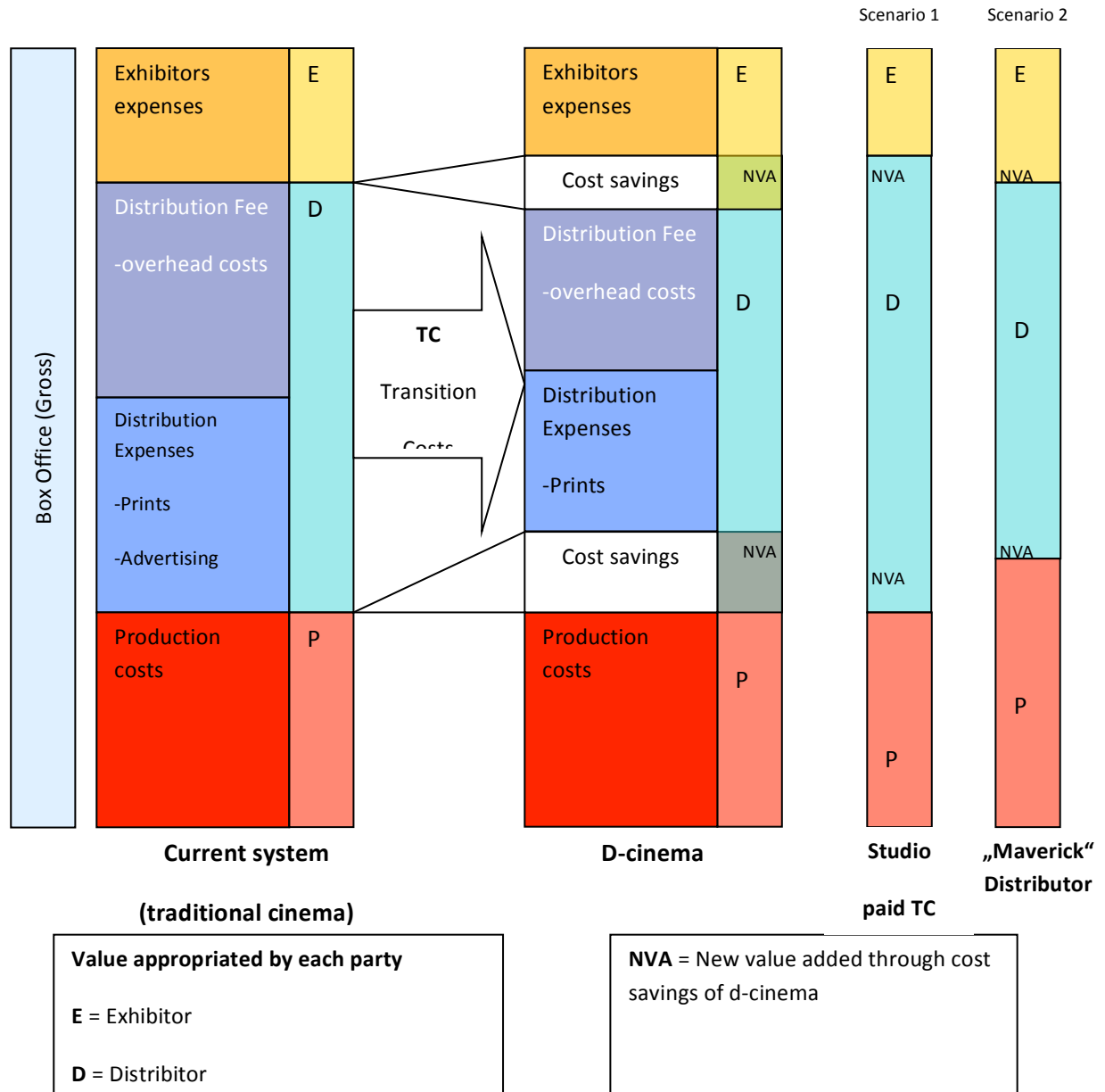
In this context d-cinema appears to be less a disruptive but rather a sustaining technology for the Majors. Sustaining technologies are consistent with a firm's business model (Christensen and Raynor, 2003) and improve the performance of established products through the "current technology product paradigm" (Kostoff et al., 2004). D-cinema bears both the characteristics of a sustaining and a disruptive technology, making it difficult to recognize the distinction. It is exactly this failure to address technological innovations appropriately that according to Christensen causes successful incumbents to stumble or even disappear from the market.

Historically, the film industry has already mastered a number of disruptive technologies (e.g. television, video recorder), despite its traditional reluctance to embrace new technologies. Its nostrum on how to deal with new technologies seems to be a combined strategy of vertical disintegration and diversification, which has led to an oligopolistic industry structure. During the 1990s the Majors have diversified themselves into the independent market by setting up or buying independent distributors, a trend that is likely to be intensified by digital cinema. Thus if entrepreneurial firms take advantage of the disruptive technology d-cinema and "redefine current markets" (Kostoff et al., 2004) the majors might simply counter them through acquisition and integration into their corporate structure.

As local independent distributors develop an expertise how to successfully handle "difficult" films in their markets, the majors might also begin to disintegrate further and try to outsource some of their distribution to these companies in the same way, they

have outsourced production through flexible specialization (see Christopherson and Storper, 1986, 1989). As the importance of a physical distribution structure diminishes their means to keep control over the industry would then be through controlling intellectual property rights as well as keeping a strong stake in development, packaging and financing and providing expertise in film production, marketing and distribution to contractors.

Diagram 3: Money Flows in the film industry/ The Hold up problem of D-cinema



The Hold up problem

Diagram 3 shows a simplified model of money flows in the traditional film industry value chain and in a system of d-cinema (a comprehensive discussion on profit calculation and accounting practices in the Hollywood studio system can be found in Daniels et al., 1998).

In the current system, box office receipts are first split between exhibitors and distributors. Exhibitors are the first to deduct their expenses, the value they appropriate is E. Distributors then deduct their *distribution fee*, which is intended to cover their overhead costs (offices, corporate expenses, distribution efforts) and the *distribution expenses* (Prints and Advertising). The distribution fee varies according to geographic area and market between 25% and up to 50% of the revenue. The value the distributors appropriate is D. The remainder, P, is allocated to the producers of the film.

After the transition to a system of d-cinema, cost savings arise: *distribution expenses* are reduced through cutting print costs, *distribution fees* are lower through reduced studio overhead. It will be interesting to see if studios can appropriate the added value they have created through cost savings for themselves or if they will have to share it with the other parties. If studios pay for the transition costs, they are likely to demand the added value on the ground that they have paid for it (scenario 1 in the diagram). However, if a new distributor enters the game at this stage ("Maverick distributor"), he would be able to offer both exhibitors and producers a better deal than the existing studios (scenario 2), since he can pass on the cost savings to them without having paid for them. In this scenario, studios will eventually have to pass on cost savings to producers as well, if they do not want to continuously lose potential box office hits to maverick distributors. The prospect of being held up by other parties in the value chain in the long run is therefore another factor that severely decreases the studios financial incentive to pay the transition costs for digital cinema.

Companies like *Hollywood Software* already offer independent film distributors and producers to outsource the distribution of entire release slates or individual films to their company. Hollywood software is a major player that provides information systems to the industry (including the majors) that automatically create sales charts, track film bookings, print shipment orders and credit payments (Hollywood Software, 2005). The company is a subsidiary of one of the largest server and digital cinema platform manufacturers in the market, AccessIT (Access Integrated Technologies). AccessIT has bought and re-commissioned all 28 installed digital-cinema systems from Boeing Digital Cinema in 2004, placing itself in the "centre of the the digital revolution" (Fuchs, 2004a). Their most recent development is the "Theatre Command Console" which supports multiple brands and models of digital-cinema projectors and is operated through an easy to use graphic interface. The president and COO of the company, Dave Gajda has said:

“The idea is to have fingertip access to and control of all critical d-cinema operations, including print-movements and pre-show content such as advertising and trailers. Whether on-site by the manager or directed remotely from the central home office, ..., operators can easily employ a single user interface to simplify training and flexibly integrate multiple technology solutions into a unified system.”(Fuchs, 2004a)

This gives rise to a tangible set of questions about training needs of staff and the transition to digital cinema.

Training costs – What training?

Although a network of high bandwidth fibre optic links to cinemas could be envisaged, transmission of content via hard disk, and in a few years via satellite is the financially more realistic scenario for digital cinemas. Slater (2002:14) has predicted that “the new projection equipment is likely to be internally more complex than the relatively simple electro-mechanical projectors that operators have been used to, so it will need to be reliable and simple to operate by existing staff.” The equipment will use built-in diagnostic software and straightforward test routines. As a consequence d-cinema projectors will be far easier to remote control when connected via a cinema management system that both controls their inputs and outputs. AccessIT’s “Theatre Command Console” is therefore a predecessor to an era where it will be possible to look after hundreds of screens in the country from a single control room (a situation already come true for UK broadcasting (Slater, 2004:15)).

The simplicity of a graphical interface and remote control dismisses concerns from exhibitors that new digital projectors will require advanced technical knowledge (McQuire, 2004) but could mean bleak prospects for some projector staff.

Flexibility, DRMS and Piracy

Today theatres often violate the strict letter of their rights agreements with distributors by e.g. switching prints from a larger venue to a smaller one (DCR, 2005a). Up until now the studios have overlooked this practice, because they are profiting from this flexibility as well. In the digital world, many aspects of the contractual agreements between distributors and exhibitors will be incorporated into digital rights management systems (DRMS). DRMS control the access and usage of digital content and assure its authenticity and integrity. Through watermarking and encryption techniques DRMS make it easier to protect intellectual property (Fetscherin and Schmid, 2003). Dean Devlin, special effects expert (Godzilla, Independence Day), has commented on the issue of piracy and digital cinema:

“[...] I think when you start talking about digital format some people get frightened [...] But the reality is, with watermarking technologies, with things that can be included into the digital projection, we actually have a chance of being more vigilant in our abilities to track down where the thieves are working [...] The print won't be on several screens at the same time without us knowing about it. We'll know the quality of the print everywhere. [...] we'll be able to track down crime in a way we've never been able to do it before” (DLP, 2005)

However if encryption technologies are too tight and systems are too rigid, significant business changes will be required in the industry (DCR, 2005). The development of a DRM system for digital cinema is therefore very complex, as interoperability with other systems and a high flexibility to re-allocate theatre assets to changing demands, are essential.

Alternative Content and Advertising

One of the key advantages of d-cinema is the possibility of theatre owners to use the projectors to show alternative content and advertisement. These two streams of revenues were predicted to be a major incentive for exhibitors to switch to digital technology. However, developments so far have painted a different picture. Patrick von Sychowski has called advertising the “Trojan Horse” and the “digital underdog that's ahead” (Fuchs, 2004b). Instead of “waiting for the movies” (and expensive high end projectors), theatre owners have made the transition to digital with low end projectors to cater advertisers. Advertising projectors outnumber digital cinema projectors already by more than 30 to one. As Sychowski has argued, exhibitors have found a low cost entry to reaping the ancillary benefits of d-cinema, and their gains from upgrading to high cost projectors are very low (Fuchs, 2004b). A good example for this trend is the network Regal Cine Media that centrally controls over 20.000 devices and runs over 800.000 ads a day.

The broadcasting of sport events has been cited as one of the primary possibilities of alternative content. Still, as McQuire has pointed out, one does not need an expensive, digital projector to show sport, because it is not a filmic experience, but television (McQuire, 2004). In addition, exhibitors did not make entirely positive experiences with alternative content so far. In Belgium, Kinopolis abandoned plans of ever showing soccer games in its cinemas again after fans rioted and tore up the seats in the auditorium following their team's loss in the game shown, and in Sweden a Mike Tyson PPV boxing match shown in a cinema ended in a knock out in less than a minute, much to the anger of the paying audience (Screendigest, 2002).

From the perspective of filmmakers, studios and distributors it is important that alternative content is only shown in theatres during “off time” (usually during the day).

Otherwise alternative content brings additional competition to screens that already face an oversupply of films, taking away business from all players in the industry. Still in its infancy, interactive cinema could be one opportunity for exhibitors to fill their theatres during the “off time”. Lev Manovich (2001) has suggested that the “dominant tone of the discourse of digital cinema lies in the possibility of an interactive narrative”, where users can choose the course of the film. Geoff Lowe, managing director of Filmserve, a British digital film content and technology company, believes that interactivity will be one key to a developing and engaging new cinema in the future. Filmserve has developed an interactive platform that enables users of mobile phones, pdas and laptops to interact with on-screen content (UK Film Council).

Innovations in this field are especially attractive to multiplex cinemas that are close to malls. Malls and cinemas benefit from synergies in real estate when shoppers use the same parking space by day as movie goes by night (Husak, 2004). Interactive cinemas could be a major attraction of malls by day, where kids could be entertained while their parents are shopping.

Other usage of digital cinemas during “off time” includes servicing for distance learning institutes, broadcasting important nationwide events or serving enterprises as communication tools.

CONCLUSION

In this paper we have tried to situate current developments in digital cinema within Christensen’s framework of disruptive technologies. We have focused the attention on what we see as the major players in digital cinema, namely the major Hollywood studios and have tried to map the implications of d-cinema on the relationships within the film industry value chain. It was shown that the market for d-cinema exhibits network externalities and that therefore a common standard is desirable. The discussion on standards also revealed the conflicting interests a diversified and vertical integrated corporation such as Sony faces, as the competition in d-cinema becomes a “preliminary battle” for the consumer electronics market. As a major incumbent, Sony is able to delay the progress of the whole transition to digital cinema for its own benefit, a strategy worth examining more closely.

We have also briefly outlined some of the complexities linked to organise a satisfying transition to digital cinema for all parties. The emergence of new markets and new entrants into the d-cinema market was examined in respect to the implications for major players in the industry. Although d-cinema was found to benefit independent players that can carve out market niches, it was also shown that the majors have a strong leverage to exploit the technology to their advantage. However, the combination of a change in the terms of competition and a potential hold up problem, are likely to lead to a further

diversification and possibly a further disintegration of major distributors. In addition we have discussed important issues associated with d-cinema, such as alternative content, training and digital rights management.

Further research is needed to explore strategies of new entrants and incumbents in this market, survey successful and unsuccessful business models and discuss how the research on digital cinema can contribute to, and be enriched by literature on strategic management and disruptive technologies. Interesting research questions are related to the performance of third party initiatives such as the UK Film Council's Screen Network; the complexity of organising a transition to d-cinema for the mainstream market; and the role of diversified, vertically integrated corporations in the process of setting standards for d-cinema, branding for subsequent markets and market fragmentation.

In conclusion it shall be mentioned that d-cinema has not solved the problem of long term digital storage yet. As Phil Feiner, CEO of the renowned optical service company Pacific Title Digital, has remarked: "It's not archival" (Parisi, 2004). Digital intermediates are stored on magnetic tapes, that have an archival life of 30 years at best. In contrast, a three-strip black-an-white masters, the current archival standard, lasts as long as 1,500 years. This means that even if a film is shot, edited, distributed and projected digitally, in the end it has to be transferred to film.

Therefore, in the uncertain future of digital cinema, at least one thing is for sure: Even if the "d-cinema fairy" converts all the screens in the world overnight to digital, traditional film is still going to stay with us for a very, very, very long time.

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Appendix 8: P3 Digital Cinema as Disruptive Technology.

In Van Der Graaf, S. and Washida, Y. (eds.) (2006) *Information Communication Technologies and Emerging Business Strategies*. Hershey: Idea Group. (with Morawetz & Randle: 3 citations)

Abstract

The distribution and exhibition of motion pictures are at a crossroads. Ever since the medium was invented in the 1890s the 'picture' has been brought to the spectator in the form of photochemical images stored on strips of celluloid film passed in intermittent motion through a projector.

Now, at the beginning of the 21st century, an entirely new method has emerged, using digitally stored data in place of film and barely needing any physical support other than a computerised file. This opens an intriguing portfolio of revenue-generating opportunities for the movie exhibitor.

This chapter will give an overview of current developments in digital cinema (d-cinema). It will examine potential new business models in an industry wedded to the analogue process. The authors will consider the strategies of companies at the forefront of the technology; implications associated with the change; and how different territories might adapt in order to accommodate this transition.

INTRODUCTION

In this chapter we will consider how the transition from film to digital product is likely to affect an industry that has been wedded to an analogue process for more than 100 years. Rather than contributing further to the debate about the qualities of competing technologies or the creative merits or demerits of digital product, this chapter will focus on the development of potentially new business models in the global film industry. The authors will examine the strategies of the companies at the forefront of the technology; the financial implications associated with change; and how different territories are adapting in order to accommodate this transition.

What revolution?

Ever since 1999, when George Lucas launched *Star Wars: Phantom Menace* on four digital screens in America, prophets of d-cinema (that is using digitally stored data in place of film) have proclaimed that it will change the film industry forever. Six years later d-cinema is still far away from wide implementation. Belton (2002) has even declared d-cinema to be a “false revolution” because it does not transform the nature of the motion picture experience for the audience, stating that “One obvious problem with digital cinema is that it has no novelty value, at least not for film audiences.” He argues that in a marketplace in which the word “digital” sells consumer products, “it is digital sound (and not digital projection) that marks for consumers the entry of motion pictures into the digital era.”

His arguments cannot be easily dismissed especially when considering the explicit goal of digital projector manufacturers to produce an image quality that equals that of traditional film prints. Slater (2002) has compared the cinema exhibition chain of traditional film and electronic/d-cinema. When looking for an answer to the question what problem electronic/d-cinema is trying to solve, he could not find “one single good technical or operational reason why the whole system should be replaced” (p. 43), with film being high quality, flexible, and most important future proof. Still key players in the industry seem to be determined to make d-cinema happen, such as John Filthian, president of the National Association of Theater Owners (NATO) in America, who has said that “digital cinema will be the biggest transition technology in the history of the movie industry” (Baird, 2004).

Catch-22

However, with just over 120,000 screens worldwide, the cinema market has been deemed too small to support any major technological innovation by itself (Screen Digest, 2003). This means that no manufacturer is currently in the position to produce a digital projector at such a competitive price, that exhibitors could afford to pay for the switching costs themselves. Consequently, the matter of financing the conversion to d-cinema has

been passed on to distributors, who are claimed to benefit the most from d-cinema by saving on print costs. The problem is further intensified, when more than one company for d-cinema equipment tries to serve the market, and more than one standard exists. For distributors however, it does only make sense to fund d-cinema conversion, if a single standard exists (similar to the 35mm standard), otherwise the cost savings of digital are offset by producing several masters for different standards. Thus the need arises for a clearly specified standard—an issue that took the participating players more than 6 years to resolve. These players can be categorized into three basic groups: equipment manufacturers, institutional players, and distributors. In the following section the major players and their stakes in d-cinema will be introduced briefly while reflecting on their role in the search for a single standard.

STANDARDISING TASTES

The earliest attempts to gain a dominant market position and to set standards have been made by the main competitors in digital projector manufacturing, Texas Instruments (TI) (DLP Cinema), Sony (GLV), and JVC (D-ILA). While JVC's position in the market has been marginalised, TI has licensed its DLP Cinema technology to projector manufacturers such as Barco, Christie Digital, and DPI/NEC and has by doing so gained an early advantage for its standard over Sony. It soon became evident however, that a working business model for d-cinema has to include not just a projector, but must consist of a bundle with digital distribution and server hardware. The main competitors in this area are companies such as QuVis, GDC, XDC, and AccessIT. As technology companies are clearly wedded to their own solutions, pointing out flaws in competing technologies while downplaying the shortcomings of their own, institutional players stepped in to help specify a single standard and support the development of d-cinema.

In the U.S. the institution in charge is a special commission (DC-28) of the Society of Motion Picture and Television Engineers (SMPTE), in Europe it is the European Digital Cinema Forum (EDCF), in Japan the Digital Cinema Consortium of Japan (DCCJ NPO), and in China the State Administration of Radio, Film, and Television (SARFT). The power of these institutions has however been limited, as they tend to avoid taking sides and promote all solutions equally. In 2002 the Digital Cinema Incentive (DCI) was formed, a joint venture of the seven major Hollywood studios (Disney, Fox, MGM, Paramount, Sony Pictures Entertainment, Universal, and Warner Bros.) that has dwarfed the importance of the other institutions to establish guidelines for d-cinema into insignificance. Although it still is the SMPTE that ratifies technical standards for cinema and television in America, even Peter Symes, vice president engineering at SMPTE has to admit that “the DCI represents a significant party of interest” and it was very unlikely that the SMPTE could reach consensus on something if the DCI was in favour of something else (Crabtree, 2004).

In July 2005 the DCI had published its final overall system requirements and specifications for d-cinema. In their guidelines they have opted for a scalable solution from 2K to 4K and have therefore left the decision which projector technology will be used in theatres to the market. They have however selected JPEG2000 as the image coding system to be used in the delivery of digital motion pictures. This decision is very likely to eliminate competing systems, such as various MPEG standards or newcomer eTrepid from the market and forces all major manufacturers to comply with the standard (Crabtree, 2004). DCI specifications have consequently been branded to be synonymous with the term d-cinema, as Tim Partridge, senior vice president and general manager of the professional division for Dolby Laboratories has explained: "I think we [Dolby Laboratories] use the terms in what has become the standard way. D-cinema to us means DCI standard equipment, E-cinema is everything below that" (DCR, 2005b).

The question arises, why the d-cinema revolution still has not fully begun, when the dominating market forces (the Hollywood studios) can so easily safeguard their interests. One might argue that all they have to do, to continue their international market supremacy, is to replicate the existing power structure and apply it to the d-cinema market. What does stop them? Can the hesitancy of the "majors" to move along with dcinema quickly be interpreted as an indication of concern about the impact the digital transition will have on the industry?

CREATING DISRUPTION?

Digital cinema [...] is perhaps the most significant challenge to the cinema industry since the introduction of sound on film. As with any new technology, there are those who want to do it fast, and those who want to do it right. As we move down this path, let's not forget the lesson learned with the introduction of digital audio for film in the '90s. Cinema Digital Sound, a division of Optical Radiation Corporation, was the first to put digital audio on 35mm film. Very, very few remember CDS, who closed their doors long ago. Such are the rewards for being first. (MKPE Consulting LLC, 2005)

As the previous statement shows, there are considerable risks attached with moving into a market too fast. Indeed some of the companies who tried to find an early foothold in d-cinema have already closed their business in this field (most notably Boeing). However as the literature on disruptive innovation and disruptive technology has pointed out, one of the biggest risks for incumbents in any market is to move too slowly.

Disruptive innovation and disruptive technology are emerging and increasingly prominent business terms describing a revolutionary change in an industry (Thomond et al., 2003). The term disruptive technology was first marked by Christensen (1997) to describe a technological discontinuity that causes the failure of incumbents in a market. Danneels (2004) defines disruptive technology as a technology that changes the bases of

competition by changing the performance metrics along which firms compete. Customers seeking certain benefits determine which attributes they value in a product, with different customer groups valuing different attributes. New products based on a disruptive technology have different attribute sets than existing products. They tend to have initially a lower level of performance on dimensions relevant to mainstream market segments but have higher performance on dimensions valued by remote or emerging market segments. Christensen (2000) has characterized disruptive technologies as typically “simpler, cheaper, and more reliable and convenient than established technologies” (p. 192).

When the disruption has established itself in an underserved customer segment, major players may be displaced as disrupter’s develop new wealth opportunities. The consequences of not securing disruptive innovations can be “far more devastating than simply lost opportunities or lost market share” (Thomond et al., 2003, p. 6). Following these definitions d-cinema can easily be identified as a disruptive technology. In the following sections we will map out current important issues stopping incumbents from embracing the technology and exploiting its full potential. We will show how d-cinema changes the basis of competition in the industry and helps new markets to emerge. We will also show how incumbents can slow down the development to their advantage, and in doing so deliberately risk losing niche markets.

Single Standard vs. Consumer Market

One of the prerequisites for a wide roll out of d-cinema has been the readiness of tested equipment. There is a broad consent among industry experts that the problems of digital projectors with image quality have now been solved. However the availability of technology that meets the requirements has not propelled the number of installed d-cinema projectors tremendously. Walt Ordway, chief technology officer for the DCI, does not see a wide implementation of d-cinema for at least 4-6 years, although an initial roll out could take place “in the next year or so.” Ordway notes that one problem with the systems that are currently fielded is their lack of security constraints and a common standard (DCR, 2005a).

On an exhibitor’s wish list for regulators of d-cinema, a common global standard would rank among the top objectives.¹ There are two rivalling technologies in the projector market, namely TIs 2K (DLP) standard, and Sony’s 4K (GLV) standard.² TI has invested an “unspeakably large amount of money” (Screen Digest, 2003, p. 30) into its DLP technology, revealing the exact amount not even to its shareholders, and currently controls the market. Sony on the other hand keeps announcing its 4K projector and plays on the preference of studios for a 4K solution. Despite Sony’s de facto, zero-market share, the DCI (in which Sony is a member) has endorsed both 2K and 4K standards when choosing the JPEG 2000 codec for studio d-cinema release masters. Although the

revenues from the high-end d-cinema market can be substantial, the real market to be won is the home cinema market. For both companies the market for d-cinema is therefore a kind of branding exercise for reaping rewards in the consumer electronics (CE) market. The underlying logic (e.g., for TI) is the following:

Cinema audiences will see the DLP logo before the start of every film in a d-cinema and come to associate it with the highest quality of picture viewing. They will then seek it out or opt for it in their local CE market. (Screen Digest, 2003)

The situation is similar to the introduction of digital sound into cinemas, which was also seen as a preliminary battle “for the potentially much more lucrative market for digital sound in the home” (Belton, 2002, p. 101). During the 1990s three different companies tried to establish their proprietary technology as a cinema standard, namely DTS (Universal/MCA), SDDS (Sony), and Dolby digital (Dolby Laboratories). Since each standard was able to capture a sufficient market share, multi-standards in cinema sound continue to exist.

Multi-standards in d-cinema are certainly not a desired outcome for film distributors as well as exhibitors. Still, as long as d-cinema is only considered as a prefacing market for the companies who actually develop the technologies in use, standards will be an issue.

Network markets

One of the reasons why a common standard is so desirable is that the market for d-cinema exhibits positive consumption and production externalities. Positive consumption (network) externalities exist, when the value of a unit of the good increases with the expected number of units sold (Economides, 1996). If both TI (2K) and Sony (4K) establish their incompatible projectors in the market, the market is split into two different networks, one for 2K projectors and one for 4K projectors. Each of these networks consists of sellers (the Hollywood studios plus independent content producers) and buyers (exhibitors). If an exhibitor installs a 2K projector he joins the 2K network, and the utility of this projector increases with every exhibitor who joins this network because the increasing size of the (2K) market increases the expected utility of all participants as they have more partners to trade with. This is especially true for the Hollywood studios, as for them the utility of the market is at a maximum, when there is only one standard (either 2K or 4K) and they can trade with all the exhibitors without incurring any additional costs.

Charles Swartz, CEO of the USC Entertainment Technology Center, has stressed the importance of a single, global, interoperable standard for d-cinema by referring to 35mm, which had all these characteristics; the single standard ultimately enabled film to become a “medium of tremendous power” (Crabtree, 2003). A situation with a double standard would therefore not be progress but a step backward for the industry.

Sony arrives, soon

As a vertical integrated corporation Sony faces competition on each stage of the value chain, with contradicting objectives adding to the complexity. Being a member of the DCI, Sony, the studio, has been able to secure that the DCI agreed on scalable format standards from 2K to 4K, and has thereby strengthened the position of Sony, the projector manufacturer. On the other side however, it has also agreed to accept rival technology as a standard. There is a strong and compelling argument that says that since the studios are the real beneficiaries of d-cinema (through print savings) they should also fund the projector installation (Baird, 2004).

One possible way to realize this funding sees the majors setting up an independent financing entity that allows cinema owners to decide on their own on how to use the funds to upgrade their cinemas along DCI standards (Kilday, 2004). If this happens, Sony will find itself in the contradictory situation, where as a member of the DCI it will have to (directly or indirectly) subsidize its competitors in equipment manufacturing. As an equipment manufacturer Sony competes against TI and its licensees Christie Digital, Barco, and NEC. It has to do so because it wants to protect its market prospects in consumer electronics, where it again competes against TI licensees, for example, Samsung, Sanyo, or Marantz.

On each stage of the value chain Sony has more to lose than its competitors (the subsequent market) but it is also the only player that can exacerbate power at a higher level by participating in the DCI. Although Sony has not even proved yet that its 4K projector is more than a functioning prototype, it is therefore still a market force one has to take into account. Sony's strategy clearly is to play on time, and by cleverly doing so, it has managed to stay in a race that otherwise would have been long over. Through repeatedly announcing its 4K projector it has raised industry uncertainty and stopped investments. As Travis Reid, president of the cinema chain Loews Cineplex said:

... the fact that (a 4K projector) exists is making everyone stop to think, and admitted that if there was no deployment (of 4K), then 2K would have been the initial rollout. (Sperling, 2004)

An exhibitor quoted in Hollywood Reporter said that:

They [Sony] are clearly trying to slow down the forward momentum of 2K being adopted and rolled out. It will be interesting to see how they've come along to being a real live projector; there are a lot of studios saying, "If this is close, then let's wait." TI [Texas Instruments] can't be happy about it. (Sperling, 2004)

Doug Darrow, Project Manager for d-cinema at TI challenges Sony with the strong argument that it has not demonstrated that 4K projectors will actually work in theatres

for a few years, in contrast to TI. However, this argument could backfire. If there is no pressing economic need (and there is none) to switch to digital projection immediately, then exhibitors and studios might well postpone their investment decisions and wait to see if Sony's 4K projector can deliver. TI has expressed little interest in the race to 4K and focuses on the commercialisation of 2K, with "the biggest challenge not lying in resolution but in costs" (Kaufman, 2004).

A transition in waiting

John Fithian, president of the National Association of Theatre Owners (NATO), states "it is fairly clear that studios will fund the transition," since "they will save a tremendous amount of money from the conversion" (Baird, 2004). The modus operandi of this transition is far away from being "fairly clear," though. The rollout plan that determines which cinemas will get converted first must be consensually negotiated with all interest parties. Should the transition start only in North America or internationally, by state, by exhibitor, by market, or where low technology and penetration allow for fast entry? (Fuchs, 2004b). The Board of directors of the NATO (2004) has formulated a resolution of requirements that need to be fulfilled for the transition to be a success. A key point for them is that interoperable, reliable equipment is in place (both NATO and DCI have pledged for a beta testing phase) that at least equals the image quality of 35mm. The equipment must further be easy to upgrade at reasonable cost, as technology advances; must be built around clearly defined standards; and has to be produced by competing multiple vendors.

For exhibitors a desirable financing plan for the transition has to ensure that all movie complexes and auditoriums, regardless of size or geographic location can participate within reasonable time, studios are committed to provide digital content, and exhibitors can independently select the equipment, and own it at the end of the financing period. Furthermore they ask for a "no dark screen" policy, meaning that films play in a nonrepudiate manner unless the exhibitor attempts to play the film in a completely different venue and that they can decide on their own about schedules, advertisements, trailers, and other content (NATO, 2004, p. 3).

From a studio point of view, subsidising the full cost of the equipment without any obligations to exhibitors does not seem to be a very healthy economic proposition. A solution that does not contain any obligations to exhibitors to show content is a de facto cross-subsidisation for independent filmmakers, as they will benefit from the installation without contributing to the costs. In the question of ownership therefore rests a crucial point in the transition to d-cinema. The immense undertaking to convert thousands of screens in America and internationally is not an "everyday" logistic and organisational challenge. To resolve the major issues it will take time. For the moment this will delay the d-cinema revolution further, as exhibitors have little incentive to enter the market on

their own before the studios have come to a decision.

THE NEW DIGITAL DEAL

The paralysis that results from the funding problem has left the market for the moment to third-party players. A first wave of third-party players proposed to pay the upfront costs for digital projectors in return for a fee (per-print, per-screening, per-ticket, or an annual contract) and promised to ensure that there is no shift in the balance of power between distributors and exhibitors (Screen Digest, 2003). The success of these companies (with some exemptions such as Kodak) has been very modest so far. In 2003 Boeing Digital Cinema closed its d-cinema business that was once projected to bring \$1 billion a year in revenue (Gates, 2003). At the same time, Technicolor has scaled down its ambitions and based on latest reports, Elsacom is still in the testing phase.

A new wave of investment into d-cinema comes from state initiatives and independent film distributors. By targeting niche markets these players fragment the market and can then gradually expand their business into the mainstream. These dynamics are reflected in Christensen's (1997) disruptive technology framework. He argues that incumbents are resource dependent (Pfeffer & Salancik, 1978) on their most demanding customers and focus their investment towards innovations that are valued by their mainstream customers. In contrast to this, new entrants are not constraint by and can not rely on an existing customer base, thus they are "forced to identify consumers who value the new features offered by the new technology and support its further development" (Adner, 2002).

In this regard, it seems as if the first wave of new entrants into d-cinema failed to correctly identify these "new customers." Most of these ventures were aimed right from the beginning at the mainstream market, ignoring the importance to segment the market that has been strongly underlined by Moore (1991). This is in stark contrast to the new wave of entrants, who are very focused on niche markets, namely the distribution of independent content. It is remarkable in this context that major new initiatives (e.g., the UK Film Councils Screen Network) are state driven. So far government support for the film industry was mainly aimed at subsidising film production, often resulting in the so-produced films not finding exhibition and reaching only a very limited audience. The idea to provide distribution and exhibition for this content through installing digital screens is a strong shift away from the traditional production-oriented subsidy logic to a more market oriented one. It directly addresses a market failure in exhibition that provides only very limited "screen space" to "art-house" films.

While d-cinema might potentially help independent filmmakers to overcome the market barriers to distribution, this does not necessarily mean that the even bigger barriers of consumer habits and tastes can be overcome as well. The American film industry has

shaped audience tastes for generations resulting in a market share of up to over 90% in Western countries. Although this domination might be a portrait of distorted consumer preferences, resulting from restricted consumer choice offered in local cinemas, the majority of mainstream audience taste is unlikely to change overnight. It will take more than access to the market to re-win significant audience shares for independent (European) cinema. Nevertheless higher exposure to content is an essential first step to alter cinema goer's habits in the long run.

What Next For The Structure Of The Film Industry?

As the aforementioned examples clearly show, d-cinema not only allows smaller competitors to carve out viable market niches but can bring completely new markets into existence. Remote areas whose access to audiovisual content that has been limited so far will now be as easily reached as regions with developed infrastructures. Both developments will increase competition: Firstly through players who fragment the market and then try to expand their strongholds into the mainstream market, and secondly through companies who operate from new strong domestic markets. Without additional costs in supplying additional "prints" for screens, economies of scale that have shielded Hollywood studios from low-budget competitors for nearly a century are eradicated. Consequently, the release of a film will become "less of a financial decision and more of a marketing decision" (TI, 2003). If this will truly give independents leverage remains to be seen. The majors themselves have hardly ever regarded printing costs as an obstacle to distribution. With "ultrawide releases" (3000+ prints) on the rise (Screen Digest, 2003), d-cinema opens the door to an ever higher pervasiveness of Hollywood product.

The studios have recently shortened the time lags between release dates in international markets and global, simultaneous, film starts have become a trend (e.g., The Matrix II, III, Star Wars, Harry Potter, Lord of The Rings). One reason for this might be that the Internet has facilitated the development of a global film audience with increasingly convergent tastes. This audience readily turns to pirated copies of films if time lags between national releases are too long. The combination of d-cinema and global simultaneous film starts is likely to propel this trend further with studios staging and marketing their productions as global events for a global box office.

Another advantage studios will take along into the era of d-cinema will be their business model of a portfolio approach to film production and distribution. The strategy to spread risk onto a slate of films is even more effective with d-cinema: If a film is a success, studios can immediately supply additional screens at virtually no cost, if a film is a failure, it can be withdrawn without bearing the sunk costs of film prints. In this context d-cinema appears to be less a disruptive but rather a sustaining technology for the majors. Sustaining technologies are consistent with a firm's business model (Christensen & Raynor, 2003) and improve the performance of established products through the

“current technology product paradigm” (Kostoff, Boylan, & Simons, 2004). D-cinema bears both the characteristics of a sustaining and a disruptive technology, making it difficult to recognize the distinction. It is exactly this failure to address technological innovations appropriately that according to Christensen causes successful incumbents to stumble or even disappear from the market.

Historically, the film industry has already mastered a number of disruptive technologies (e.g., television, video recorder), despite its traditional reluctance to embrace new technologies. Its nostrum on how to deal with new technologies seems to be a combined strategy of vertical disintegration and diversification, which has led to an oligopolistic industry structure. During the 1990s the major studios diversified themselves into the independent market by setting up or buying independent distributors (New Line Cinema, Miramax, Fox Searchlight, etc.), a trend that is likely to be intensified by d-cinema. Thus, if entrepreneurial firms take advantage of the disruptive technology d-cinema and “redefine current markets” (Kostoff et al., 2004) the majors might simply counter them through acquisition and integration into their corporate structure.

As local independent distributors develop an expertise on how to successfully handle “difficult” films in their markets, the majors might also begin to disintegrate further and try to outsource some of their distribution to these companies in the same way that they have outsourced production through flexible specialization (see Christopherson & Storper, 1986, 1989). As the importance of a physical distribution structure diminishes their means to keep control over the industry would then be through controlling intellectual property rights as well as keeping a strong stake in development, packaging, and financing and providing expertise in film production, marketing and distribution to contractors.

Why The Hold Up?

Figure 1 shows a simplified model of money flows in the traditional film industry value chain and in a system of d-cinema (a comprehensive discussion on profit calculation and accounting practices in the Hollywood studio system can be found in Daniels, Leedy, & Sills, 1998). In the current system, box office receipts are first split between exhibitors and distributors. Exhibitors are the first to deduct their expenses, the value they appropriate is E. Distributors then deduct their distribution fee, which is intended to cover their overhead costs (offices, corporate expenses, distribution efforts) and the distribution expenses (prints and advertising). The distribution fee varies according to geographic area and market between 25% and up to 50% of the revenue. The value the distributors appropriate is D. The remainder, P, is allocated to the producers of the film.

After the transition to a system of d-cinema, cost savings arise: distribution expenses are reduced through cutting print costs, distribution fees are lowered through reduced studio

overhead. It will be interesting to see if studios can appropriate the added value they have created through cost savings for themselves or if they will have to share it with the other parties. If studios pay for the transition costs, they are likely to demand the added value on the ground that they have paid for it (scenario 1 in Figure 1). However, if a new distributor enters the game at this stage (“Maverick distributor”), he/she would be able to offer both exhibitors and producers a better deal than the existing studios (scenario 2, Figure 1), since the distributor can pass on the cost savings to them without having paid for them. In this scenario, studios will eventually have to pass on cost savings to producers as well, if they do not want to continuously lose potential box office hits to maverick distributors. The prospect of being held up by other parties in the value chain in the long run is therefore another factor that severely decreases the studios financial incentive to pay the transition costs for d-cinema.

Companies like Hollywood Software already offer independent film distributors and producers to outsource the distribution of entire release slates or individual films to their company. Hollywood Software is a major player that provides information systems to the industry (including the majors) that automatically create sales charts, track film bookings, print shipment orders, and credit payments (Hollywood Software, 2005). The company is a subsidiary of one of the largest server and d-cinema platform manufacturers in the market, Access Integrated Technologies (Access IT). AccessIT has bought and recommissioned all 28 installed d-cinema systems from Boeing Digital Cinema in 2004, placing itself in the “centre of the digital revolution” (Fuchs, 2004a). Their most recent development is the Theatre Command Console which supports multiple brands and models of d-cinema projectors and is operated through an easy-to-use graphic interface. The president and COO of the company, Dave Gajda has said:

The idea is to have fingertip access to and control of all critical d-cinema operations, including print-movements and pre-show content such as advertising and trailers. Whether on-site by the manager or directed remotely from the central home office, ..., operators can easily employ a single user interface to simplify training and flexibly integrate multiple technology solutions into a unified system. (Fuchs, 2004a)

>>>>>>> Take in Figure 1<<<<<<<<<<<

This gives rise to a tangible set of questions about training needs of staff and the transition to d-cinema. Slater (2002) has predicted that the new projection equipment will use built-in diagnostic software and straightforward test routines. As a consequence d-cinema projectors will be far easier to remotely control when connected via a cinema management system that both controls their inputs and outputs. AccessIT’s Theatre Command Console is therefore a predecessor to an era where it will be possible to look after hundreds of screens in the country from a single control room (a situation that already has come true for (UK broadcasting [Slater, 2004])). The simplicity of a graphical

interface and remote control dismisses concerns from exhibitors that new digital projectors will require advanced technical knowledge (McQuire, 2004) but could mean bleak prospects for some projector staff.

CONCLUSION

In this chapter we have tried to situate current developments in d-cinema within Christensen's framework of disruptive technologies. We have focused the attention on what we see as the major players in d-cinema, namely the major Hollywood studios and have tried to map the implications of d-cinema on the relationships within the film industry value chain. It was shown that the market for d-cinema exhibits network externalities and that therefore a common standard is desirable. The discussion on standards also revealed the conflicting interests a diversified and vertical integrated corporation such as Sony faces, as the competition in d-cinema becomes a "preliminary battle" for the CE market. As a major incumbent, Sony is able to delay the progress of the whole transition to d-cinema for its own benefit, a strategy worth examining more closely. We have also briefly outlined some of the complexities linked to organising a satisfying transition to d-cinema for all parties.

The emergence of new markets and new entrants into the d-cinema market was examined in respect to the implications for major players in the industry. Although d-cinema was found to benefit independent players that can carve out market niches, it was also shown that the majors have a strong leverage to exploit the technology to their advantage. However, the combination of a change in the terms of competition and a potential hold up problem, are likely to lead to a further diversification and possibly a further disintegration of major distributors. In addition we have discussed important issues associated with d-cinema, such as alternative content, training, and digital rights management. Further research is needed to explore strategies of new entrants and incumbents in this market, survey successful and unsuccessful business models, and discuss how the research on d-cinema can contribute to and be enriched by literature on strategic management and disruptive technologies. Interesting research questions are related to the performance of third party initiatives such as the UK Film Council's Screen Network (2005); the complexity of organising a transition to d-cinema for the mainstream market; and the role of diversified, vertically integrated corporations in the process of setting standards for d-cinema, branding for subsequent markets, and market fragmentation.

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Appendix 9: P4 Getting in and getting on in Hollywood: Freelance careers in an uncertain industry.

In Smith, C. and McKinlay, A. (eds.) *Creative Labour and the Labour Process*. London: Palgrave. (with Randle: 52 citations)

Abstract

This chapter explores issues in film industry related employment in the US, reporting on a study carried out between June 1999 and March 2002 around the themes of 'getting in, staying in and getting on' in the Hollywood (Los Angeles) visual media industries. The study set out to explore the experience of freelance workers within a sector changing rapidly at both a global and local level (Wasko, 1994) and is part of a wider comparative project concerned with similar issues in the UK."

1. Introduction

This chapter explores issues in film industry related employment in the US, reporting on a study carried out between June 1999 and March 2002 around the themes of 'getting in, staying in and getting on' in the Hollywood (Los Angeles) visual media industries. The study set out to explore the experience of freelance workers within a sector changing rapidly at both a global and local level (Wasko 1994) and is part of a wider comparative project concerned with similar issues in the UK.

The study reported here has grown out of earlier work concerned with the nature of employment and management in the UK film industry (Blair 2001, Blair, Grey and Randle 2001), with the relationship between the US and UK industries (Culkin and Kerrigan 1999, Blair and Rainnie 2000, Kerrigan 2000) and with a comparison between the industries in the two countries (Blair, Culkin and Randle 2003).

With a primary interest in film-related employment in the UK, the location decisions of US majors are of considerable importance. While some US film production does take place in the UK; Canada, Australia and Mexico have also been seen as benefiting from 'runaway' or 'offshore' production – the tendency for film-making traditionally carried out in Los Angeles to take place in other locations¹. Runaway production was a major issue for our interviewees and was felt by them to be affecting the ability of Los Angeles based film workers to find work, but it was also the case that other events outside of their control such as technological change, strikes (or threatened strikes) in sub-sectors of the industry, or the cataclysmic events of 9/11 could have serious effects on the availability of work. Against this background of uncertainty individual freelancers had adopted a range of strategies for finding work and making careers. Networking was a key strategy for all of our interviewees and the importance of contacts is revealed as paramount. When work is scarce the quality of these networks may determine whether a freelance career continues or ends.

We begin with an account of the importance of the entertainment industries to southern California, and film and television more specifically to Los Angeles and then consider some of the sources of uncertainty in those industries. Next we provide a brief note on the background to employment relations in film and television. This is followed by a description of the method the research team adopted in order to identify and contact freelance film industry workers in LA. A major section reports findings on how freelance workers experienced and were responding to change in the industry over the period of the study before we finally draw some conclusions.

2. The Hollywood Film Industry

The entertainment industry is crucial to the economy of southern California, growing by more than a third in the last decade of the 20th century (EEI, 2004) while film

¹ Essentially there are two forms of runaway production – 'creative', which departs because the story takes place in a setting that cannot be duplicated at home and 'economic' - in which the prime consideration is a lowering of production costs.

and television production in Los Angeles County alone accounts for more than a quarter of the total employed in entertainment (California LMI, 2005). When the multiplier effects² of payrolls and employment are taken into account, the film industry probably contributes more than US\$25 billion in payroll and nearly 295,000 jobs to the Los Angeles economy. With employment in aircraft, missiles and spacecraft falling (EDD, 2005) these industries are arguably now the dominant employers in LA.

Film production is labour intensive, with up to 85 per cent of the cost of production attributable to labour costs. This can be divided into above the line or 'talent' (40 per cent), below the line or 'crew' (33 per cent) and postproduction (12 per cent) costs (KPMG Peat Marwick 1988)³. Film production costs almost doubled in the decade to 2003. However, the total cost of delivering a film to the consumer, with marketing costs nearly tripling over the same period, has increased even more dramatically.

Entertainment industry statistics showing the number of days of location shooting in L.A. County reveal a shift away from film and towards television production (EIDC, 2005a; EIDC, 2005b; EIDC, 2005c). With the total number of production days rising by 60 per cent, a 55 per cent decline in film production between 1997 and 2003 is disguised. Television production, at the same time, has almost tripled, absorbing unemployed feature film workers and largely propelling the industry.

The entertainment industries in the US are characterised by a set of unusual features (Gray and Seeber 1996). Of particular importance in the context of this chapter is the fact that they have an exceptionally high level of unemployment and are dominated by casual employment on a project-by-project basis. One Californian study (EEI, 2004) found that the "jobs-to-workers" ratio, which indicates the number of jobs available for each worker, ranged from a low of 0.67 in 1993 to a high of 0.79 in 1997, where a ratio of less than 1 suggests that more than one worker is available for every job. This indicates that almost half of all entertainment workers relied on non-entertainment jobs for their primary income. The same study also found that in 2002 entertainment workers in production had an average of 2.3 employers and workers in production services 2.6, compared with 1.7 for workers who earned their primary income elsewhere. This underlines the highly uncertain and competitive environment in which entertainment workers operate.

3. Sources of uncertainty in the audio visual media industries

There is general agreement that during the 20th Century technological changes⁴ have comprised the single most important influence on employment and industrial

² A number of economic multipliers (a measure of the total economic impact of a particular industry) has been used for the film industry. It has been assumed to be between 1.6 (British Columbia Film Commission, 2001), 2.12 (Virginia Film Office, 1999) and to be 3.1 for wages and 3.6 for goods and services by the Monitor Company (DGA/SAG 1999).

³ These are average percentages. With some films featuring star actors or directors talent costs may well exceed 40 per cent, while on a high concept special effects film (e.g. Star Wars) the costs for postproduction and "crew" will make up the biggest part of the budget.

⁴ for example; cable TV, satellite technology, miniaturisation of equipment, home video and pay-per-view

relations in the electronic entertainment and media industries (Brown, 1996). We have considered the impact of this 'disruptive technology' elsewhere; at a global level (Randle and Culkin 2003, Culkin, Morawetz and Randle 2006); a UK national level (Randle and Culkin 2004); and at a UK regional level (Randle and Morawetz 2005). Digitisation has no doubt aided, and will continue to aid the rise of regional film production centres in North America and around the world forming a (qualified) challenge the Los Angeles film cluster (Lukinbeal, 2004; Scott 2005).

If Hollywood has historically been the first choice for the majority of US producers to make their movies, many other countries now offer aggressive competition seeking to attract US investment through a combination of tax breaks, active promotion of the country as a production location by government agencies, lower labour costs, reduced union influence and the weakness of their local currencies against the US dollar.

By far the most successful country following this strategy has been Canada⁵. Several US industry reports have been published, claiming very significant job losses to Canada (CTPFA 2004, FTAC 2004, DGA/SAG 1999, CEIDR 2002) as a result of runaway production. However, these suggestions are not undisputed as a report (Neil Craig Associates, 2004) produced for the Canadian Film and Television Production Association demonstrates. Canada has been mimicked in its approach to targeting US production by a string of nations spanning Europe to Australasia and South Africa. As the Hollywood Majors are spending more money on fewer films (Variety, Sep. 5, 2004) this translates to more competition by locations for projects, hence the targeting of capital by competing nations has become more aggressive. These nations may, however, find themselves engaged in a 'race to the bottom' as they are forced into continually increasing their financial incentives in order not to lose production to other locations.

Moving production out of the country, however, is not without its drawbacks, as one director notes:

"Depth is a big problem even in Toronto. Let's say you only bring the stars, so you need a supporting actress in her late 30s - but anyone who's got the goods has already gravitated to L.A. It's even more of a problem in a place like Halifax because then it's as if you're casting community theater."
(*Variety* Sept 5 2004)

Locations outside of LA may thus lack the critical mass of talent which means that their financial attractiveness is moderated by the absence of appropriately qualified and skilled actors or crew members. A critical question for the Los Angeles industry is to what extent can other countries replicate the dense network of workers that a location such as LA offers? When production and post-production tasks are multiple but disintegrated, and assembled through dense networks of subcontractor relationships, then locations that possess such dense networks are necessarily limited, and cost alone for discreet functions, such as post-production work, may not offer the competitive features of the Hollywood cluster.

⁵ for a detailed analysis of the Vancouver film industry see Coe, 2000 and Coe, 2001

One argument sees the future of the Hollywood industry as comprising mainly non-production jobs, with Los Angeles remaining as a centre for the industry's dealmaking, financing and advertising (*Variety*, Sept 2 2003). The pronouncements of Askoy and Robins (1992) and Hozic (2001) to the effect that Hollywood is now effectively 'footloose', are however, challenged by Scott (2005:56) who argues that these are "both exaggerated and premature". To put the impact into context Scott maintains;

"So far, runaway production has not seriously undermined the vitality of the Hollywood film industry, and it may never become life-threatening, at least in the more creative segments of the industry" (2005:55)

Scott's comments suggest that the degree of embeddedness of the Los Angeles industry is high and the long term impact of producers location decisions will be mediated by the fact that there are few places in the world where a critical mass of talent is so tightly clustered. However, he is also suggesting that for below the line workers the future may not be quite so assured.

This brief review of the context in which freelance workers in the Hollywood industry operate suggests that there are a variety of factors impacting upon the ability to find work in Los Angeles. The number of movies being made, the impact of new digital technologies and the location decisions of the major studios are crucial in the medium to long term and as later sections will demonstrate, less predictable events can have sudden and dramatic effects on the opportunity to work. Against this background workers have varying degrees of attractiveness to employers, some are more highly skilled than others and/or have worked for them previously and are thus a known quantity. Finally, we will suggest, some workers have more developed networks of contacts than others and in an environment of declining work opportunities this may prove crucial to survival in the industry.

4. Employment Relations in the US Media Industries

The US entertainment industry as a whole is highly unionised, although patterns of unionisation are changing as above the line unions have been growing while below the line membership has fallen. This latter tendency is accounted for by both technological change and moves towards non-union production in some sectors (Gray and Seeber 1996). Christopherson (1996) has described the current organisation of production in the motion picture industry as more integrated in terms of distribution and production than at any time since the studio system dominated US film making in the 1930s. However, this growing integration has been achieved through a flexible subcontracted network system ("virtual integration") which developed during the 1970s, rather than by re-adopting an in-house form of production. In taking this approach major distributors use contract and investment to integrate the various functions involved in the production of entertainment products, rather than ownership and employment of personnel. The resulting structural workforce flexibility, it has been claimed, has significantly contributed to the success of the entertainment industry in California (EEI, 2004). In an industry that continues to experience cyclical trends, project based (un)employment has become a fact of life for the entertainment workforce.

This system, while offering some economic advantages for employers, has not been without its drawbacks for them and as the new structures developed during the 1970s negative implications became apparent in the form of a loss of control over the maintenance of a skilled labour force. Furthermore, the unions were strengthened when they stepped in to fulfill roles previously played by the employer and to negotiate around issues far wider than simple rates for the job. They were involved in the development of a roster system which had the twin functions of maintaining lines of seniority and certifying skill and experience, the creation and operation of a health and pension scheme (The Motion Picture Health and Welfare Fund) into which employers paid on the basis of employee on a union contract, and a 'royalty' scheme connected to the outputs of production (Christopherson 1996).

During the 1950s the roster system⁶ was supported by the major studios, as it served as a certification and screening device for labour while allowing them to shed overhead. The system allowed craft unions to control labour supply and maintain seniority rights. However, the 'vertical disintegration' which characterised the period following the decline of the vertically integrated studio period of the 1930s and 1940s, meant that skills had to be acquired over an extended period of intermittent project work, rather than through continuous employment in a studio. While craft unions were able to control the supply of labour through this process, those undertaking apprenticeships were subject to greater hardship and eventually the frustration of those seeking to enter the industry, employer objections to union control over labour supply and new production technologies led to the development of initial training programmes which have become the preserve of the film and television schools (Christopherson 1996).

As a result of these changes in the ways skills were acquired, over time the heterogeneity of the workforce increased and the culture of production within the industry began to change. During the 1990s and related to these changes the unions began to lose members as non-union films were made, production fled to other parts of the world and concessions were made to what were seen as wealthy and even greedy studios (Wasko 1995)

While union membership is still seen as a goal for many entrants, bringing as it does health and social security benefits and signalling a degree of experience across the industry, the extent of change in the industry [see Christopherson 1996 for a full account] has meant declining control and influence for the unions. With employers increasingly offering only 'flexible working' [fixed term, freelance contracts] and unions unable to wield their former, quite significant power in placing film workers in employment, freelance workers are increasingly having to rely on developing their own strategies for acquiring skills, finding work and making careers in the industry.

⁶ Under the system the studios and independent producers sign contracts with the unions whose members are on rosters based on the amount of seniority they have acquired across the industry as a whole. This serves as a certification and screening device. Employers looking for labour would consequently approach the union who would seek to ensure that available work was spread evenly amongst its members. Thus the union was afforded a degree of control over who worked on what production.

5. Research Method

The recruitment of participants for any longitudinal survey is problematic, with design issues such as the creation of a representative sample identified as a key problem (McDonald and King, 1996). Nevertheless, while more complex to design than their cross-sectional counterparts, they still need to strive to construct a sample that can reflect the population it seeks to represent. However, when we are faced with a population, which is difficult to accurately define and access, our view on what value we should place on the pursuit of representativeness needs reassessing.

We decided to employ a panel study, a form of a longitudinal study involving a set of base measures followed by a succession of follow-up interviews (Oppenheim, 1992). For this study the base measures included; educational and family background, routes of entry, work patterns to date and union membership status. Freelance workers represent a particularly disparate group, giving rise to difficulties in identifying suitable subjects and gaining their cooperation. Participants were contacted via email, based on a searchable database (<http://www.crewnet.com>). Since email penetration in the US was high in 1999, especially in California and in the media industries in general, we suggest that this represents both an innovative and effective method for collecting data relevant to our subject group. The degree of accessibility we encountered may well be linked to the position of freelance workers in the labour market. It was our experience that film workers invariably had several email accounts, a pager, mobile and landline telephones and a fax number. Contact information was made readily available on Crewnet, which appears to us related to the need for workers operating within the freelance industry to be easily contactable at all times.

The existence of the database is itself an indicator of the pressure on individuals to raise their personal profiles. The résumés held on the database gave names, postal and email addresses, fax and pager numbers as well as brief details of educational/training background and recent productions that the individual had worked on.

Several occupations key to the production phase were targeted and, randomly selected, individuals in the LA area were contacted, via email, and invited to take part in the study. This approach secured a good response, with 25 per cent of the 180 contacted agreeing to take part in the interview programme. The next step involved plotting the addresses of those who had indicated willingness to take part in the study on a detailed street map of Los Angeles. By far the majority were based in the West Los Angeles area and most of these in the West Hollywood district. In the event it was possible on the first visit to arrange in depth, semi-structured interviews with twenty three individuals in both above and below the line occupations as well as a number of representatives of IATSE (International Association of Theatre and Screen Employees) affiliated unions.

Although the research team offered to travel to meet the film workers on their own ground, all but one were prepared to come to us. This prompts the question of why freelance workers were willing to travel at their expense and in their own time to take part in an academic study. The issue was raised with several of the interviewees and drew

two broad responses. The first was related to a desire to ‘pay one’s dues’ – a recognition that a willingness to give something back to others involved in industry related activity was to the mutual benefit of all. The second response was concerned with the potential benefits that might accrue from the encounter in terms of contacts or information. Both responses can be seen as a comment on the nature of freelance work in the US film industry as a highly relational activity, which is further borne out by the empirical material examined in later sections of the chapter.

This methodology may also raise further questions concerning bias in the sample of interviewees. For example are individuals who choose to put their resumes on Crewnet likely to represent a less successful group who need to take every opportunity to raise their profile? Furthermore, are those with the time and inclination to travel to meet academic researchers likely to represent a group at a stage where every tenuous contact needs to be explored in case it constitutes an opportunity? If so, it could be argued that findings which appeared to demonstrate difficulties in obtaining work might be more closely related to the marginality of the subject, rather than, for example, the economic environment.

In the event the profile of respondents, while not including any Oscar nominees, did include people with over 30 years of experience and some who had earned six figure salaries over a relatively lengthy period. The inclusion of the resumes, on Crewnet, of established and successful freelancers, was an early indication of the need for film workers to make use of every available opportunity for self-marketing. However few, if any, respondents were able to report any tangible benefit from the presence of their resume on the database and none had directly gained paid employment from it. While we cannot claim this to be any more than speculation, we believe that given the networked nature of employment-seeking in the industry such open and non-relational forms of information are of limited value in finding employment.

A further arguable shortcoming of the study in its first phase was the relative shortage of respondents representing craft occupations especially those in the lighting and camera departments (grip, gaffer, best boy, clapper loader, focus puller). As these are members of the larger departments within a production crew their absence may have proven significant. Firstly, it may be that camera crew tend to gain jobs as a coherent team and form what Blair (2001) refers to as a ‘semi-permanent group’. Secondly, a lack of response from these occupations might indicate that they are less affected by variable demand, are more consistently in work and consequently are less available for interview. We were subsequently able to remedy this by using a ‘snowballing’ technique – asking interviewees to arrange for us to meet their own contacts in these occupations.

While the argument put forward in this chapter is qualified by the forgoing account, we nevertheless maintain that the study provides us with a valuable picture of the current issues associated with entering and finding continued employment in what has become a largely freelance industry.

6. Employee Strategies in a Climate of Uncertainty

In this section we explore some of the circumstances surrounding entry into the industry, the conditions under which freelance employees are expected to work, and the strategies they use to find work and to develop careers in film and television. Getting into the industry can take place through one of several routes. Full-time positions are generally restricted to specialised suppliers and services directly related to production such as laboratories, locations services, prop and wardrobe houses and film stock houses. In the Hollywood industry, however, virtually all positions in film production itself are now freelance. One author advising newcomers on getting into the film industry, lists amongst the advantages of freelance work 'the opportunities to choose your own job' and 'to work when you want to'. In short he continues 'being a freelancer gives you a level of freedom that you can't have when you're committed to a full-time job' (McHugh 1999: 8). Evidence from the freelance workers interviewed as part of this study suggests that, in practice, such freedom is largely negated by the difficulties experienced in finding work.

A text aimed at those aspiring to enter the US entertainment business emphasises that while an element of luck and access to a mentor may be important, 'networking' is central to achieving a successful career (Tepper 1999). This appears to be widely acknowledged both within the industry and amongst academic observers of the industry. Our interview subjects acknowledged the centrality of their networks to their ability to find work;

...if I'm looking for work there's five people I call and if those people don't know someone who knows something, then I'm in trouble... (Matt, First AD)

A wide range of personal networking strategies were reported. Examples, however, include; always having resumes at hand and keeping them up to date, or ringing up contacts from the set when in work, rather than waiting to be out of work. This latter strategy can be seen as a way of, demonstrating one's desirability as an employee, indicating usefulness as a contact who may have 'inside' information and avoiding being seen as over instrumental ('[s]he only rings when [s]he wants something').

The importance of networking is such that it cannot be abstracted from the production task and maintaining one's network and seeking work becomes a central part of the job. The following respondent felt it **was** the job;

...finding and negotiating work is the hardest part. Doing the work is the fun. Finding the work is the job. (Margery, script supervisor)

Despite intensifying competition for jobs as a result of the changing production environment, there was some evidence from the study of increased collaboration between individuals in seeking and securing work. For example in the case of script supervisors, who tend to work individually, there being normally only one attached to each production, union meetings were seen as an important opportunity for networking and information exchange. One script supervisor described how she shared a subscription

to one of the job information services available with two other young women in the same occupation, although they could be in competition for the same vacancies.

6.i Working for free

Those taking part in the study worked in a range of different media industries; independent and feature film, commercials, music video and television. The routes interviewees had taken into the business were equally diverse and are not explored in detail in this chapter however, no-one had simply fallen or drifted into the business. A strong motivation to make a career in the entertainment industry appears to be a pre-condition and is essential in order to overcome the high barriers to entry.

An unusual feature of the entertainment industry is that individuals are frequently expected to work without payment in the early stages of their careers (although this can also be a feature of 'getting on' and changing roles further into a career. We return to this in a later section). Many of our panel reported having spent some time working for free or for 'deferred payment' (a share of the profits if the film makes money). Additionally whole crews are often 'hired' for free on, for example, low-budget independent productions. While such a crew is likely to consist largely of aspirant entrants it is the case that more experienced crew members might from time to time agree to work in this way. This might happen if, for example, they are not currently in work and the production represents an opportunity to network with new talent or if they want to move on to a new role and a director is willing to allow them to operate, for example, as a Director of Photography rather than Camera Operator. From time to time working for free might constitute a favour for a friend or contact working on a low or no budget production. A Director of Photography on music videos describes a dilemma:

...one director I've worked with, he financed his own little DV film... I don't know how it turned out. I was supposed to shoot it for him, but at the last minute I got a couple of jobs in a row. So it was like 'sorry'. But it was going to be a kind of freebie for him. I can't do that if I get a job. You help out as much as you can, but if you get paying jobs that's kind of a little bit more important. So I had to pull away from him... and I haven't talked to him since. What do you do?... (William, DOP)

However, those in work were conscious of the growing pool of aspirant film workers seeking entry into the industry, many coming through the film school route, who were prepared to work long hours for free or for 'copy and credit'⁷. A young script supervisor felt that there were many unscrupulous producers who were prepared to take advantage of this situation:

⁷ This refers to the practice of providing individuals who have worked on a production with a video copy of the product, and of formally acknowledging their contribution. Credits are an important legal requirement in establishing entitlement to a share of any profits that might be made by the film where there is an agreement for deferred payment. They are similarly required in order to be entitled to 'residuals' (residual or supplemental payments) – income generated when a work is reissued in another medium (eg 35mm film to video or to television)

...I've only been here for about six months and I've only worked on one feature... The work is free and that's just the way it is, if you don't have a lot of experience, you have to work for free a lot. And I've attached myself to a bunch of different projects that never came to fruition and it's just a lot of talk, a lot of producers just lying, basically it's just flat out lying, saying 'oh, we're going to get this movie rolling in about a month here, we'll keep in touch with you, you know, It's all free work, and I can only work for free so much, yes, so it's hard in the very beginning... (Andre, script supervisor)

Internships are quite a common entry route to the industry, generally through one of the film schools, and take the form of a short unpaid apprenticeship. The purpose is to gain practical film making skills. There seems to be a general recognition that skills are learned 'on the job' and that the formal training of a film school education does not equip graduates to work in the industry.

Others had begun by working, again often voluntarily for film-related businesses such as the camera rental houses as a way of learning about the equipment and making contacts in the production sector itself;

...what I did was I went to all the rental houses here in Hollywood and volunteered my time, which is the great secret by the way... for people who want to get into the film business ... and I was lucky, I hooked up with some very nice people who I still know over at the rental house... (Robin Camera Operator)

It would be difficult to provide concrete evidence that working for free is on the increase specifically as a result of pressures on the industry through, for example, runaway production. It is probably true to say that the advent of working without pay is closely related to structural changes in the industry that came about as a result of the 'virtual integration' of the 1970s. As apprenticeship schemes sponsored by the studios declined and film schools became the key source of training, gaining practical experience became an individual responsibility. Combined with this the development of the low budget independent production may provide opportunities to work for free. Having said this, where work is scarce for whatever reason, freelancers may be prompted to work for free as a networking strategy:

...you do it for free just to meet people, which is what a lot of people do, and I've actually... I've thought about it when it gets lean, you know, its like, well maybe I should, just to get on the set and see people and make some new connections... (Tudor)

6.ii. Family support

In many cases, those we spoke to indicated that sporadic work in the industry would be supplemented, or even sponsored by, other forms of part-time work either in parallel or between unpaid jobs. In practice it seems unlikely that any form of regular part-time work would be possible while working in the industry given the long and

irregular hours worked by crews in production. For the majority of those taking on casual employment outside of the industry this was likely to consist of bar or restaurant work which could be dropped quickly, and where another job was relatively easy to find later once the production was over.

Several of our sample, however, had access to family support, suggesting that individuals from wealthier backgrounds might be better able to sustain themselves through periods of unpaid or very low paid work;

...I have also been very lucky to have a mother and father that helped support a career in the film business. And I do have friends that are in the same boat. And its one of the things that unfortunately is really necessary... some way to finance the time that you have here...because you're either going to be working for free to get experience, or your going to be working for some pay, some free... or you're going to... the bottom line is... going to drop out...

The following interviewee was fortunate to be able to supplement his earned income from film work with unearned income from investments;

...I'm gonna give it five to ten years... it's called paying my dues... and coming from a business family, I never like having all my eggs in one basket. I've invested a lot in the stock market. I've done things so I have a certain little income ... (Keith, Director of Photography)

In some cases support from the family might involve direct handouts, though in others access to other forms of paid work might be critical. In one case a young script supervisor, who claimed she had rejected financial support from her family, talked of having supported herself with a part-time job. When questioned about how she accommodated this work with the varying demands of film work she explained that her job was with a relatives company who accepted that if script supervision work had become available it would take priority.

An Independent Film Director at an early stage in his career, who was heavily involved in producing 'ethical' commercials, was able to gain financial backing for his current project partly as a result of having family contacts outside of the film industry:

... to be honest with you... I'm starting this one up because I have some investors in Beverley Hills and in New York that are going to help me outmy dad's, sort of, business associates ... (Chris, Independent Film Director)

There seems little doubt that parental influence has always been an important factor in entering film careers, perhaps most obviously in the number of actors and actresses who have mothers and/or fathers in the same occupation. The precise dynamics of this process are beyond the scope of this chapter but we can speculate that this is likely to consist of some combination of the availability of role models, of being brought up within a network of parental contacts and a movie making culture and of

location. That this extends beyond the above the line occupations is indicated by the comment of an expatriate British camera operator who referred to the 'three generation camera dynasties' that existed in LA. Perhaps what is changing is the importance of direct parental support to bolster aspiring entrants through the lean times early in a career. If a previous generation of entrants were disadvantaged by a lack of family background in the industry to help ease them into a job with a studio, the new generation have the double disadvantage that even if an opportunity to work on a movie presents itself they may not have the financial support to carry them through the early days of working for free.

6.iii 'Getting on' in the industry

Even those who had got into the industry and begun to make a living, receiving paychecks on a fairly regular basis, may be forced back into working for free in order to 'get on', that is, to move up to a higher level occupation. An aspirant Director comments;

... I've been [working] 'union' as an actor for a long time, but I'm kinda starting all over again as a Director, where I'm working for credits, and I'm working for free practically. I've only been paid on a couple of jobs recently... and in a production role... (Tony, Actor/Second Assistant Director)

Once again the pattern seems to be that in order to acquire a reputation as a trustworthy crew member in a new role, skills have to be acquired on the job by working for a low rate or for free. This might require the individual to go back to working in low budget/independent movies where in addition to gaining experience he/she can also make a new range of contacts and join new networks. This suggests that on the more speculative projects, where the financial risk is greater we might expect to find more labour working for free. A camera assistant explained it:

... I moved up from Second Assistant to First Assistant, it's the same thing so what you end up doing is going back down to the bottom of the budget range and you work with people... and you try to find people who you think are moving up themselves... (Robin, Camera Operator)

The problem for those wishing to make a career move from say, clapper loader or focus puller to camera operator, is that within the networks an individual will be known by his/her current role and work will come forward on that basis. Avoiding being 'pigeon-holed' therefore means having to refuse work in that area and going through what the following respondent referred to as a 'starvation period';

...you're working as an electrician or best boy electric, in lighting, and people are starting to like you and you're making money, but you wanna be a DP, so still you're shooting this project on the side, and the problem is, the more you work as an electrician or best boy, electric, or Gaffer that's what anybody who meets you is gonna remember you as, that position, so after a while you have to say, 'you know what, I wanna be a DP', so then you make that leap, I'm only doing DP, so there's this

starvation period, you know, where you're shooting things and not getting paid, but you wanna just be a DP, and if you can last that some people think of you as the DP... so you get to the point where you're making money doing it, that's when you've made it. I happen to be in a starvation period... (Keith, Director of Photography)

The implication of a 'starvation period' is that in the industry there is a degree of separation between jobs and that the idea of a career of continuous steps between inter-related activities, as might be characterised by the internal labour markets of corporate institutions, does not fit. There are clear breaks between jobs which require aspirants to go back to square one and acquire training, experience and contacts often by working once more for free. At the same time there is an understanding by respondents that learning for new jobs is nevertheless reasonably structured, and that this represents a temporary period of job transition.

7. Experiencing Uncertainty

7.1 The impact of runaway production

In the past, as production moved to other states within the US, Los Angeles based workers could travel from project to project. However, under Canadian Immigration and union rules the only foreign occupations allowed to work in the country are above the line; directors, producers and stars. Consequently, above the line occupations have been employed to manage Canadian, below the line, crew during the principal photography (filming) stage. A young Independent Film Director referred to a meeting with representatives from a Canadian Film Commission;

... they were like, slick, they were like serving everyone coffee, and you know, I expected a foot rub or something, that's how much they were kissing your ass. It was great... but what they're doing is they come down here and they tell, like, independent producers like myself, they say 'hey, if you bring your film up here we're going to give you tax breaks, you know, they offering me free location and a tax break... and they were going to match funds for my film.... (Sean, Independent Film Director)

Interviewees were asked what proportion of the previous year they had spent in work, was it for example 50 per cent in work 50 per cent looking for work? A line producer felt that this was an over estimate;

...it's more than that, it's probably 60:40 or maybe even 65:35 looking for work more than working, it really is... (Todd, Line Producer [13])

While the above ratio seems fairly typical, a number of (below the line) interviewees stated that they and their peer group worked less during this year than in previous years. In the 2002 interview round, Adam, a sound recordist stated that in the 20 months since his last interview out of around 600 possible working days he had worked on ‘...probably 100 of them..’.

This supports the contention (LA Weekly 13.4.99) that it is ‘working class Hollywood’ (the film crews and support services such as equipment rental and catering) that is being hit disproportionately by reductions in employment opportunities. A camera operator commented:

...Definitely the big thing that you’ve seen... I’ve seen it in the last couple of years... is this huge and increasing divide between the fortunes of people who are in the executive part of this industry and people who are in production. When I first got to this town this was basically where the executive and management side of the business was, and this was also the centre of production... and that is shifting. I mean, there is pain at all levels, but the real pain is on the production end...

And a young first Assistant Director was having second thoughts about staying in the business:

...I’m recently thinking about... ‘do I wanna live my life like this?’ as I’ve watched the industry decline over the last three years... everyone I know is making less money now than they were two years ago, everyone I know is having trouble finding good work, everyone I know is complaining that the jobs have gone to Canada... (Matt, First AD)

A Director of Photography with nearly forty years experience in the industry, interviewed as the start of this study in 2000, commented that the shift to Canada was:

... terrible, it’s absolutely devastating, it has completely removed the possibility for me to work in American pictures for the last year and a half or thereabouts.....it’s so horribly impacted now that the really good guys and women that do what I do, they’re out on the street looking, having a hard time getting jobs.....it’s because of this migration to Canada and other foreign places so.... and it’s built up a lot of resentment to widen the gap between producers and below the line... (Peter, DOP)

The final sentence is a suggestion that the beneficiaries of runaway production are the production companies and a layer of the ‘above the line’ creatives. The evidence here is from a well-established head of camera department with many years experience and a successful career behind him, who seems to be suggesting that the migration of work is something that had begun to impact on him over the previous eighteen months.

A Wardrobe Supervisor with 32 years in the industry had been very vocal in her opposition to runaway production during a first interview in 2000 and was actively

involved in the IATSE campaign to promote 'countervailing tariffs' for US producers taking production out of the country. She felt the migration of work had a major impact on jobs in her trade:

...My union used to top out at 1,000 people, now its 1800 people, probably of that 1800 800 do what I do, so there have to be 800 jobs for us, and there aren't...and there probably never will be again, because of this runaway...

Asked for her assessment of runaway production two years on she replied:

...I notice it more now, but it doesn't affect me as much. It happens... so the anger that was coming out a couple of years ago has died down quite a bit ...

She continued, talking about runaway production to Australia and New Zealand;

... they have enough crafts people in New Zealand and Australia to do 2 or 3 huge pictures a year, but they can't support an entire industry, a national industry and that's what they're finding in Canada...

and went on to say that that when production reports come out they often showed TV pilot shows being produced in Canadian cities but that many subsequently returned to LA;

...Talking to producers who go up there all the time, they are doing an extra day of production because unless you get one of the to three crews in Vancouver or Toronto, maybe five in Toronto, they're still grabbing high school kids for the bottom of those crews. There's so much production they don't have the trained people ...

There were frequent comments on the availability of appropriately experienced and qualified crew in Canada and others which suggested that the impact of an influx of production into the country had been to make crew there unwilling to tolerate the terms and conditions accepted as normal by the Hollywood crews.

7.ii Strikes and 9/11

Despite concerns about runaway production, it was clear that this was not the only environmental factor affecting the ability of our panel to find work. Robin, a camera operator who was trying to break into a Director of Photography role, speaking in March 2002 talked about his previous year's work:

...I started getting some really good jobs as an operator (camera operator). Most of last year, 2001 was really taken up with that. I ended up, let's see, I did B camera on Planet of the Apes and then I did some stuff that was actually assisting, but I did another big chunk on Training Day..... Most of last year, in fact all of last year was operating.....that took me through I guess about to the end of summer 2001 and then

everything closed down and I've been out of work for about seven months now... (Robin, Camera Operator)

What do you think caused the drop off?

Two things..... I worked virtually solidly, as did everybody else in this town for six months between the beginning of 2001 and June, because everybody was rushing everything they could find into production because... they were worried about the SAG strike..... we all knew there was going to be a fall-off after that...and there was, basically it stopped... nothing new was being green lit... they had actually co-ordinated everything, so that everything was wrapped before June.

He continued;

...then 9/11 happened, and everybody went into this collective frenzy about "oh my God, is the public going to accept what we've put out, is everybody going to reject buying movies or are people going to require completely different kinds of movies, and there was this kind of... you had to be here... total collective angst....

These patterns were confirmed by other panel members. The SAG (Screen Actors Guild) commercial strike⁸ had caused a drop off in work for many with no involvement in the making of commercials whatsoever. There was a belief that as commercial work dried up the most experienced and most well connected found work in other sectors and the shake down effect pushed the less experienced and less well connected to the margins of the industry. This worked in the opposite direction as the threat of an across the board SAG and WG (Writers Guild) strike loomed towards the summer of 2001. Studios strove to get as much production 'in the can' as possible before the onset of the strike. This opened up opportunities for crew to work more or less continuously and for some to break into the higher roles they aspired to.

However, the events of September 11 2001 were to have the effect of virtually closing down the industry. Several reasons have been put forward as to why this happened; studios became anxious about the sensitivity of audiences to the messages and images contained in their output; both restrictions on flying and a fear of flying constrained business activity and investors became more cautious about committing capital to high risk projects. Virtually all of our panel of interviewees commented on the impact of 9/11, from increased security on the lots where they worked which slowed down production activity, to the absence of opportunities for employment.

⁸ A strike by members of the Screen Actors Guild working in advertisements over residuals (royalties). This was seen as a key issue in determining compensation in the sector. A central part of the case for SAG members is that the more frequently an advertisement is shown or the more widely [for example when it moves to another technology platform] the greater the degree of 'typecasting' of the actor. This might mean that the association of the actor with a particular product cannot be overcome so easily and the degree of exposure makes it more difficult for him/her to find follow on work.

7. Conclusions

This chapter has demonstrated the importance for the freelance entertainment worker of creating, maintaining and extending a network of contacts in order to maximise the opportunities to work. This is to a greater extent (though notwithstanding the fact that some are born into networks) within her/his control. Furthermore, we have seen that a range of factors outside of the control of the individual freelance worker in the entertainment industries can have a very significant impact on his/her ability to find work at any given time.

In Los Angeles a number of factors are combining to impact upon the nature of, and prospects for, work in the US (West Coast) industry. While technological changes are having some impact on the way the industry is structured, and may prove significant in the longer term, of more immediate significance is the tendency for production to 'runaway' from the US to locations where state incentives, lack of union organisation, lower wage rates and weaker local currencies are having the effect of cutting costs, sometimes considerably.

There is considerable debate about the precise extent to which runaway production is impacting on jobs in Hollywood and whether this represents a permanent and critical movement. Both the literature and interviewees refer to productions, for example TV series, which have runaway only to return for a variety of reasons, not least because of a shortage of sufficiently experienced and talented labour. Nevertheless runaway production has clearly been felt by our interviewees to be in large part responsible for what they currently see as a tightening of the jobs market. Consequently, while Scott's (2005) prediction that runaway production may never threaten the life of creative above-the-line Hollywood may hold out, its impact on increasing the work uncertainty of below-the-line 'working class Hollywood' seems less questionable.

Respondents in this study were, then, highly aware of the continuing local problem of runaway production and the impact of changing technologies but also raised the more immediate impact of strikes (or even anticipated strikes), or unanticipated events such as 9/11 on the jobs market within the sector. In the case of the newer entrants to the industry there is little direct previous experience with which to compare their current experiences. 'Getting in' remained a matter of, perseverance, active networking, family background and support and last but probably not least, luck.

Established freelance film employees, however, were experiencing difficulty in maintaining previous levels of employment and were able to broadly quantify the decline in paid work. In terms of 'getting on' in the industry, previously established freelancers reported that making career advances, in effect, meant going through a 'starvation period' during which they may be obliged to work for free, or for 'copy and credit' once more, often in the independent or low budget sector, before building up a resume and profile which would allow access to the better paid, generally unionised, work with the majors on feature productions. This repeated process which may be experienced as stressful and uncomfortable by freelancers and which will have a formative influence on the quality and character of their non-work lives may nevertheless present itself as a

rational strategy for employers in a project based industry characterised by a large surplus army of willing labour.

The long run effect of vertical disintegration of the film business and its replacement by a virtually integrated industry has been to intensify insecurity for those employed on a freelance basis and this has a major impact on the way that employment is experienced and the ways that lives are lived. As Baines (1999:21, paraphrasing Mariussen and Wheelock 1997) points out:

“...when large corporations have delegated risk further down the line, to subcontractors, to smaller firms, to a more flexible workforce, and to the self-employed, the overall result has been to transfer a business risk onto the household.”

The reality of freelance work is demonstrated by our panel. Leisure becomes work as ‘seeing friends’ means looking for job opportunities; the family becomes a source of continuing financial support, well beyond the years of higher education, as periods outside of paid employment mean falling back on parents; children become an unsupportable burden as periods in work mean long hours, and periods outside of work mean living on reduced streams of income; training to acquire the skills to work and to move on in a rapidly changing industry becomes the responsibility of the individual, to be gained more formally during periods out of work or on the job by working for free on low or no-budget productions.

Freelance working in the US entertainment industries provides a graphic picture of the insecurity and uncertainty of project based employment in the creative industries. Nevertheless, this is a ‘structured uncertainty’ where these features of the industries are well known, understood and to a great extent accepted as a fact of occupational life. If jobs in the creative industries are seen as replacing more traditional industries and freelance working replaces more permanent modes of employment, then increasing numbers of workers may well find themselves shouldering the burden of delegated risk against such a background of structured uncertainty.

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Appendix 10: P5 Facing the digital future: Digital Technology and the Film Industry.

Industry report commissioned by the East of England Development Agency. (with Morawetz: 7 citations)

As indicated in the Table of Contents, this Report is held in a separate document, with the title, "P5 Facing the digital future: Digital Technology and the Film Industry 2007."

Appendix 11: P6 An Emotional Business: A Guide to Understanding the Motivations of Small Business Decision Makers’.

Qualitative Market Research: An International Journal 3(4). pp 145-157. (with Smith: 216 citations)

Abstract

This paper argues that the way in which the UK Government, operating through various departments and quangos, approaches policy implementation designed to improve the effectiveness of the small business sector, is based on a flawed understanding of how small businesses actually operate. This naïve, over-simplistic understanding of the motivation of those in the small business sector means that many government interventions that are made, are blunt instruments destined to fail, given the limited understanding shown of the complexity of the small business market.

Introduction

This paper is in four parts. First we discuss the basis for government definitions of the small firm and its market. We then move to argue that much UK government intervention (especially at the information provision level), designed to help improve the effectiveness of the small firm sector, is based on a flawed understanding of how small firms actually operate. We then move to describing how this naive, over-simplistic understanding of the motivation of those in the small firm sector means that many interventions are inevitably blunt instruments destined to fail, given the limited understanding shown of the complexity of the small firm market (Bennett and Robson, 1998; Keeble, 1994; May and McHugh, 1991; North and Smallbone, 1995; Storey, 1994). Finally, we offer recommendations for improving the interventionist process, based on leading edge qualitative research (Martin and Turner, 1986).

Two key pointers are embedded within the various parts of this paper. These are based on findings from two recent studies among small firms; a series of large-scale qualitative studies undertaken for a blue chip company and a mixed study on the Business Link network. First, the authors will demonstrate the way in which leading edge qualitative research is able to burst the myth that small businesses are simply scaled down versions of large enterprises. Second, we will indicate how such research is able to capture the emotion, ambiguity and complexity that characterises this market (Stacey, 1995; 1996; Aram and Noble, 1998; Dexter and Smith, 1991) - features which quantitative approaches alone (and any intervention based on their findings) struggle to accommodate.

These observations will be helpful to those - both in commercial organisations and government departments and quangos - interested in making effective interventions in the small firm market (Payne and Skelcher, 1997; Stanworth and Stanworth, 1990).

Defining the small firm market

In 1970 the government of the day formed the Bolton Committee, with the objective of examining the role of the small firm in the UK economy. This committee was established despite a generally held view that, as a contributory factor, the small firm was of little significance in determining the nation's standing on the world economy (GLC, 1983; O'Farrall, 1988; Rainnie, 1991). While the committee did not suggest that the small firm was otherwise, the findings did raise the question, "what then is the role of the small firm?"

On a wider scale, through analyzing international trends in small firm activity Bolton established one fact in particular. The rate of market share (in terms of economic activity) of the small firm was in steeper and faster decline in the UK than in other developed economies:

We believe that the health of the economy requires the birth of new enterprises in substantial numbers and the growth of some to a position from which they are able to challenge and supplant the existing leaders of industry. We fear that an economy totally dominated by large firms could not for long avoid ossification and decay . . . This "seedbed" function, therefore, appears to be a vital contribution of the small firms sector to the long-run health of the economy. We cannot assume that the ordinary working of market forces will necessarily preserve a small firm sector large enough to perform this function in the future.

(Bolton, 1971)

Ever since Bolton's findings were reported political parties, academics, trade bodies and lobbyists have argued over the importance of the sector. However, social scientists (in particular)

have tended to concentrate on the macroeconomic side of the argument. For example, the impact of the small firm on employment levels (Storey et al., 1987; North and Smallbone, 1995), VAT receipts (Chittenden et al., 1996; Deverouz, 1991; Sandford et al., 1989), GDP and export levels (Kaufmann, 1995; Storey, 1982) which in turn are often linked directly to a specific public policy targeted at the small firm market. However, recent evidence (Hill and McGowan, 1999) does suggest that small firms and entrepreneurship do play a major role in the world economy (Timmons, 1994) and that they do constitute the bulk of enterprises in all economies in the world (Storey, 1994).

But, what do we actually mean when we refer to the small firm market?

Defining the small firm

There is no single definition of a small firm, due to the wide diversity of businesses. Perhaps the best description of a small firm remains that used by Bolton, which suggested that, a small firm is an independent business, managed by its owner or part owners and having a small market share. In turn, the Bolton Report adopted a number of different statistical definitions, intimating that size was relevant to sector. For example, a firm of a given size could be small in relation to one sector where the market is large and there are many competitors. Alternatively, a firm of similar proportions could be considered large in another sector with fewer (generally smaller firms) players.

In government the norm has been to measure size according to numbers of fulltime employees or their equivalent. Section 249 of the Companies Act of 1985 states that a company is "small" if it satisfies at least two of the criteria outlined in Table I.

For statistical purposes, the Department of Trade and Industry (DTI) usually works with the following definitions:

- . micro firm: 0-9 employees;
- . small firm: 0-49 employees (includes micro);
- . medium firm: 50-249 employees;
- . large firm: over 250 employees.

However, in practice, DTI products and services targeted at the sector adopt a plethora of working definitions depending on their own particular aims and objectives (Culkin, 1998). It is not difficult to see the potential ambiguity in which government both defines and measures the small firm.

Nor can the UK ignore the European dimension. In February 1996, the European Commission adopted a communication setting out a single definition for the SME (Table II). The Commission sought to apply this across all community programmes and proposals. The communication also included a (non-binding) recommendation to Member States, the European Investment Bank and the European Investment Fund encouraging them to adopt the same definitions for their programmes. The communication allowed members to use lower threshold figures, if they so wished. However, existing SME definitions in community programmes were allowed until 31 December 1997, after when the single definition came into force.

Table I UK definition of SMEs

| Criteria | Small firm | Medium firm |
|---------------|----------------------------|-----------------------------|
| Turnover | Not more than £2.8 million | Not more than £11.2 million |
| Balance sheet | Not more than £1.4 million | Not more than £5.6 million |
| Employees | Not more than 50 | Not more than 250 |

Table II EC SME definitions

| Criteria | Micro | Small | Medium |
|--|-------|-------|--------|
| Maximum number of employees | 10 | 50 | 250 |
| Maximum annual turnover | – | 7mecu | 40mecu |
| Maximum annual balance sheet total | – | 5mecu | 27mecu |
| Maximum percentage owned by one, or jointly by several, enterprise(s) not satisfying the same criteria | | 25.0 | 25.0 |

Note: To qualify as an SME, both the employee and the independence criteria must be satisfied and either the turnover or the balance sheet total criteria

The small firms in this research

The results are based on findings from two recent studies among small firms:

- (1) a series of large-scale qualitative studies undertaken for a blue chip company;
- (2) a mixed study on the government sponsored services.

The research for a major UK telecommunications plc included the running of eight focus groups with the owners of small firms right across the country, the target audience was segmented in terms of turnover (starting at c. £50,000 and rising to over £1 million). The mixed study involved users and non-users of government business services in Government Office Eastern Region (GOER). Two focus groups were run (one composed of eight owner/managers with no experience of government-sponsored services, and an identical group with direct (and recent) experience of government sponsored services); this was followed by a telephone survey of over 250 owner/managers. Interviews were spread over a three-month period and the structured interview lasted on average 15 minutes.

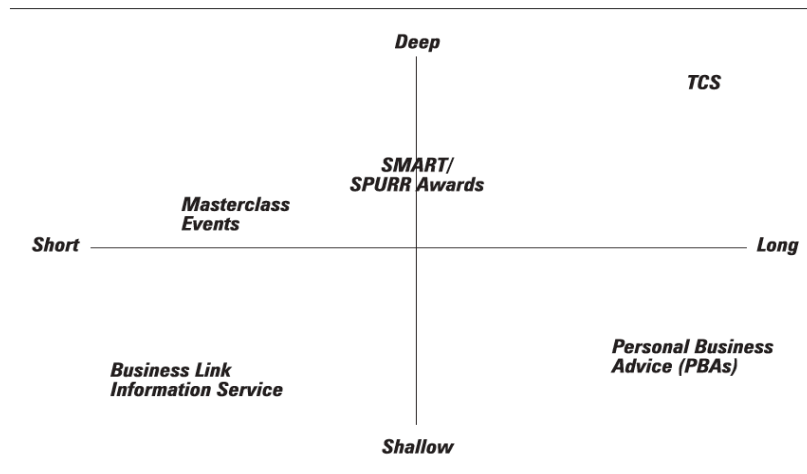
Small firms: some myths and realities

We now move on to discuss the way in which many UK government interventions, designed to improve the effectiveness of the small firm sector, is based on a flawed understanding of how small firms actually operate and what motivates them to act in the way that they do. Figure 1 shows some of the range of services offered by government, we categorise these services as either shallow or deep (targeted solely at an individual or intrafirm) and short and long (over time).

It is interesting to note that while the TCS programme was first introduced in 1973, it has taken until the publication of the government's white paper (DTI, 1998) on competitiveness to recognise that this deep intervention is extremely successful. A two-year partnership between a graduate, a university and a small firm, in part subsidized by the DTI (among others) is probably the sharpest instrument in the interventionist toolkit and is set to double in size under this new administration. Unfortunately, the Trade and Industry Minister accredited with this foresight

resigned within weeks of the paper's publication.

Figure 1 Interventionist activities

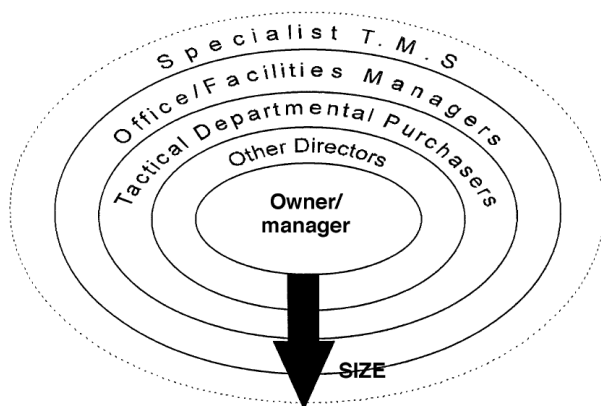


As we go down the scale of size, the number of businesses rises rapidly (DTI, 1997). However, subtle complications in the small business sector make life even harder for the budding interventionist. Specifically, small businesses simply do not behave in the same way as larger organisations. Larger organisations are inherently more complex in their structure, their organisation and the level of departmentalisation and specialization within the company. This leads to, on the surface, increasingly complex decision-making criteria. However, although small firms may be regarded in one very valid sense as relatively "simple" units in terms of their attitude, behaviour and decision-making, they have complexities of their own.

Classic business-to-business understanding claims that in any particular organization there will be a range of individuals involved in a purchase decision (Hague, 1993). These can range from "key influencers", to "gate keepers" of information, to "purchasing specialists", and so on, up to a final decisionmaker who will sign off a purchase. But equally, this varies widely by the size of the organisation under consideration. While a typical corporate customer may very well operate in this mode, the heart of the small business decision-making unit is essentially the owner/manager, and it is this owner/ manager position that raises several layers of complexity for the interventionist. As a business grows, typically the first step will be for other directors of the business to become involved in decision-making. This may then lead, with increasing size, to tactical relationships being undertaken at departmental level. Specialist managers then come into play as the business evolves through a sufficient level of size and complexity, as can be seen in Figure 2.

In this way one may think it would be reasonable to make two basic assumptions about smaller businesses. First, they are relatively simple in structure. Second, very few individuals - usually - are involved in decision-making. Third, their needs, technically speaking, are more straightforward than those of a larger business. As a result, the small firm can be treated as a neat rational economic unit (Swartz and Boaden, 1997). Therefore, the market ought to be relatively simple to research and straightforward to market to (in terms of intervention processes). In fact, the reverse is true.

Figure 2 Layers of the decision-making unit



Larger businesses may, indeed, have more complex decision-making units with diverse personnel involved, various influences on purchase decisions, and so on. But it is true that in larger businesses, decision making is taken in a structured, hierarchical way around defined roles for those involved in the decision. Thus, although the structure of the organisation and its decision-making units may be complex, attitudes and behaviour will often tend to be more "rational". So although many individuals may be involved in a particular decision, the way they process information (Betts-Grey and Edwards, 1997), build attitudes, and take decisions could be arguably, in itself, more straightforward (Brown, 1996; Andrews and Smith, 1996).

Smaller businesses - although they have simple structure - often exhibit highly complex attitudes and behaviours. First, of course, there is an alarming variety of small firms who are particularly difficult to categorise. Second, they will often be "personality driven" in a way that larger organisations are not. In other words, understanding the context, attitudes and behaviour of the individual small businessperson becomes equally as important as understanding their business. For example, one respondent in research (a group discussion among small firm owner/managers) asked the question:

I work long hours, day in day out, in what this government thinks is a "not cool" industry but I supply a couple of blue chip companies who don't have many other places to go . . . so who's the important one in this relationship and when will they [the DTI] recognise my value in all of this?

Three further quotes from the group discussions reveal the anxiety felt by many in this position:

If the DTI really understood what the world was really like they wouldn't send me a bunch of failed consultants to advise me on how to run my life.

They [the DTI] think all we have to do is turn up to a seminar, fill in an application form for a such and such award and we'll be world class companies . . . as if . . .

I was on the verge of a major breakthrough with a new line when the bank put the squeeze on . . . had I been Glaxo I bet they wouldn't have thought there was a problem . . . the DTI were also nowhere to be seen

This represents a particularly awkward barrier to overcome in terms of generating a bond and a relationship between government (and large companies) and small firm customers. Without an appreciation for the personality involved, the intervention process with its rational

pursuit of all things "world class" will remain in exile in the small firm community. To understand the small firm, government interventions must place significantly more emphasis on understanding the context, and the individual person who is the decision maker.

Contextualising the small firm operation: happy families

This simplistic understanding of the motivation and complexity of those living in the small firm sector leaves government intervention in danger of remaining the blunt instrument, destined to a life on the bookshelf rather than a force in the boardroom. In understanding small businesses, interventionists therefore need to first take into account some key contextual issues.

The first is about ownership. Unlike decision makers in many larger organisations, our small firm decision makers often, if not usually, are owner/managers and, as has been seen, the business is inextricably tied up with their life and identity. Thus, while managers in large organisations have responsibilities, small businessmen literally own any decisions that they take.

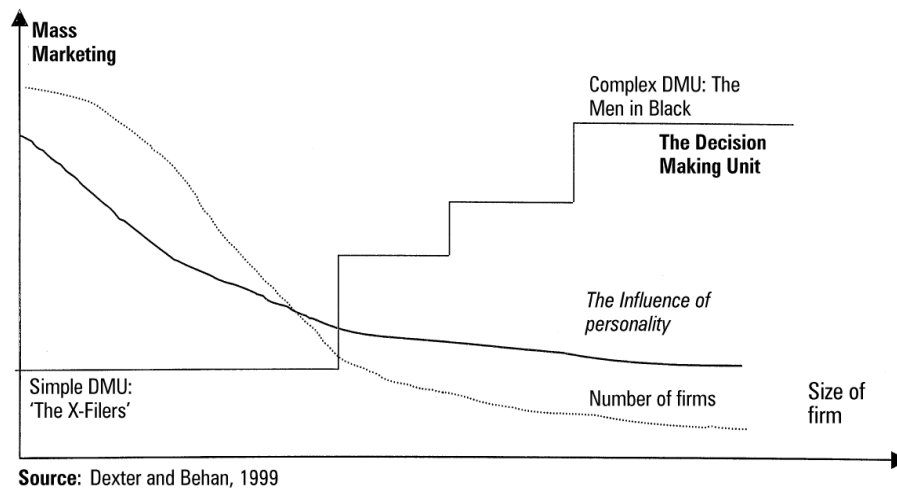
My youngest son thinks we should be going onto the World Wide Web . . . every night this week it's been "when are you going to get on the 'net, dad?"

The second contextual issue is the fact that in a small firm there is frequently no place for specialists. Certainly small firms may take advice and soundings from outside their organisation, but it is rare that they have the resource or the expertise to take complex technical decisions through a specialist channel (Darby, 1997). The small firm owner/manager will, unlike his counterpart in a larger organisation, need to be taking decisions about banking, technology, communications, credit facilities, office equipment, whether to buy a new radio for the factory floor, to the kind of stationery to order (Brooksbank, 1996). Recruitment alone is a major headache for many small firm owners as our research uncovered:

I lose sleep over getting wrong again . . . I promised people in the office I'd get someone in to help . . . within six weeks they had caused so much unrest I had to let them go . . . I'm getting in a Feng-Shui expert next week to try and help create some harmony in the office . . . you can't realise the effect this has on me . . .

The next contextual issue is that small firms - through the intensity of their involvement with the business - as identified in our two research projects, regularly fall back on the argument that they are unlike any other company. This idiosyncratic view of the world means that they are often unable to deal with broader concepts that might affect "all small firms", i.e. they tend to fall back on specific examples from their own experience (Crant, 1996; Nielsen, 1997 and Wright and Ashill, 1998). Thus, small firms often exhibit what we call the "Alamo syndrome", an intrinsic suspicion of all large "monolithic" suppliers; these firms are fighting in a hostile world where everybody is against them. Thus we might characterise the spectrum as shown in Figure 3: at the large end, complex DMUs inhabited by the "men in black"; at the small end, the mass market of personally driven "Xfilers".

Figure 3 The interrelationship between complexity and personality



As one of our respondents (only half tongue-in-cheek) suggested:

Just because I'm paranoid doesn't mean that they're not out to get me!

We suggest this means that understanding small businesses is very rarely a straightforward task; from the small firm perspective, how can a very large organization (like a high street bank or a government department) really understand what it is like to run a small business?

How can they [the DTI] possibly understand my needs?

However, although they often describe themselves as operating on their own in a “cruel world”, small firms, as we confirmed, have an extensive support and information network (Bennett and Robson, 1998; Dibb, 1997), which may include:

- Professionals, such as accountants, solicitors, financial advisers, and so on.
- Their peer group, other small businesses operating in the area.
- Their suppliers, whether large or small.
- Their staff (in cases where they have staff).
- Their customers.
- Interestingly, their competitors (a surprising amount of dialogue goes on between small businesses that are actually in competition with one another in a particular area).
- Contacts from their personal life: friends, relatives, acquaintances, and so on.

It is encouraging to note that support for these general insights exists from other European countries - for example Nielsen (1997), in an unpublished presentation at a recent seminar, reviewed the Danish Technology Institute's experience of work in this area, saying:

SMEs need the same level of knowledge and technology as large corporations, but their capacity to receive and adapt is weak . . . they perceive themselves as lone wolves but learn best with other companies.

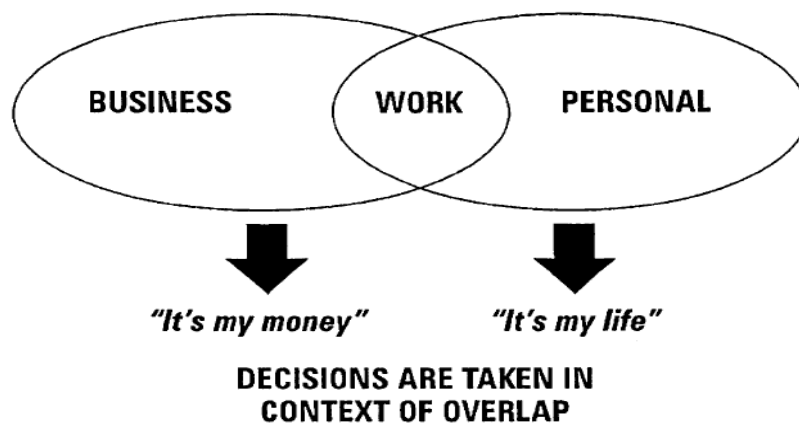
Interestingly, a recent ESRC sponsored survey of SMEs revealed that 38 per cent had sought business advice from business friends / relations. This compared to 27 per cent seeking advice from Business Links and 23 per cent talking to Chambers of Commerce (Bennett and Robson,

1998). All of these contextual influences (friends and families) will play a supporting role where complex decisions need to be taken. Tony Blair is a well known advocate of e-commerce but no doubt it will be the children of owner/ managers who push their parents into the Net.

The business/personal overlap

For the small businessperson, work subsists at the boundary between their business and their personal life (see Figure 4). All money in the business belongs to them, and they control, in many cases, a steady income. Their income is inextricably related to the ebbs and flows of business. In many cases, they will identify with, and be identified with, their business in a way that is not true in a larger organisation. Equally important, and set against this backdrop, we must be aware of the boundaries between what constitutes their job and the rest of their lives.

Figure 4 The business/personal overlap



Small firms (and as a consequence the owners own personality) suffer from a range of conflicting pressures, which although to some extent also affect decision makers in larger organisations, impact significantly less strongly in understanding buyer behavior (Culkin and Cox, 1997; Simons and Davila, 1998). The pressures that exist in the world of small firms mean they have to be flexible; to meet customer demands they often do not differentiate between "work time" and "personal time". In many cases, they feel they have to be available to their customers at all times. Of course, in many cases, they do not have others to delegate to, and do not have back-up to the main people involved in the business (Li, 1997).

Letting off steam in the office was good therapy when I worked for Company A (a large multinational), but it's just not an option these days.

But at the same time, it is true that - emotionally - many small businesses would like to separate the world of work and the world of leisure. Like everybody else, they have families; like everybody else they are looking for a balance. They can feel trapped by their business, not always finding it a joy.

Understanding the immediate family ties

While acknowledging that various approaches can be taken to segment the small firm market, it is the authors' view that there exists a number of value-based segments which are almost universal in their application to this market; segments that policy makers interested in opening a dialogue

with the small firm sector would do well to acknowledge:

- *The undisputed head of the household* Difficult, self-important, often aggressive individuals. These small businesses really see themselves battling against the odds. It is the Alamo syndrome writ large. They usually have an exaggerated view of their own capabilities in a business sense. Most of them seem to be labouring under the illusion that they are running ICI. They are often easily irritated by what they perceive as the failure of large suppliers, and indeed customers, to recognise their abilities, visit them, give them their due, etc.
- *Married under sufferance*. The second type tends to dwell exclusively on the hardships rather than the motivations and joys of business life. They are highly introspective types with an inward focus. When you ask them for their priorities, no matter what the subject, they are mainly concerned with reducing costs, avoiding risks, and defending an entrenched position. They are not outwardly oriented. They have a very limited appetite for new marketing opportunities and change generally. If the business is struggling, it will tend to be due to factors that they perceive to be beyond their control.
- *DIY husbands*. What we call the DIYers are, in fact, extremely expert in the nuts and bolts, the practicalities of their core skills - the “doing” part of the business. But they do tend to have very limited business and financial skills. They are often rather unworldly and get by on instinct and luck. They often do not see themselves really as businessmen or entrepreneurs, and they will tend to lack confidence in business matters.
- *Enlightened partners*. By contrast, what we call the enlightened partners will take a much more progressive, outward position vis-à-vis their business. Usually they are entrepreneurial types who are keen to market and develop their business, expand into new areas, find different USPs for their customers, and so on. We usually find that they are relatively well educated and often, interestingly, have previously been senior employees in larger organisations.

Typically, the DIYers and the married under sufferance types highlighted in our research came to business for one of the following reasons:

- Family tradition.
- Could not think of anything else to do.

The enlightened partner, by contrast, was highly motivated and skilled at business in general, as well as their core craft:

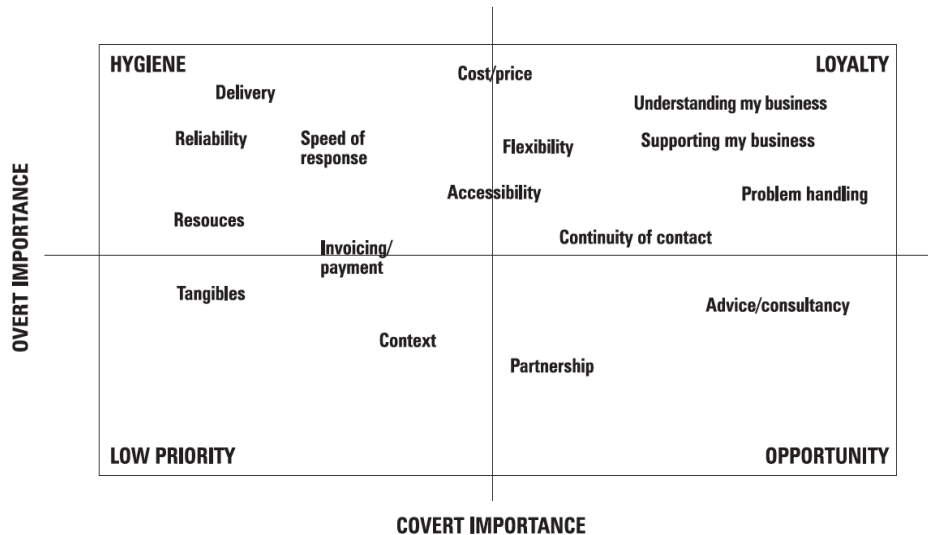
- *Married with a roving eye*. Many small businessmen claim to work all hours that God sends. However, the lifestyle is quite different. His emphasis is simply to do enough work to pay for the lifestyle that he wants and then stop. So in contrast with many, being a businessman does not necessarily define this person's identity. It is merely a tool to generate an income and a lifestyle. In reality, this means that although they may pay lip service to competitive pressures and the stresses of running a small business, they will tend to avoid challenges until this has a direct effect on their ability to live in the way that they want to live.

Understanding the psychographics and motivations of the small firm owner/manager therefore becomes crucial; especially in the case of the policy maker who is responsible for the investment of not inconsiderable amounts of public funds in an effort to improve the competitiveness of firms operating in this sector.

Establishing the framework for helpful interventions in the small firm community

In our experience, therefore, in attempting to open a dialogue with the small firm market one should take a dual approach (Culkin et al., 1999). Thinking purely of the business side of that overlap, any interventionist (public or private sector) will always need to understand what is the nature of the business in the usual (rational) sense (de Ruyter, 1996; Denis et al., 1997; Zaltman, 1997) (see Figure 5):

Figure 5 The generic small business priorities



- Its turnover?
- How many employees does it have?
- What technology is in place and what are the plans for technology?
- What kind of customer base does it have - is it a high street business with many transient customers, or does it rely on a few large, regular customers?
- Is it growing or shrinking?

But at the same time, there needs to be an understanding of the personal perspective of the small businessman (Steyaert, 1997), it is often their business after all. Issues that can affect the way that the small firm takes decisions - particularly with regard to communications and marketing - include:

- Age.
- Gender.
- Their level of educational attainment.
- Their previous employment - were they involved with a large company and decided to set up on their own, or have they always been self-employed?
- Their general attitudes - small businessman are notoriously cautious but clearly some are more at the early innovator end of the spectrum than others.
- Their business philosophy - inward or outward focused?
- How do they manage their time, particularly in terms of the overlap and space between work and play?

Overlaid on this, we often find broad themes about the vision and culture of the business. The first relates to the kind of management style that is in place within the company - which, as we

have demonstrated, can range from the rational to the emotional. Second, what are the goals for the firm? It is possible to classify some of the issues discussed above into a range of categories. There are those issues that a customer will tell us are important in an overt (rational) way, and then there are those issues which seem to have a greater or lesser impact on their overall warmth towards a particular supplier (covert, or sub-rational issues). This may not be expressed in quite the same way. So we have developed a view of issues that revolves around plotting key attributes of a supplier along the overt and covert importance dimensions. Key loyalty issues will include:

- understanding my business;
- supporting my business;
- continuity of contact;
- flexibility;
- the way that problems are handled;
- accessibility.

Cost and price often straddle the boundary between a hygiene issue (the “there or thereabouts is good enough” opinion) and a loyalty issue (this can make the difference between engaging with the intervention process or not).

Hygiene issues

Those issues on which an organisation is expected to deliver but where no extra warmth is gained for particular excellence - including:

- Delivery issues.
- Reliability.
- Speed of response.
- Approach to invoicing and payment.
- The resources behind the supplier (government department or high street bank).

Lower priority issues

Not generally considered not to be important in the decision making process, they will include tangibles such as office premises, office environment, certain types of written communication and presentation, and so on. However, they can have an important background or contextual effect on attitude, and thus decisions that are taken (Gilmore and Carson, 1996; Carson and Coviello, 1996). Of course, different segments will generate a different map of priorities.

How the intervention process can be improved

The small firm market is constantly bombarded with different sources of information and advice provision. We believe that there still remains a large question mark over whether those responsible for synthesizing and presenting business support packages at government level and providing this information service actually help the small firm (DTI, 1996; Mercer, 1996).

It is worth noting that many Business Links have installed sophisticated client information systems, which hold a wealth of data at individual small firm level; how well they use this intelligence must remain open to question.

Why do they keep sending me this expensive drivel? It's very professionally produced [details of the Business Link's seminar programme] but it still heads for the bin with the rest of the junk we get from the DTI.

There needs to be people below (and incidentally, at the level of) the policy maker who can assemble the "jigsaw" of available information into a sensible, meaningful picture. A Select Committee report (1999) has recently suggested a major overhaul of the way in which Office for National Statistics (ONS) markets information, the implication being that ONS was not delivering a quality service or adequately exploiting the data that it managed. There are, of course, pockets who remain in the "we know best" strait-jacket. Nevertheless, over the past five years, there is evidence of considerable progress. Although somewhat piecemeal, there are support service providers who do operate in a more eclectic way than in the past; drawings on, and weaving together, evidence from the UK and overseas (Stacey, 1996; de Koning et al., 1992), in order to design sensitive and long lasting intervention packages.

I was very skeptical at first but on my second visit I started to understand what they [Business Link] were all about . . . I now call them whenever I need them.

Such enlightened interventionists have realised that, in essence, all support is qualitative in the sense that they need to be interpreted in context, with the full appreciation of where the support comes from, its strengths and its weaknesses. They have accepted that support from several sources is likely to provide a more reliable guide for decision-making than support from a single source (Duan and Burrell, 1997).

Given the plethora of support services now available (Garrick, 1996), it is increasingly important that evidence presented to the decision maker is kept to a manageable proportion. Specifically, it is important for policy makers to demonstrate an approach - an analytical framework - with which they operate, from the outset of the intervention.

Of particular importance here is sorting out how different government departments at the development stage present the problem. Too often policy makers will come at the problem by listing possible outcome measures (how many delegates can we attract to this event?). Whereas there is an urgent need to communicate the problem in terms of intervention objectives (what is the customer's overall level of satisfaction with the standard of support service?). With interest in the Internet (Berthon et al., 1997), as a global (never mind a regional) communications medium burgeoning, it is possible to understand how things might be in the future with regard to the sheer volume of information available to the small firm (Rowan, 1997; Denison and McDonald, 1995). However, the question remains for the policy maker as to whether their information is presented (by some form of government sponsored intervention) in a form \pm at a level of specificity and depth - that makes for better decision making among users in the target audience (Antoniou, 1997).

Policy makers must be alert to the different ways in which the problem may be initially expressed and, using all these different "languages of definition", must work towards the design of an intervention that is targeted and manageable. If the policy maker is allowed just one question at the outset of the development stage(s) it should be, "on completion of this intervention, what value do I anticipate the small firm owner/manager to place on this intervention?" (Tammo et al., 1996).

Going beyond the credibility of the intervention development process, one must examine the way in which the decision maker scrutinizes the voracity of the "package of support" which they are invited to inspect before making a decision. Much has changed in the "hothouse" climate of the small firm sector in recent years. Today it is no good policy makers falling back on the DTI rulebook in trying to explain the robustness of their offer. The policy maker must be prepared \pm whether they like it or not \pm to ensure that their offer is seen by the owner/manager as believable and relevant (DTI, 1996). Support services offered to the owner/manager must be directly for

them. In a business environment there is enormous emphasis on measuring exactly what benefits flow from what action (Myung-Sul and Hill, 1997). In a small firm setting the pressure is, in turn, for the policy maker to produce intervention in a more competitive based style. Thus, the owner/manager is looking for the policy maker to identify, for example, three key issues that underpin the offer, and for the evidence to be presented in such a way that it helps them decide how to interpret each of these five issues.

Conclusion

Our objective was to provide an understanding of the decision-making processes used by different types of owner/managers in the small firm sector. We sought to show that leading edge qualitative research has now burst the myth that small businesses are simply scaled down versions of large enterprises; with examples from recent research we explained how small firms actually think and behave. For the benefit of the policy maker, we also addressed the question of whether the information needs of those engaged in decision making in the small firm sector are being satisfied.

We know that today's policy maker (16 Tory ministers in less than 20 years at the DTI; Labour is already on its third!) may be in a post for a comparatively short period of time. It therefore becomes important for the policy maker to concentrate on what is achievable in the market and not necessarily for their personal career (Mercer, 1996). Of course, the idea that there can be a clash between the individual goals of a minister and the goals of the party is hardly a new observation. Nevertheless, the authors would argue that pressures placed on a policy maker in recent years have brought this issue into sharp profile. Thus, individuals – knowing they must produce results in the short term to keep a career on line - tend to associate themselves with projects and tasks that are achievable within reasonable time-frames (Saunders et al., 1996; Abratt et al., 1994). There is less interest in projects with wider and longer-term pay-offs. We suggest that this has resulted in the launch of many (small firm) interventions, which have addressed the career of the policy maker, not the target audience.

It is well documented that, with regard to new services, there is a leading edge “early adopter group” who are first in to the new service offer (McDonald, 1996). At the other end of the spectrum, a group of “technophobes” who feel uneasy about embracing anything new. In between there exists the owner/manager who will keep a watching brief - neither committing to, nor rejecting the offer. Given this often large, “watching brief” category, good qualitative research practice dictates that we need to unpack this mindset, rather than simply accept it (for example, the authors highlighted the critical issue of the business/personal overlap). For instance, it is reasonable to assume that a certain individual's attitude towards a government offer (e.g. Business Links and TECs) will be a function of his/her own individual beliefs and attitudes. It will also be the function of the individual's perception of what they think others think about the brand. In the light of this insight, the interventionist can start unpacking this “watching brief” category by exploring the wider context of respondents' perceptions of what others currently think and may be about to do. For instance, the interventionist could start by exploring the extent to which an individual's willingness to embrace the brand (Business Link) would be changed - triggered - by external events, such as learning that a key competitor was now embracing the offer. Thus, putting their own business at a competitive disadvantage. By providing a model that explained this “watching brief” category, one is able to provide the policy maker with insights that will enable them to interpret how other market sectors might take up the offer.

Concerning, for example, the Business Link brand, research evidence (Culkin, 1998) indicates that as a mass (SME) market product is not the “green light” winner Michael Heseltine may have

originally envisaged (Culkin et al., 1999). However, certain sectors and businesses are highly receptive. The longer-term strategy (and there does need to be a long-term strategy) must address weaknesses identified if the service is to be used wider afield.

Policy makers can only achieve this by demonstrating a real empathy with the target market and factoring in the business leader's own intuition and prior knowledge on the subject. In addition, by helping set support services in a wider analytical framework context, together with helping improve the quality of the small firm offer, policy makers may yet win the case in the arena in which the service must be compete.

Looking to the future, as we enter a world with more and more information sources (online and database), the authors would argue that many of the issues raised above will come into even sharper focus. One can envisage increasing calls from small firms for information from different sources, which they require piecing together. In the face of an overwhelming amount of information service provision, small firms will place more emphasis on concentrating on what is achievable, and making sure that the outcomes are entirely actionable. There is also likely to be increasing demand among the target audience for assurance about the applicability of the information and advice source that has been assembled.

The authors believe there is also going to be a competitive advantage to the policy maker who, at the outset of the intervention process, can help define the problem in a manageable way, while at the end of the intervention helping the decision maker through the decision making process. The government (through the Business Link network) is in the right position to take advantage of the opportunity, but does the policy maker have the vision to make it so!

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Appendix 12: P7 Anchor Institutions and Regional Innovation Systems for supporting micro and small businesses.

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Abstract

Universities should, and must take a lead role as an *anchor institution* within their region, especially in light of the Brexit decision. Such a role will include providing a wide range of formal and informal support, knowledge and resources targeted at micro and small businesses (MSBs), complementing usual Small and Medium Enterprise (SME) support. Drawing on my evaluation of the winners of the annual Times Higher Education (THE) Entrepreneurial University of The Year Award and analysis of the Chartered Association of Business School (CABS) Small Business Charter Awards, I suggest four different ways to enhance collaboration to enable MSBs to make maximum use of ‘anchor university’ support.

Introduction: how “localism” is driving the MSB innovation ecosystem

Whether you were part of the RemainIn camp or a Brexiter, the die has been cast. We have entered uncharted territories and to borrow from a speech delivered in 1898 by the politician Joseph Chamberlain (father of British PM, Neville Chamberlain), “*I think that you will all agree that we are living in most interesting times.*”

Even before this decision was taken, the UK faced a productivity challenge whereby its performance has weakened compared to the rest of the G8 economies. Nevertheless, research demonstrates that micro and small businesses (MSBs) are a key under-tapped resource for addressing this challenge – especially when engaged in international and innovative activities - accounting for 60 per cent of all private sector jobs and 47 per cent of revenue (ERC, 2015). Improving the UK’s low productivity is a key challenge to generate growth in the post-Brexit economy. While MSBs are a vital part of the economy, many commentators also recognize the key part played by business support initiative in helping stimulate growth amongst this group.

Take for example, Growth Accelerator, a nationwide business advice programme for growth-oriented businesses, underpinned via a government subsidy. As is common in the vast majority of national programmes, Growth Accelerator was subject to numerous audits in order to evaluate its effectiveness. The estimates from government indicated that for every £1 spent yielded benefits to the economy of between £4.54 and £9.92. If true, Growth Accelerator would have boosted the SME economy by £1bn (Mole, 2015).

Business support comes primarily from national government, but in the UK November 2015 public spending plans, the Department for [Business Innovation and Skills](#) was pressed to find 20% savings or face a possible a possible break-up. The Business Secretary argued it would be “a step backwards” if his department were abolished and while BIS remains, the Growth Accelerator ended abruptly the following month.

The closure of the Business Growth Service (BGS), which included the Manufacturing



Advisory Service (MAS) and the Growth Accelerator programme was announced by Anna Soubry, the minister for small business. She said, “Where taxpayers’ money is used to provide support, this is best done at the local level which is why we’re providing further funding to growth hubs and away from Whitehall.”

So, given all that we know, the question is, how will

BIS was formed in 2009 through a merger of the Department for Innovation, Universities and Skills and the Department for Business, Enterprise and Regulatory Reform.

this happen and who is going to lead the regional level charge?

Think Local, Act Local: anchor institutions and Regional Innovation Systems

In the rest of this paper, I want to present some ideas as to why universities should take a central, or anchoring role in this drive towards regional devolution. I believe the benefits for the MSB community in embracing such an idea would come directly in the form of a) attracting foreign direct investment and b) increased retention of highly skilled talent. In Scotland alone, Universities are [cited](#) as a determining factor in almost half of all foreign direct investment (FDI) projects. As a producer of highly-skilled graduates and postgraduates, generator of world-class research and development and found at the centre of industry clusters universities help create the conditions that make Scotland the most attractive place to invest in the UK, second only to London.

The Road To Devolution

The five devolution deals announced since –Liverpool city Region, North East, Sheffield City Region, Tees Valley and West Midlands Combined Authority – build upon a foundation of city deals, growth deals, combined authorities, enterprise zones and university enterprise zones (UEZs).

As the devolution movement gathers pace, the terms anchor institutions and Regional Innovation Systems (RIS) will become increasingly important. Anchor institutions are nonprofit institutions that once established tend not to move location. Emerging trends related to globalization - such as the decline of manufacturing, the rise of the service sector, and a mounting government fiscal crisis - suggest the growing importance of anchor institutions to local economies. According to Community-Wealth.org (a project of The Democracy Collaborative in the U.S.), in many places, these anchor institutions have surpassed traditional manufacturing corporations to become their region's leading employers. Their scale and local links mean that they can play a key role in local development and economic growth, representing the 'sticky capital' around which economic growth strategies can be built and innovation fostered at a local level (Work Foundation, 2010:3). I would argue that this is why universities have powerful credentials and potential to be key anchors within UK regions. We know that universities are *somewhere* in the UK and that *somewhere* matters, more than ever before.

Regional Innovation Systems encourage rapid knowledge, skills and best practice diffusion within a geographic area. Larger than a single city, an RIS is a supported innovation network that interacts regularly to enhance innovation in a region. The apparent shortcomings of traditional regional development models and policies, led Doloreux and Parto (2005) to develop a framework that highlighted the importance of regional scale and of specific and regional resources in stimulating the innovation capability and competitiveness of firms and regions.

- ❖ firstly, the importance of interactions between the actors of the innovation system in relation to the exchange of knowledge;
- ❖ secondly, the set-up and the role of institutions supporting knowledge exchange and innovation within a region; and
- ❖ thirdly, the existence and role of RIS in regional innovation policy-making.

Fig. 1 depicts the RIS concept, showing the main actors and dimensions and how they

interact (Cooke and Piccaluga, 2004). As such, we can see how innovation is very much an interactive and dynamic process heightened by networking with related *actors*. Whilst lonely individualistic pursuit happens, more generally supportive, symbiotic relationships within networks trigger innovation. Innovation and technological advancements are very complex processes with mutual interdependencies; it also goes to show how key anchor institutions act as a life support system, particularly for MSB growth firms.

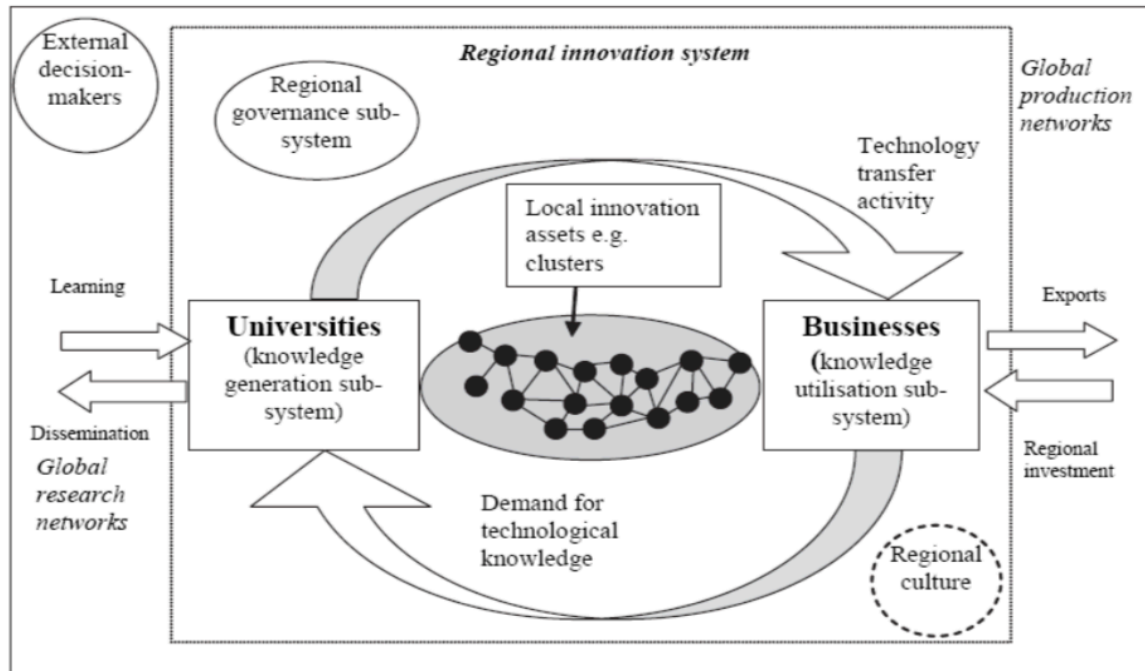


Fig 1. The Regional Innovation System
Source: Cooke and Piccaluga, 2004

Supporting the UK MSB sector and improving start-up and scale-up survival rates is important

Without a champion in Whitehall, it has not been easy to evidence the impact the MSB sector makes on the UK economy, nor the barriers it faces. The creation of the Enterprise Research Centre (ERC) in 2013 - with its core mission to help understand what drives small firm growth - has already gone some way to identify policies, structures, processes and techniques effective in supporting MSB growth and development.

Enterprise Research Centre
The ERC was established in 2013 to answer one central question, 'What drives SME Growth?' Originally funded by the ESRC, Innovate UK, BIS and the BBA, the ERC is a collaboration of senior researchers from Aston, Warwick, Imperial College, Queens University Belfast and the University of Strathclyde. The Centre aspires to become the international focal point for research, knowledge and expertise on SME growth and entrepreneurship.

Thanks to the work of ERC experts we now know that MSBs employ 12.1 million or 60% of all UK employees. As important is the fact that 90% of MSBs survive their first year in existence, 74% manage to keep going for two years but that figure drops to 63% for three years, or more (BIS, 2015). What is more alarming is work by the Centre, which show of all UK firms born in just one year (1999 in this study) around 90% no longer exist and that for the first fifteen years about 10% die per year.

Only about 5% of start-ups add a substantial number of jobs to the UK economy Anyadike-Danes & Hart (2014).

Passing the five-year survival point and building critical mass of five or more employees massively increases an MSB's survival chances; and, it's one reason why we need anchor institutions with a remit built in, to help firms through those early years – from start-up to scale-up. The 2015 [CMI/CABS survey](#) highlighted limited business capabilities in many MSB's. Three quarters of UK customers shop online but 44% of MSB's have no website, 71% are not mobile ready and 69% do not use social media marketing; missing significant revenue opportunities. Moreover only 7% of MSBs seek support to increase productivity. Universities have the capabilities, in the form of industrial placements, student projects and more to make significant inroads in the resourcing requirements of local MSBs.

Making The Case: Universities As Anchor Institutions

Certain universities already play a key role in enterprise support and entrepreneurship within their region, responding to the need to develop competent individuals to work across commercial and public sectors and cope with today's uncertainty and complexity.

UK universities are learning how to teach enterprise and entrepreneurship programmes, in a way that goes well beyond the business school, extending across the institution and embracing wider networks (James & Culkin, 2015).

Such universities, located at the heart of a region encourage innovation amongst MSBs, stimulate entrepreneurial aspiration from students and provide skills, knowledge and experience to help start their own business. In so doing, they send signals about innovation and growth to smaller businesses (Mason, 2014; Culkin & Mallick, 2011). Universities can stimulate regeneration, skills acquisition, innovation; and business support, provided that businesses understand the scope of what is available (See Case Study 1).

One only has to look at the citations for each of the eight [Entrepreneurial Universities of the Year Award winners](#), and the REF2014 Impact Case Studies (that speak to small business and entrepreneurship), to see the anchoring role certain universities already play for the MSB sector, as well as the wider business community ([Witty, 2013](#)).

What does a successful anchor institution do?

I want to conclude with a call to action. Despite the uncertainty that a Brexit victory has caused, there are four simple steps required in order to enable universities to take on the mantle of anchor institutions, operating at the heart of their regional innovation system and help MSB sector grow and prosper in an

Case Study 1: Digital Estate Value-Added Reseller

Hertfordshire Business School (HBS) is Hertfordshire's principal regional university and as such attracts significant inquiries from the local business community. These inquiries are often related to existing business challenges, specifically those associated with skills gaps in three main areas: marketing related, product development and operational issues. One such business RealTech, approached us in 2008 with a small project for our Graduate Consultancy Unit, this involved us evaluating the current trends concerning digital estate in Tier 1 retailers. Our Graduate Consultancy Unit (GCU) was made up of undergraduate final year, postgraduate students and a group of academics with various sector and enterprise competencies.

RealTech were keen to both understand the current digital estate in these Tier 1 Retailers, and to also understand the customer's use of these information systems, and their appetite for more. The GCU delivered its first report, details a technology vs. product roadmap, and suggestions for RealTech concerning future customer latent needs. They commissioned a second study involving accompanied shopper journey research, again a report was delivered.

Four years later RealMedia came back to us, this was a Management Buy-Out (MBO), from the original RealTech, and were looking for another study. In the intervening four years, we have conducted two contract research projects, and had two postgraduate student project teams work with

increasingly devolved nation.

1. *Boost university-business collaboration*

MSBs need to value opportunities to collaborate with universities. Hughes & Kitson, (2013) and [NCUB](#) (2014) found *'universities and colleges are brimming with expert knowledge that attracts scholars and businesses from all over the world. However only a small percentage of UK firms cite universities as their principal source of information for innovation (5% of SMEs and 2% of larger firms)'*. It is not surprising therefore that Dame Ann Dowling's [Review](#) of Business-University Research Collaborations in the UK (2015), highlighted found that collaborative R&D funding for commercial projects with two or more academic partners was twice as high for those without any academic partner.

2. *Simplify and clarify collaboration processes between, government, universities and businesses*

There is massive potential for universities to raise impact through simplifying and clarifying agency support roles. Dowling (2015) found that complexity causes frustration and confusion, especially among MSBs. Hence the UK economy is not reaping full potential from connecting businesses with University research, and such arrangements need simplification. Projects should be needs-driven. As Kevin Mole (2015) argued in the [Guardian](#) Newspaper *"Growth hubs are certainly interested in the same outcomes as ... government, but will not deliver more effective programmes than [Growth Accelerator](#)..... because the programmes and projects are developed on the basis of the funding, rather than an evidence-based view abrupt policy changes undermine confidence and squander resources. Closing Growth Accelerator was costly – not for the Treasury but for the economy as a whole."*

Initiatives targeted at MSBs need to be tailored and targeted to specific market niches. Smallbone *et al.* (2015) believe that many market failures in the small firm sector result from *a one-size fits all approach*. In addition, key *mind-sets* and personality drivers need to be better understood. Support for different MSB owner-manager personality types and helping businesses in a targeted way at critical stages in their development are important. Focusing on identifying MSBs with greatest growth potential is highlighted in a BIS Paper (2015) on the [Sociology of Enterprise, which](#) distinguishes between *growth inclined* businesses (where there is a strong vision for the future) and *growth ambivalent* and *growth resistant* organisations. Initiatives characterised by a psychological dimension will help to target scarce resources on improving start-up and small business scale-up success rates.

The lack of growth-focused organisations has returned us to a *policy proliferation period*, during which [Greene and Patel](#) (2013) noted that 891 different sources of support for MSB's and 18 access to finance schemes co-existed. This is hardly the most efficient arrangement, some might say, and we need to make a more determined effort to learn from other approaches elsewhere in the world (e.g. Mazzucato, 2013; Block & Kellor, 2012).

3. Encourage MSBs to become strategic and entrepreneurial thinkers

Start-ups need to balance enthusiasm with strategic clarity in order to scale-up. Universities can help with strategic thinking, whilst acknowledging that retrieving a flawed strategy is very challenging. MSB start-ups need to balance being *strategic entrepreneurs* with living as enthusiastic *opportunity seekers*. A lack of strategic focus is at the heart of many business failures. Entrepreneurial ventures are often effective in identifying opportunities but less successful in developing competitive advantages to drive value (Ireland *et al.*, 2003). The chances of moving from start-up to scale-up can be improved by addressing three key axes.

Firstly, appropriate decisions about strategic positioning, “knowing where to play to win”. Secondly, “focus for maximum impact”. Thirdly, “following the minimum route to success and maximising limited resource usage”. Business School academics know that when it comes to leadership, the skills required to steer a start-up through its first 12-18 months are very different from those required during the scale-up period. The skills needed to attract, develop and mentor can place additional unforeseen burdens on the founders during this period; often leading to a need to bring in a new skill set from outside, with experience of navigating the a much larger, more mature form of company.

4. Position universities as thought leaders in the local labour market

Universities drive thought leadership and prompt fresh thinking. People find it increasingly difficult to progress from low to high skilled jobs, partly explaining why many consider setting up an MSB. Anyadike-Danes (2014) stressed that universities can support individuals in the labour market, concluding that just over one in four of all jobs in the private sector are destroyed or created over an average of 12-month period. Coupled with the survival rate of MSBs, *joined up thinking* is essential to approaching the MSBs and the low skilled sector. It is why, as part of its [RAKE](#) initiative in 2015, [ISBE](#) focused on the role of anchor institutions. In today’s *primary* labour market individuals receive training to keep pace with technical change and raise productivity. In the secondary labour market and MSBs, people gradually fall behind in skills. Universities enable networking opportunities and can help MSB and the lower skilled jobs alike.

Concluding Mantra: think local, deliver applied research, and collaborate

Here, I have set out the role universities can play - as anchor institutions within a devolved regional innovation system - for the benefit of MSBs. My view is that much value can be gained when universities lead in terms of providing thought leadership and offering initiatives to support MSB communities to help overcome systemic concerns that hold back competitiveness and innovative performance. A recent Universities UK [blog](#) highlights the direct and indirect effects that universities can have on the economic, cultural and social spheres in the areas they operate. Long-term challenges, that include hard-to-fill vacancies and skills shortages, demand systemic solutions. Universities have a pivotal role to play through their relationships, especially at local level, and fulfilling management leadership needs. These can be combined as the basis of new local learning

and innovation ecosystems, engaging learning providers, employers and other stakeholders into a shared solution.

The majority of academics live in the same region as their host university, which recruits the majority of their students and governing bodies from the cities and regions in which they are located. As Dowling says “We need a change of culture in our universities to support and encourage collaboration with industry. In the UK we can be a bit dismissive about research that actually has an application, but in reality such use-inspired research can be truly excellent.”

I would add that collaborations with industry should focus on the local and start with micro and small businesses. This would acknowledge the importance of “*the somewhere*” which the winners of the eight Entrepreneurial Universities of the Year Awards recognised.

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Appendix 13: P8 Entrepreneurial universities in the region: the force awakens?’

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Abstract:

The growth in popularity of the Regional Innovation System (RIS) approach has, in part, been driven by the need for economies to respond to the after shocks of the global financial crisis. At the same time, we see the term *Anchor institutions* is used increasingly to describe organisations that have an important presence in the local community and make some strategic contribution to the local economy. The purpose of this paper is to consider the needs of the micro and small business ecosystem through the lens of the entrepreneurial university as a regional anchor institution.

Keywords: Anchor Institutions, Entrepreneurial orientation, Regional Innovation Systems, Entrepreneurial Universities, Growth, Small firms

Introduction

In the lead up to George Osborne's combined Autumn Statement and Spending Review, Sajid Javid the Business secretary made a plea for his department to exist beyond November 2015, in front of the Business, Innovation and Skills select committee on 14th October. With Javid's department under pressure to find 20-40 per cent of savings in its £18bn budget it was no surprise when the committee's chair (Iain Wright MP) opened proceedings with a withering observation, "where are you adding that distinctive added value in order to make a real difference to developing a more enterprising, competitive economy for Britain...[a lot of it]...could be carried out and successfully completed with a revised, enhanced Treasury and a beefed-up Department for Education and Skills?"

The Business secretary defended his department, saying it would be "a step backwards" if the government decided to abolish it, as his was the only one focusing solely on economic productivity while playing a big role in innovation, research, science spending, self-employment and the delivery of apprenticeships. Despite such an apparently wide-ranging brief, the Department for Business, Innovation and Skills was only formed in 2009, by Peter Mandelson. Then it was tasked with boosting economic growth in the wake of the 2008 financial crisis, but now includes a wide span of regulatory and business support functions. As Javid went on to say, "I have some 45 partner bodies. Do I still need 45 partner bodies? Are there costs, middle-office costs or other costs, that can be shed between those bodies? I have over 80 locations that my Department operates in. Do we need 80 locations? I do not think so."

Following the Spending Review a series of events were set in motion that could leave just science, research and higher education teaching as the only items of revenue spending left in a post 2017 BIS budget. As Julian Gravatt pointed out in a recent blog, responsibility for current higher education teaching costs moved taxpayers from to students; matched by a similar switch with apprenticeships. The apprenticeship levy will help BIS cut most of its £800 million a year spending by transferring responsibility to employers. In addition, Innovate UK will transfer £165 million from grants to loans over the next few years. Finally, with the Treasury currently assessing 38 landmark devolution deals from cities, towns and counties across the UK; it is not unreasonable to expect that, most of the £1.5bn adult skills budget will be moved into the regions along the lines of the Greater Manchester devolution deal struck in 2014.

In a further erosion of BIS duties, the Higher Education Funding Council for England (HEFCE) and the Office for Fair Access will most probably merge to become a single regulator of universities called the Office for Students. This is, after all, one of the major recommendations of the recently released Higher Education Green Paper. But, while the Green Paper commits to a continuation of quality-related (QR) funding for universities, who is to say that post-Hefce, BIS will be responsible for the distribution of the research excellence framework (REF) funds? It may take time for the political ramifications to play

out, given the vested interests at stake, but the links between BIS and the UK's universities have further loosened. This will come as little surprise to some commentators as Scott (2014) noted there has always existed a lack of coordination between national policies for higher education and for regional development. This is notwithstanding the fact that universities contribute to UK productivity targets by delivering direct and indirect expenditure on goods and services, providing jobs, developing a more highly skilled workforce and generating new knowledge.

Despite its origins, when higher education largely reflected the values of localism, the reform of English higher education triggered by the Browne Report (2010) encouraged universities to shift their attention towards an international growth trajectory, at the expense of local and regional development support (Goddard *et al*, 2014). But as we know, universities are *somewhere* in the UK and that *somewhere* matters, especially since the demise of the Business Link network in 2011 and the government committed to a widening devolution agenda (Christopherson *et al*, 2014). I want to explore some of the reasons why, and how universities might reinvigorate their relationships with local business, in an effort to retain highly skilled talent, re-exert their influence on local and regional economies and emerge as a long-term anchor institution. This paper concludes with four key observations that could be of value to other universities exploring opportunities for locating themselves at the heart of their regional innovation system.

Think Local. Act Local

Anchor institutions are large, often non-profit, organisations at the heart of a local regional community that have a clear social purpose and are able to offer a range of formal and informal support and guidance to the local business community. In fact, an examination of the eight Entrepreneurial Universities of the Year Award winners and the REF2014 Impact Case Studies - those pertaining to small business and entrepreneurship - would appear to support the idea that value exists for a university to take a lead in terms of being a focal point for thought leadership and initiatives to support the MSB sector, in addition to the wider business community (Witty, 2013).

The importance of supporting the UK MSB sector and improving start-up survival rates

Identifying policies, structures, processes and techniques that will be effective in supporting the health of small firms remains as vital as ever, which in part led to the launch of the Enterprise Research Centre (ERC) in 2013. Small firms continue to be in the engine room of the successful recovery of the UK economy, employing 12.1 million or 60% of all UK employees (BIS, 2015). Yet despite there being over 5.4 million small firms in the UK, accounting for 33% of the total private sector turnover, recent research shows that 90% of businesses survive for one year, 74% for two years and 63% for three years or more. One of the most powerful insights into this issue comes from a study conducted by Anyadike-Danes & Hart (2014) at the ERC. Their analysis of all UK firms *born* in 1999

shows that 90% no longer exist. Moreover their analysis showed that of those that survived the first fifteen years the hazard of extinction is running at about 10% per year. In summary research at the ERC tells us only about 5% of all start-ups make it through to a point where they make a significant contribution to the UK economy in the sense of adding a substantial number of jobs.

Further uncomfortable reading comes from the fact that in many ways small firms do not help themselves. For example, the findings of a recent CMI/CABS survey (2015) stated the majority of entrepreneurs were positive about their future, but at the same time alerted us to some staggering figures about the limited business capabilities of many small businesses. For example, 44% of small businesses do not have a website, 71% are not mobile ready and 69% do not use Twitter, or even make use of free or low cost tools such as social media, as part of their marketing mix. With three quarters of UK customers now shopping online this clearly points to many small businesses missing out through a lack of strategic thinking on significant revenue opportunities. Moreover the survey showed that only 7% of smaller businesses are seeking support in an attempt to increase productivity.

A key takeout from these research findings with regard to the role of anchor institutions within regional innovation systems might play seems to underline the critical importance in getting small businesses past the five year survival point, whilst also helping them build a critical mass of five or more employees. If they can get to this threshold then this massively pushes up their chances of survival, including introducing them to the digital age and new ways of doing business.

The Concept of the Regional Innovation Systems (RIS)

I now want to look at one important dimension in supporting the MSB sector: the growing popularity of the regional innovation system concept. This is the notion of there being within a region different economic and social interactions between agents - spanning the private and public sector - that encourages the rapid diffusion of knowledge, skills and best practice within a geographic area. Larger than a single city, a RIS is an administratively supported innovative network of institutions that interact regularly and strongly to enhance the innovative outputs of firms in the region (Cooke and Schienstock, 2000). Of course, the concept of thinking more regionally about innovation is not new. Lord Heseltine has long argued that central government is often too remote and too organised along national government departmental lines to foster the quality of support needed by small firms working in towns and cities within key regions. Numerous reports, including those from the Lords' Heseltine and Young, have emphasised the importance of setting up regional economic infrastructures that will support small firm communities. The argument is that the focus should be on understanding the nuances of the regional business economy and setting up support that is sensitive to local conditions, rather than relying on central interventions – the raison

d'être of the defunct Business Link movement. As a concept, there is much debate about exactly which characteristics constitute a RIS, and despite the fact that the research framework is still being developed Doloreux and Parto (2005) have identified three dimensions that help us define the concept.

First, the term is used to imply, and place an emphasis on the notion of innovation as an interactive and dynamic process, as opposed to some linear model path. The point being that learning and innovation will be heightened through people being part of a network of related *actors*. There will be some who argue that innovation and creativity stems from a more lonely individualistic pursuit. But it is more generally accepted that supportive, symbiotic relationships within networks can provide a trigger to innovation, as innovation and technological advancements are two very complex processes with mutual interdependencies (Cooke, 2001; Mastroeni, *et al.* 2013).

The second characteristic of a RIS is the existence within regional networks of key *anchor* organisations - whether these would be private, semi-public or public - that act as a type of life support system, particularly for small and high growth firms (Runiewicz-Wardyn, 2013). Thus typically the presence of a RIS is seen as being in evidence where there is a strong regional institutional presence at the heart of the geographical network.

The third characteristic of a RIS is the fact that, when there is recognition of there being a regional network in play, with a core anchor organisation at its heart, then this becomes a magnet for attracting more focused policy thinking and resourcing, targeted on the area. In a way the very existence of an anchor organisation within a regional network creates a kind of virtuous circle whereby, given the focus on the debate and discussion the anchor institution creates, the region then becomes more likely to attract government funding and ideas to support small firms (Mason & Brown, 2014).

The concept of the economic anchor institution

According to the Work Foundation, anchor institutions do not have a democratic mandate and their primary missions do not involve regeneration or local economic development. Nonetheless their scale, local rootedness and community links are such that they are acknowledged to play a key role in local development and economic growth, representing the 'sticky capital' around which economic growth strategies can be built (2010, P3). Anchor institutions are seen as playing a vital role in ensuring innovation is fostered at a local level in a way that benefits from local eco systems. I would argue that this is a particular benefit to micro and small firms, who are often more reliant on the revenue derived from within the region than their medium sized counterparts. The anchor organisation typically provides a range of formal, but also informal support, advice and guidance to members of the small business community. The creation of Local Economic Partnerships (LEPs) in England and Innovation Agencies in Scotland and Northern Ireland is one example of the need to foster innovation with a deeper

understanding of the nuances and complexities of the regional context (Fitjar and Rodríguez-Pose, 2015).

Against this backdrop, over the last few years, universities have been seen as having all of the credentials to play the role of the key anchor institution within regions. The question remains, is that a role the universities see for themselves? It was the Wilson Review (2011) that first introduced the idea of the importance of there being a local economic *anchor* institution, such as a university, within a regional innovation system. Certain universities are now playing a key role in helping to encourage enterprise and entrepreneurship with their region; responding to the need to help develop graduates capable of enterprising and entrepreneurial behaviour. As can be seen among the Entrepreneurial University of the Year Awards winners, this goes beyond simply encouraging a cohort of individuals who may be minded to set up their own business. It also focuses on the wider need to generate individuals able to work across the commercial and public sector because they have the mind-set that can cope with the uncertainty and complexity that is a feature of today's environment. UK universities are learning how to teach enterprise and entrepreneurship, both within the curricular, but also through a wide range of experiential methods and activities. These activities go beyond the business school, extend across the institution (James & Culkin, 2015) and also embrace the wider network.

A Entrepreneurial university campus located at the heart of a region is now seen as a way of supporting and encouraging innovation amongst SMEs in the area (Etzkowitz, 2014). This focus naturally brings universities into greater contact with businesses within its local area and reinforces a point that universities are natural anchor institutions with the regional innovation system concept. The report on creating entrepreneurial campuses (Mason, 2014) addresses the importance of a space that stimulates the entrepreneurial aspiration of students and provides them with the opportunity to develop the skills, knowledge and experience, including helping them to start their own business (Culkin & Mallick, 2011). The combination of comparatively light touch, minimum intervention support activities, coupled with much more in-depth research and consultancy support, sends out a signal to smaller businesses in the region that the University is a natural first port of call when it comes to helping with innovation and growth. Universities can also operate as a beacon alerting businesses to where funding can be accessed, and creating an entrepreneurial flavour to the campus that encourages businesses to be innovative and apply fresh thinking to their own day-to-day challenges.

The collective and cumulative impact of a university being the anchor institution within its regional innovation system

A simple checklist of activities universities offer does not communicate the way in which the collective impact of these activities creates outcomes for the region that are often greater than the sum of the parts. While infrastructure matters feature in many of the

recent devolution deals, the softer aspects of skills and innovation, the potential for a sustainable and more productive growth and inclusion is somewhat diluted. This is where universities can play a significant role according to the mission of individual institutions for example, in regeneration; skills; innovation; and business support. The challenge is of course getting out the message that this support from universities is available. The next challenge is managing expectations, particularly for micro and small businesses about the extent to which the university can help any of them on a one-on-one consultancy basis.

My analysis of the role played by the eight Entrepreneurial University of the Year winners leads me to make four observations that may be of benefit to other anchor institutions and also help inform wider national policy making on how best to support micro and small businesses.

Redoubling efforts to boost the extent of university-business collaboration

There is value in an entrepreneurial university taking a lead - within a region - in terms of being a focal point for thought leadership and initiatives to support the micro and small business sector. Universities provide a natural rallying point for marshalling governmental and other funds that can be accessed by these firms. They provide networking opportunities for small businesses, e.g. as a facilitator for putting micro and small businesses in touch with each other. Being able to access an anchor institution seems to give smaller businesses the confidence and expertise to innovate and grow. For example, Dame Ann Dowling who recently published her Review of Business-University Research Collaborations in the UK (2015), highlighted that analysis of collaborative R&D funding showed that the business impact for commercial projects with two or more academic partners was twice as high for those without any academic partner.

However there is tremendous room for improvement (Hughes & Kitson, 2013). In their recent Report, NCUB (2014) found that *'universities and colleges are brimming with expert knowledge that attracts scholars and businesses from all over the world. However only a small percentage of UK firms cite universities as their principal source of information for innovation (5% of SMEs and 2 % of larger firms)'*. From a Business School perspective, Thorpe and Rawlinson (2013) highlight a number of different ways in which business schools can collaborate more effectively with businesses, including: designing best business practice into courses; bringing more practitioner experience into the university faculty; moving away from individually funded projects to a more multi-touch relationship between businesses and business schools; improving the measurement and the impact of research on business; promoting research in larger multi-dimensional teams and having clearer more defined roles for different institutions, which of course links to the idea of understanding the role played by different anchor organisations within any one local economy.

Making collaboration between government, universities and businesses more straightforward

My second observation is there does seem to be a massive potential for universities to play an even greater role within their regional innovation system, post the Business Link network, the winding down of the Business Growth Service and the under resourced local growth hubs – the latest incarnation of the one-stop business support shop. However, for this to be achieved it would seem that all players in a regional system would seem to benefit from greater simplification and clarification of the role played by different support agencies within the region. Dowling (2015) concluded that the complexity of existing support mechanisms cause frustration and confusion, and means that the UK is not reaping the full potential of connecting innovative businesses with the excellence in the research base at UK universities. The report highlighted the importance of simplifying what many seem to believe are excessively complex schemes designed to assist collaboration between industry and universities (Hughes, 2008). The goal is to unlock the full strategic potential of collaborative relationship, but as Mole (2015) argued this is now under threat, *“Growth hubs are certainly interested in the same outcomes as the government but will not deliver more effective programmes than Growth Accelerator.....because the programmes and projects are developed on the basis of the funding, rather than an evidence-based view abrupt policy changes undermine confidence and squander resources. Closing Growth Accelerator was costly – not for the Treasury but for the economy as a whole.”*

So, enterprise researchers have made considerable progress in adding granularity to our understanding of the massively wide-ranging notion of a SME (Wright, *et al.*, 2015; Theodorakopoulos, *et al.*, 2015; Culkin & Smith, 2000). But there is still a need to target and tailor initiatives to specific niches within this overall sector. In addition to Kevin Mole’s article in the Guardian, Smallbone *et al.* (2015) believe that many of the market failures in the small and medium enterprise sector result from government persisting with *a one size fits all* approach towards such a heterogeneous range of businesses. They go on to argue that little attention has been paid in the literature to the issue of how anchor institutions might support small firms in the local economy.

Today the emphasis needs to identify the key *mind-sets* and personality drivers at work within the small firm sector. We now find there is more recognition of the importance of directing support on different personality types and helping businesses in a targeted way at critical stages in their development. More recently, with a focus on identifying MSBs with the greatest growth potential, there is the Department for Business and Innovation Skills Paper on the Sociology of Enterprise, led by a team at the Enterprise Research Centre (Theodorakopoulos, *et al.*, 2015). This has alerted us to the importance of distinguishing between *growth inclined* businesses, where there is a strong vision for the future. These are differentiated from *growth ambivalent* organisations who are somewhat averse to business growth and less likely to exhibit the positive mind-sets and

behaviours of the more growth inclined. And in a further category there are the *growth resistant*, who although apparently attempting to build a business, do not demonstrate a strong vision for growth of their business, with one concrete manifestation of this being their reluctance to employ staff or take on financial commitments that would help them innovate and succeed.

Initiatives that bring a psychological dimension to helping us target resources on improving start-up and small business success rates are to be welcomed. What no growth organisation needs now is a return to the *policy proliferation period*, during which Greene and Patel (2013) noted that 891 different sources of support for small businesses and 18 access to finance schemes co-existed. This is not the most efficient way of organising enterprise initiatives for small firms given there are more effective, focused approaches that could be followed from elsewhere in the world (Mazzucato, 2013; Block & Kellor, 2012).

Encouraging smaller businesses to develop a strategic entrepreneurial mind-set

There is the challenging issue of, on the one hand, encouraging and supporting those who wish to start-up a business, whilst at the same time alerting putative start-ups about the dangers of launching into a venture without total clarity around their overall marketing strategy. In an anchor role within the region, universities would need to review what they can do to get the message out to 'would be' start-ups the importance of thinking strategically at the outset about their potential business development idea. The message is that it is extremely difficult to tactically retrieve a flawed strategic position. Energy and enthusiasm are a necessary, but not a sufficient condition of business success, which is one reason failure rates are so high among early-year firms. So the challenge is how to find ways of developing cost effective 'one to many' ways of communicating with putative micro business start-ups about the importance of acting like *strategic entrepreneurs*, rather than enthusiastic *opportunity seekers*.

A difficult challenge is encouraging the entrepreneurial culture, but at the same time helping to educate individuals about exactly what the process of setting up a successful business involves. On the one hand we must acknowledge those seeking out new opportunities and who are willing to take a step into self-employment, but on the other hand, we need to remind individuals of the importance at the outset of having a clear strategic focus. It is this lack of strategic focus that is at the heart of explaining considerable amount of business failure (ERC, 2015). In this new Volatile, Uncertain, Complex, Ambiguous (VUCA) world it is important for businesses themselves to recognise the importance of applying some strategic assessment of the likely success of the venture.

With this in mind it is helpful to distinguish between the concept of *strategic entrepreneurship* and *opportunity seeking*. Strategic entrepreneurship involves simultaneous opportunity-seeking and advantage-seeking behaviors and results in

superior firm performance. On a relative basis, entrepreneurial ventures are effective in identifying opportunities but are less successful in developing competitive advantages needed to appropriate value from those opportunities (Ireland *et al.*, 2003). I would argue that any start up needs to be absolutely clear about the difference between these two concepts. In essence strategic entrepreneurs are those who would have clarified in their own mind three key characteristics of success. Firstly, they have made appropriate decisions about their strategic positioning, they know where to play to win, namely areas where they have a differentiating strategic advantage. Secondly, they have identified where to focus their business efforts in order to achieve maximum impact. Thirdly, they are clear about how to follow the minimum route to success, they know how to make maximum use of their limited resources. In contrast opportunity seekers have energy and ideas around a possible innovation, but have not necessarily subjected this idea to rigorous, strategic entrepreneurial thinking.

This differentiation between strategic entrepreneurship and opportunity seeking is likely to be more important as we find more and more people being forced into freelance work or setting up micro businesses, due to job redundancies and cost cutting exercises, rather than opting for this out of choice (Jayawarna, *et al.*, 2014). I have already mentioned that universities are *somewhere* in the UK and that *somewhere* matters, especially when it comes to supporting start-ups to a point where they can make a contribution in the sense of adding a substantial number of jobs.

Universities as thought leaders in planning for the arrival of a radically different structure to the UK labour market

My observations also highlights the potential for universities to play a thought leadership role in shaping the development of skills in their regional economy. Universities, given their closeness to the dynamics of the local labour markets, are well placed to read the more deep-seated trends that are taking place and help prompt fresh thinking about how we should respond to these. For example, from an overall perspective, the UK economy might be seen to be on a path to recovery. But we cannot assume that this means a return to business as usual with regard to the overall structure of the labour market. A number of commentators, including members of ISBE highlight the continuing polarisation of the labour market with growth in relatively high and low skilled jobs. This means that people will be finding it increasingly difficult to progress from low to high skilled jobs. This has major implications for helping people with a career progression and skills development. The fact that many people may feel that they are *trapped* in the low skilled sector perhaps (partly) explains why many will consider setting up a micro business. This leads to the conclusion that an integrated approach to skills development and boosting productivity at a local level is needed, whereby we recognise the fluidity between being in employment and being a freelance worker/ micro business. During an engaging debate at the ISBE Conference in Manchester, Michael Anyadike-Danes

captured the importance of radical thinking around how universities can best support individuals in the labour market succinctly in his presentation (2014). He concluded that just over 1 in 4 of all jobs in the private sector were destroyed or created over an average of 12-month period. This remarkable level of volatility and turbulence in UK labour market, coupled with the issue of the survival rate of small firms, emphasises the importance of *joined up thinking* in the approach to micro businesses and the low skilled sector. Clearly there are no easy answers to this complex issue, but universities are well placed to prompt fresh thinking on how we deal with enhancing skills and boosting productivity, with so many individuals being in the low skilled sector and fluctuating in and out of the micro business sector. It is why as part of its RAKE initiative in 2015, ISBE focused on the role of anchor institutions. I for one, look forward to following the developments from each of the three funded projects, over the coming twelve months.

In thinking about support for micro businesses and the challenge of the skills crisis, it is helpful to return to the notion of there now being a *primary* labour market in which individuals can be expected to receive training and development that will keep them up to speed with technical change and ensure that they are at the leading edge in terms of productivity. But at the other end of the spectrum is the *secondary* labour market in which it becomes difficult for employers to provide training and where people in this sector will gradually fall behind in terms of acquiring new skills. When we look at the labour market through this lens we can see that the support needed to help those who are in micro businesses will be similar to those who find themselves in the increasing long tail of low skilled jobs in the secondary labour market. Finding a way forward to help those in the *secondary* sector is a massive challenge, but one can see how universities in their role as anchor organisations in their region can help people provide networking opportunities that will help the micro business and those in lower skilled jobs alike. The message is that increasingly people will need to find imaginative ways of taking personal responsibility for their own training and career development. More and more individuals will need to see themselves as a *brand* that needs cultivating, rather than expecting a job and attendant training.

Final Thoughts

In this paper, I have sought to re-examine the role played by anchor institutions within the RIS, in the light of Chancellor's Spending Review. Anchor institutions are large, often non-profit, organisations at the heart of a local regional community that have a clear social purpose and are able to offer a range of formal and informal support and guidance to local SMEs.

My review of both the work of the eight Entrepreneurial Universities of the Year Awards winners and the REF2014 Impact Case Studies has been very revealing. It has indicated that much value can be gained when universities take a lead in terms of providing thought leadership and offering initiatives to support the MSB sector - in

addition to the local business community - in order to overcome the systemic issues that have held back UK competitiveness and innovative performance for decades. As I was reminded in a recent Universities UK blog, universities have direct and indirect effects in the economic, cultural and social spheres in the towns and cities in which we live. Long term problems – such as hard-to-fill vacancies and skills shortages - demand systemic solutions and new models to transcend the barriers and rigidities, along with the fragmentation of interests, which characterise our current systems. Universities have a pivotal role to play in this, through their relationships with key players in the skills system, especially at local levels – as well as meeting the management leadership needs of employers within the communities they inhabit. These can be developed and combined as the basis of new local learning and innovation ecosystems, engaging learning providers, employers and other stakeholders in a shared solution.

The fact that the majority of academics live in the same region as their host university; those universities recruit the majority of their students from their localities and regions and the composition of their governing bodies are drawn from the cities and regions in which these universities reside has also contributed to my thinking here. As Dowling said, “We need a change of culture in our universities to support and encourage collaboration with industry. In the UK we can be a bit dismissive about research that actually has an application, but in reality such use-inspired research can be truly excellent.”

I would go further and say collaborations with industry should focus on the local and start with the small and micro businesses that we know reflect the *somewhere* that most of the winners of the eight Entrepreneurial Universities of the Year Awards reside.

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