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Continuity in Technological Change: A Political Economic Analysis of Digital Film Exhibition

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CONTINUITY IN TECHNOLOGICAL CHANGE:
A POLITICAL ECONOMIC ANALYSIS OF DIGITAL FILM EXHIBITION

by

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TITLE: CONTINUITY IN TECHNOLOGICAL CHANGE: A POLITICAL ECONOMIC ANALYSIS OF DIGITAL FILM EXHIBITION

MAJOR PROFESSOR: Dr. Eileen Meehan

This thesis analyzes the current transition to digital cinema projection technologies within the film exhibition business. I begin by discussing two historical cases of technological change in film exhibition technology, and I identify the corporations that successfully controlled periods of technological change in order to solidify their position atop the film industry. In drawing from these historical case studies, I examine the current transition to digital cinema projection technologies by discussing the structure of the film exhibition business and identifying those exhibitors that are controlling the transition to digital cinema. I find that the top three exhibitors – Regal Cinemas, AMC Entertainment, and Cinemark – are controlling digital cinema through two joint ventures: Digital Cinema Implementation Partners (DCIP), and National CineMedia (NCM).

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CHAPTER 1

TOWARD A POLITICAL ECONOMY OF DIGITAL FILM EXHIBITION

The transition to digital cinema is underway along with the accompanying rhetoric proclaiming the arrival of a unique film-viewing experience. This transition has been a slow process due to unresolved issues relating to technical standards, adequate security measures, and a lack of funding for the implementation of digital cinema systems (Culkin and Randle, 2003; McQuire, 2004). With these issues sufficiently addressed, theaters in the United States and around the world have begun installing digital projectors in preparation for the exhibition of digital content. This thesis investigates the transition to digital cinema by focusing on the political economy of technological change. In other words, I focus on the industrial implications of technological change, which focuses on the ownership structures within the film exhibition business and identifies the individuals, corporations, and associations holding the largest financial stake in the transition to digital cinema. I begin by explaining the relevance of this topic of study and providing additional information regarding my rationale for pursuing this topic, including a review of the relevant literature. These considerations lead to a series of questions that guided my research process. I then explain the specific methods employed in conducting my research. Finally, I conclude with a discussion of the findings as well as possible scenarios for the future of film exhibition.

Film exhibition has been a largely overlooked area within film studies, but a small and growing corpus of scholarship is taking note of the importance that exhibition has played throughout film history (Acland, 2003; Waller, 1995; Gomery, 1992; Musser, 1991). Acland (2008) refers to this emerging sub-field as “exhibition studies,” which

seeks to “document the historical making and remaking of cinema’s exhibition contexts” (88). This study contributes to exhibition studies by contextualizing the current transition to digital cinema within the history of technological change in the film exhibition business. Previous studies dealing with the industrial history of film exhibition have focused on the managerial decisions, diffusion of innovations, and technological changes that have shaped the industry (Gomery, 1992). However, rather than privileging technology as the primary factor accounting for change, I examine the power relations that constitute a broader structural context within which technological change is possible. In doing so, my approach resists technological determinism in order to identify the political, economic, and legal frameworks that enabled technological transitions.

Technology may be understood as dialectically situated between democracy and capital. When used for democratic purposes, technology interconnects citizens from around the globe for purposes of organizing political action, facilitating dialogue, or enabling cultural exchanges. In order to be used for purposes such as these, technology must be participatory. That is, citizens must have the ability to access the technology and be able to use it to connect with others. On the other hand, technology may be controlled by capital, particularly within an industrial context, in order to extract greater surplus value from commodities by supplanting labor processes or eliminating spatial and temporal barriers that impede the rapid circulation of commodities (Braverman, 1974). Therefore, technology needs to be viewed as a complex phenomenon that interacts with the economic, political, and socio-cultural spheres of life. However, the technological changes discussed here occur within the industrial context of the United States film industry and have been carefully orchestrated by certain key corporations for the

maximization of profit. Although the historical context within which each technological change takes place may vary, the process of corporate control remains consistent. Therefore, technological change in an industrial setting is always controlled by capital and used for the maximization of profit, regardless of the aesthetic novelties promised by each technological change.

Indeed, film history is often defined in terms of technological change: silent films were followed by sound films, which eventually added color, surround sound, computer-generated imagery, etc. Such a neat chronological history of film technology suggests that changes in technology were rational and inevitable. However, the adoption of a new technology rarely occurs because of technological sophistication, but rather as a result of a broader set of existing power relations among institutions (Wasko, 1994). Corporations secure patents for inventions, granting them a limited monopoly for the commercial exploitation of the technology. Then, corporations defend their monopoly and stifle competition by securing patents for hundreds of possible variations on the technology (Noble, 1977). In doing so, the corporation is able to license a technology for widespread industry adoption, thereby maximizing profit while individual inventors become reliant on corporations for the development of their ideas. Therefore, technological change in any industry needs to be viewed as a carefully calculated and highly controlled undertaking within an economic, political, and legal framework that allows for commercial exploitation. To this end, I demonstrate how two previous changes in film technology illustrate this tendency. Specifically, I focus on the advent and adoption of a standardized film projection system and the implementation of a standardized sound format for film exhibition.

CHAPTER 2

FILM EXHIBITION AND TECHNOLOGICAL CHANGE

Technological change is rarely an inevitable development within an industrial context (Gomery, 2005). Rather, technological change is driven by profit motives inherent in capitalist industrial enterprise. Accordingly, I demonstrate how film exhibitors have sought to capitalize on new technologies throughout the history of the film industry. Specifically, I explain how film projection technology was successfully controlled by Thomas Edison and the Edison Manufacturing Company. Similarly, the advent and adoption of sound technology was controlled by Western Electric, a wholly owned subsidiary of American Telephone and Telegraphy (AT&T). In each case, corporations were able to secure the necessary patents for each technology, which allowed for the commercial exploitation and widespread adoption of those technologies. Furthermore, each corporation acted within the economic and political structure of the time and was supported, for a time, by the law. As we will see, Edison's Motion Picture Patents Company was eventually dissolved in 1918 after the U.S. government filed an antitrust suit against the company (Conant, 1960). I will begin with a discussion of early projection systems, and then I will focus on the inclusion of sound in film exhibition.

The history of film projection technology offers an excellent case study for the link between aesthetics and economics. The development of film projection technology in the United States is tied to Thomas Alva Edison's development of the phonograph. By using the profits he had earned from the development of the phonograph, Edison sought a way to add a visual element to his phonograph, which led to the development of the

Kinetoscope (Richardson, 1967).[1] The Kinetoscope was developed in 1891 by W.K.L. Dickson while working at Edison's research laboratory. The device was patented in 1893 and was designed to exhibit an approximately 30 second motion picture to a single viewer, who activated the machine by depositing a nickel in the machine.[2] Within a year of its development, the first Kinetoscope parlor was opened in New York City in 1894, which featured five Kinetoscopes showing different motion pictures to customers. Soon thereafter, Kinetoscopes were installed in parlors, hotels, and storefronts in cities around the United States (MacGowan, 1954). In this sense, the Kinetoscope provided the impetus for the formation of a motion picture industry, but the single-viewer restriction of the device was antithetical to a form of mass entertainment. In order to reach a mass audience, motion pictures would need to be projected onto a screen.

The idea of projecting motion picture images on a screen was not new in 1894 but the technology was yet to be developed. After witnessing Edison's Kinetoscope on display in Paris (Neale, 1985), Auguste and Louis Lumière were the first to actually develop a motion picture projector. The Lumière brothers gave a public demonstration of their Cinématographe machine in 1895, which successfully projected moving images onto a screen. The device solved the single-viewer limitation of Edison's Kinetoscope by allowing for multiple viewers to enjoy a projected image. Although Edison noted in his Kinetoscope patent that the device could possibly be a projector, he had not seen the

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[1] Edison's Kinetoscope was just one of many devices developed to showcase motion pictures. I have focused on Edison's device primarily because of its role in providing a foundation for the motion picture industry in the United States.

benefit of developing such a device (MacGowan, 1954). However, within a year of the Lumiere brothers' exhibition of their projector, Edison gave a public exhibition of the Vitascope, which was developed by Thomas Armat and C. Francis Jenkins. The two inventors had originally called their projector the "Phantoscope," but the name of the device changed to "Edison's Vitascope" when production rights were granted to Edison. This capitalized on the widespread recognition of Edison's name as well as the patents Edison had pending on the film stock to be used in the machine via an exclusive agreement with Eastman Kodak.[3] Thus, Thomas Armat successfully developed the motion picture projector and licensed his projector to Thomas Edison, which provided the impetus for creating a form of mass entertainment based on the exhibition of motion pictures. During the years leading up to the turn of the century, rival firms and inventors sought to capitalize on the burgeoning motion picture industry by producing films in violation of Edison's patents and by importing cameras from Europe where Edison's patents were not valid. Between the years 1898-1902, Edison defended his position by engaging in patent litigation that either put rivals out of business or forced them to abide by his terms (Musser, 1991).

In the years that followed, Edison was embroiled in patent litigations to maintain his monopolistic position over the motion picture industry. As Edison focused his energy

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[2] Originally, viewers paid $0.25 to an attendant to activate the motion picture, but Edison was able to cut labor costs by installing the nickel-in-the-slot function.

[3] This information was taken from an autobiographical essay written by Thomas Armat in 1935. The article can be found in Fielding, Raymond (ed.). (1967). *A Technological History of Motion Pictures and Television.* Berkeley, CA: University of California Press

on battling other firms for control of the industry, the demand for film continued to grow and hundreds of independent firms began producing motion pictures. During the early years of the twentieth century, the creation of a film production company was still relatively easy as it did not require extensive amounts of capital. Consequently, this time period was marked by open competition in which hundreds of independent firms worked against Edison and other large firms for control of the burgeoning motion picture industry. Since Edison's attention was primarily focused on obtaining patents for his film cameras, he was not actively engaged in competing with the smaller independent firms. However, once Edison's patents were recognized by the courts, Edison used his patents to bring lawsuits against the independent firms for patent infringement. To effectively dominate the industry and eliminate the hundreds of independent companies, Edison allied with the seven largest American film production firms, two French producers, and the leading American importer-distributor of films to form the Motion Picture Patents Company (MPPCo) in 1908, which pooled all members' patents together for tighter control over the industry.[4] All members of the MPPCo acknowledged Edison's patents and agreed to work exclusively with those firms that had received licenses from the MPPCo. By controlling the industry in this way, Edison and the other top firms could structure the industry according to their terms and create barriers that would inhibit smaller firms from entering the business. Starting in 1909, the MPPCo used its patents and patent litigation to block entry of independent exhibitors into the industry and to

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[4] The MPPCo members included The Edison Company, The American Mutoscope and Biograph Company, The American Vitagraph Company, The Essanay Film Manufacturing Company, The Selig Polyscope

force non-MPPCo film companies out of the industry. Responding to this, the industry the United States government filed an antitrust lawsuit against the company in 1912, alleging that the MPPCo had "engaged in unreasonable restraint of trade and (had) monopolized commerce in films, cameras, projectors, and accessories" (Conant, 1960, 20). The MPPCo abandoned these practices in 1914, but was finally dissolved in 1918.

This brief overview of motion picture projection technology illustrates three very important points. First, the history of motion picture projection illustrates the importance of controlling new technologies by using the legal apparatus, specifically by securing patents on technological devices. Second, we have seen how patent litigation was used by Edison to stifle competition and maintain his position of power atop the oligopolistic motion picture industry. Finally, the creation of the MPPCo provides an excellent example of how multiple firms can pool their resources together in order to effectively dominate and structure an industry according to their terms. Moreover, Edison and the members of the MPPCo had access to tremendous capital resources, thereby giving them power to dominate the industry. Edison's exclusive agreements with Eastman Kodak for the film stock to be used in motion picture production and threatening to withholding films from exhibitors not in compliance with Edison's terms are two indicative examples of the exclusionary practices that the MPPCo used. Although the MPPCo was eventually dissolved, its patent litigation caused many independent producers to flee to Los Angeles where they were able to operate under relative freedom from MPPCo interference. The MPPCo represents the culmination of motion picture industry control through patent

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Company, The Lubin Manufacturing Company, The Kalem Company, American Star, American Pathé, and the distributor George Kleine.

litigation. The industry would not witness practices similar to those of the MPCCo until the introduction of sound.

The introduction of sound provides another example of powerful corporations shaping and controlling the motion picture industry through patent litigation. Although attempts to link sound to motion pictures were undertaken as early as 1889, I will focus on the widespread adoption of sound technology standards within the motion picture industry. Specifically, two different methods of wedding sound to motion pictures were developed in the early 1920s and each vied for widespread industry adoption: 1) the Vitaphone system, a sound-on-disc technology developed by the Warner Brothers film studio and controlled by Western Electric, a wholly owned subsidiary of the American Telephone and Telegraphy Company (AT&T); and 2) the Photophone system, a sound-on-film technology developed by General Electric (GE) and its co-owned subsidiary the Radio Corporation of America (RCA).[5] An additional sound-on-film technology, known as Movietone, was developed by Theodor Case and William Fox and was primarily used for Fox Movietone newsreels (Gomery, 2005). The Movietone system was also controlled by AT&T's Western Electric through a sublicensing agreement that allowed

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[5] At this point, RCA was a co-owned subsidiary of General Electric and Westinghouse, which, along with AT&T, had comprised the main players in the patent pool created by GE at the request of United States Navy when the US entered World War I. All three firms held key patents for manufacturing wireless point-to-point communication systems. The resulting Radio-Telephone Patent Pool continued after the war with AT&T controlling wired communication (telephony); GE and Westinghouse controlling wireless communication (radio); and all three companies experimenting in radio broadcasting. RCA was created by AT&T, GE and Westinghouse to specifically control the radio stations previously owned by American Marconi. The US Navy had appropriated those stations during the war due to Marconi's association with the British Navy. Because the post-war continuation of the patent pool was illegal, the Anti-Trust Division of the Department of Justice investigated General Electric, Westinghouse, and AT&T in the 1930s. Ironically, AT&T was simultaneously attempting to claim all of radio for itself. The upshot was complex but included GE and Westinghouse buying out AT&T's share of RCA.

AT&T to cross-license its technologies and block competitors from entering the industry. Therefore, AT&T's Western Electric controlled both a sound-on-disc technology and a sound-on-film technology, whereas RCA controlled only a sound-on-film technology. Consequently, Western Electric's sound-on-disc Vitaphone system would briefly become the industry standard, but RCA continued to use its Photophone sound-on-film system in its newly created film corporation, Radio-Keith-Orpheum (RKO). In what follows, I provide a brief description of Photophone and Vitaphone systems, as well as illustrate how the corporations controlling these technologies shaped the structure of the motion picture industry.

Warner Brothers was the first American motion picture studio to introduce sound films through its Vitaphone format. The Vitaphone system combined sound with motion pictures by using a phonograph disc that accompanied the motion picture. Warner Bros. was a smaller studio in comparison to the other major Hollywood film studios at the time: Fox Film Corporation, Paramount Pictures, RKO, and Loew's Incorporated, owner of the Metro-Goldwyn-Meyer (MGM) studio. However, Warner Bros. was more financially aggressive than the larger studios. When Warner Bros. decided to take a risk on the Vitaphone sound system, the studio relied on financial assistance from Goldman Sachs to offset the cash-flow problems it was having at the time.[6] As a result, the Vitaphone Corporation was established, which formally leased the Vitaphone sound system from

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[6] Earlier, historians depicted Warner Bros. near bankruptcy at the time it leased the Vitaphone sound system (see Conant, 1960), but later research has shown that the company was experiencing cash-flow problems associated with aggressive business practices (see Cook, 1996).

AT&T's Western Electric (Cook, 1996). AT&T continued to improve the quality of the sound-on-disc technology, and the Warner Bros. studio subsequently released the first feature-length sound film, *The Jazz Singer*, in 1927 (Conant, 1960).

In addition to the sound-on-disc technology developed by Warner Brothers, AT&T's Western Electric also controlled a sound-on-film technology known as Movietone, which was developed by William Fox and Theodor Case. Fox and Case attempted to exploit their sound-on-film technology by producing newsreels that would accompany motion picture exhibitions. However, during the early 1920s, the Fox-Case Corporation did not have access to the resources needed to achieve such exploitation. Consequently, Fox-Case approached GE and RCA to suggest forming an alliance since GE had also developed a sound-on-film technology.[7] Rather than partner with the smaller Fox-Case Corporation, GE and RCA decided to compete with Fox-Case by creating RKO Pictures to enter the motion picture industry directly (Gomery, 2005). Fox-Case decided to turn over its patents to AT&T's Western Electric, which could more effectively compete with GE and RCA. As a result, Western Electric held patents for both sound-on-disc technology as well as sound-on-film. Before commenting on the extent of Western Electric's power, I will discuss the development of the Photophone sound-on-film system controlled by GE and RCA, which provides the second major form of sound film technology.

When Fox-Case approached GE and RCA to form an alliance, GE had already developed a sound-on-film technology known as Photophone. Sensing the possibility of

earning additional profits from its technology, GE gave its patent to its subsidiary RCA in order to exploit the technology in the motion picture industry. However, RCA was unable to compete with the powerful position of Western Electric. When a committee of five film studios – Paramount, MGM, Universal, First National, and Producers Distributing Corporation – formed in 1927 to determine which sound format would be chosen as the industry standard, Western Electric's Vitaphone system was chosen in favor of RCA's Photophone. In response, RCA entered the motion picture industry directly by creating RKO, which was a fully integrated film corporation (Wasko, 1982). Although RKO would continue to exclusively use RCA Photophone sound reproduction equipment, RCA could not compete with the powerful position of AT&T's Western Electric.

AT&T's Western Electric became one of the most powerful corporations in the motion picture industry, controlling 90 percent of sound film production through Electrical Research Products Incorporated (E.R.P.I.), a licensing division that established exclusive agreements with producers (Conant, 1960). This fact becomes even more pronounced when one considers that Western Electric and its parent company, AT&T, were previously not involved in the motion picture industry. However, Western Electric became dedicated to exploiting commercial opportunities other than the telephone in 1926 when it created E.R.P.I. Therefore, E.R.P.I. was responsible for exploiting multiple patent holdings for sound film technology through licensing agreements in the motion picture industry. E.R.P.I. accomplished near complete control of the motion picture industry in two ways: by withholding films from theaters not using Western Electric

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[7] The Fox-Case sound-on-film technology differed from the GE/RCA technology in that it used a variable

sound equipment and by requiring producers to pay royalties on all sound film productions. In this sense, E.R.P.I. engaged in similar exploitative behaviors to those of the MPPCo when projection technologies were introduced.

These case studies demonstrate how two previous technological changes were developed and implemented within the motion picture industry due to the decisions made by a few key corporations and their subsidiaries. Despite the differences in historical context and the corporations involved, the same economic logic seems to undergird the actions taken by the corporations in question. Those corporations established an oligopolistic structure within the motion picture industry during a period of technological change. Moreover, a single corporate entity was able to remain atop the oligopoly by exploiting a pool of patents for each technology. In the case of film projection technology, Thomas Edison solidified his position through patent litigation. When Edison and other large firms felt threatened by independent competitors, the large firms pooled their patents by creating the MPPCo, thereby consolidating power into a single entity that was able to eradicate competition through litigation. In the case of sound technology, two basic formats were developed, but AT&T's wholly owned subsidiary Western Electric was able to successfully exploit multiple patents by establishing exclusive licensing agreements with producers through its wholly owned subsidiary, E.R.P.I. Both MPPCo and E.R.P.I. illustrate the extent to which technological change can be driven by corporations and their subsidiaries that effectively monopolize industrial

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density recording as opposed to the variable area recording used by GE/RCA.

standards. With these considerations in mind, I will now discuss the objectives guiding my research.

CHAPTER 3

RESEARCH OBJECTIVES AND METHOD

The preceding discussion focused on the corporations that successfully shaped the structure of the motion picture industry during periods of technological change. The current transition to digital cinema systems provides a contemporary technological change that can be understood in relation to the historical precedent outlined above. Accordingly, I identify the firms controlling digital projection technology, including the exhibitors that stand to benefit financially from the digital transition. By identifying the latter, I determine the ways in which the film exhibition business is being structured in relation to digital cinema. Specifically, I wanted to know whether any relationships exist between corporations that may suggest collusive or monopolistic behaviors similar to those of the MPPCo and E.R.P.I. Ultimately, I use my analysis of the digital transition to suggest possible scenarios for the future of film exhibition.

In sum, then, the following research questions guide the research process:

RQ1: What is the current structure of ownership in film exhibition (i.e., what are the largest cinema chains, and how much of the market do these chains control)?

RQ2: Which firms are controlling digital projection technology through joint ventures, ad-hoc organizations, or collusion?

RQ3: Which exhibitors stand to benefit financially from the transition to digital cinema and how?

To address the research questions outlined above, I conducted document analyses. This section will discuss how I employed this method. I begin by discussing the sample, procedure, and measures for my document analysis, including my justification for using document analysis. The first portion of my research focuses on determining the current structure of film exhibition, specifically focusing on those entities controlling digital projection technology. I identify the major theater chains in the United States and assess their size as measured by number of movie screens as well as the geographic scope and location of their theaters. Having identified these firms, the second portion of my research focuses the ways in which certain firms are positioned to benefit financially from the transition to digital film exhibition. Specifically, I discuss how those firms have structured their business operations in order to benefit from the digital transition.

The present study is informed by a critical political economic perspective. Critical political economists investigate the power relations underlying the production, distribution, and consumption of resources (Mosco, 2009). The political economic perspective stands in opposition to neoclassical economics or, more simply, economics, which developed in the late nineteenth and early twentieth century when quantitative models were used to explain and predict economic phenomena. Rather than relying on the application of quantitative models or formulae, political economists maintain that economics is inherently political because economic decisions are characterized by both normative and teleological assumptions (Myrdal, 1971). Therefore, political economy responds to neoclassical economics by stressing the importance of the power relations that undergird economic affairs.

Traditionally, critical political economists have relied on a counter-hegemonic reading of official documents to determine the patterns of ownership and control within corporations (Bettig, 2009). Accordingly, I analyze documents from both primary and secondary sources. Primary documents included government filings, such as 10-K reports filed with the United States Securities and Exchange Commission (SEC) and annual corporate reports. Given the business disclosure requirements in the United States as defined by the Securities Act of 1933, I used the SEC filings to determine the ownership structures and business operations of major theater chains and their connections, if any, with larger corporations conducting business in other areas of the film industry. In addition, the SEC filings also allowed me to determine any strategic partnerships or third-party agreements the company has negotiated.

Aside from primary documents filed with the U.S. government, I also relied on additional sources. For example, press releases from corporations, professional organizations, or ad hoc entities involved in the transition to digital projection technologies provided additional information that supplements official government filings. Finally, trade publications provided reports on film exhibition in the form of news, commentary, or officially sanctioned corporate communications. The disclosures made in these secondary sources were compared to disclosures made in the primary documents, which yielded additional data concerning the structure and business operations of the entities in question.

Overall, my document analysis was concerned with obtaining qualitative disclosures about the ownership structures, business operations, and intellectual property rights for the corporations involved in the transition to digital projection technology.

Data was culled from a close reading of the documents with special attention given to possible sources of bias. For example, the 10-K filings with the SEC are prepared for potential investors and include "forward-looking statements" that may conceal the actual state of affairs within the corporation. Although my document analysis provided me with the advantage of a non-reactive approach to research, I remained aware of selective deposit and selective survival when analyzing such materials (Webb, Campbell, Schwartz, Sechrest, & Grove, 1981). Selective deposit and selective survival refer to the purposive inclusion or exclusion of certain types of data, respectively, and therefore caused me to consider the political, social, economic, and cultural context within which the documents were created.

CHAPTER 4

RESULTS

The transition to digital film exhibition in the United States occurs at three distinct tiers. The first two tiers are directly associated with the hardware used in digital projection. Specifically, the first tier includes patent holders for digital projection technology. The second tier involves the corporations that have been granted licenses to manufacture digital projectors using patented technology. Finally, the third tier involves the movie theaters in which the digital projectors are installed. I will begin by discussing the first two tiers of the digital transition, including the ad hoc organization responsible for developing standards for digital projection. Having identified the patent holders, manufacturers, and standards for digital projection systems, I then discuss the current structure of the motion picture theater business in the United States by providing quantitative data concerning the number of screens and theater sites for the largest theater chains. According to statistics for the film exhibition business, the top four theater chains accounted for 56% of the total box office revenues in 2008 (AMC Entertainment Inc, 2009). However, I will focus specifically on the business operations and ownership structures of the three largest exhibitors – Regal Cinemas, AMC Entertainment, and Cinemark – because these three exhibitors are working together to control the transition to digital cinema. Finally, I discuss the specific ways in which the Big Three are controlling digital cinema through joint ventures that exploit business operations outside of film exhibition.

In 2002, six major film studios – Disney, Fox, Paramount, Sony Pictures Entertainment, NBC-Universal, and Warner Bros. Studios – formed a coalition known as

Digital Cinema Initiatives (DCI), which was created to establish standards and specifications for digital cinema. The DCI specifications established standards for digital cinema systems in the following areas: digital cinema system frameworks, digital cinema distribution, packaging, compression, transportation, exhibitor or theater specifications, projection standards, and security measures. Although these standards established specific guidelines for digital cinema, the standards were broad enough to cover multiple digital cinema formats, including differing projection technologies and resolution formats. Currently, however, digital projection technology in the United States is dominated by Texas Instruments and Sony.

Texas Instruments holds the patent for digital light processing (DLP) technology, and Sony holds the patent for silicon x-tal reflective display (SXRD) technology. DLP technology was developed in 1987 by Dr. Larry Hornbeck while working at Texas Instruments and is currently the most widely used technology for digital projection. However, Sony's SXRD technology is gaining a more significant presence in movie theaters because the company is primarily focused on producing higher resolution projectors. Generally speaking, digital projectors are manufactured to project images in either 2K or 4K resolution. Although the cost of 4K projectors has started to decrease, the projectors are still more expensive when compared to 2K projectors. On the other hand, 4K projectors offer nearly four times higher resolution than 2K projectors. With such a significant difference in resolution, the industry is moving toward 4K projectors as the standard for digital cinema systems. However, 4K projectors require additional hardware to function properly, such as a 4K server that can handle the digital film file (Karagosian & Macdowell, 2005). Because of these additional factors associated with

installing 4K systems in theaters, 2K projectors have gained widespread adoption in theater chains. Moreover, Texas Instruments ensured greater use of its DLP technology by licensing the technology to independent hardware manufacturers, whereas Sony has chosen to use its proprietary SXRD technology solely in Sony projectors. Table 1.1 provides a listing of the three corporations granted licenses to manufacture digital projectors using Texas Instruments' DLP technology, including the location of each corporation's headquarters. In what follows, I offer a brief description of each company's business operations.

Table 1.1

Licensed Manufacturers of Digital Projectors Using DLP Technology

Company	Location
Christie Digital Systems	Kitchener, Ontario
Barco	Kortrijk, Belgium
NEC Corporation	Tokyo, Japan

Christie Digital Systems is a privately held company that describes itself as a visual solutions company, providing projection technologies for entertainment, business, visual environments (i.e., virtual reality), and control rooms (Christie Digital Systems, 2010). The second licensed manufacturer is Barco, which describes itself as a global technology company that designs and develops visualization solutions for medical imaging, media and entertainment, infrastructure and utilities, traffic and transportation, defense and security, education and training, and corporate audio-visual needs. Barco

conducts business in more than 90 countries and posted €638 million in 2009 (Barco, 2010). Finally, NEC Corporation divides its business operations into six categories: information technology (IT) services, IT products, network systems, social infrastructure, personal solutions, and electron devices. For 2009, NEC's consolidated net sales totaled ¥4215.6 billion (roughly $46 billion) and the company ranked #727 on Forbes list of the world's 2000 largest companies (NEC Corporation, 2009; Forbes.com, 2010).

In sum, Texas Instruments and Sony hold patents on the most widely used form of digital cinema projection technologies. While Sony has concentrated on developing and manufacturing higher resolution projectors, Texas Instruments has gained widespread adoption of its DLP technology because it has been used in 2K projectors. Furthermore, Texas Instruments has granted licenses to Christie, Barco, and NEC for manufacturing projectors using DLP technology. Sony, on the other hand, has focused on producing 4K projectors using its proprietary SXRD technology, which offer higher resolution than 2K projectors. As the cost of 4K projectors continues to decrease, more exhibitors may choose to install 4K projectors in their theaters. In this sense, exhibitors will have a significant impact on how the transition to digital cinema will progress. In order to gain a better understanding of how digital cinema is controlled at the level of exhibition, I will discuss the current process of structuration underway within the film exhibition business in the United States.

The motion picture theater industry in the United States is currently dominated by the top three theater chains – Regal Cinemas, AMC Entertainment, and Cinemark (collectively referred to as "the Big Three") – which have consolidated their size and power atop the industry through acquisitions and mergers. Furthermore, the Big Three

theater chains are working together to control digital cinema. Table 1.2 provides a quantitative assessment of the concentrated power atop the motion picture theater industry and the trend toward consolidation is unlikely to cease any time soon. In fact, AMC Entertainment recently agreed to purchase the Kerasotes Theatres chain, which will further consolidate theater ownership in the top three exhibitors. The merger will result in AMC owning the entire Kerasotes Theaters chain with the exception of three properties that will be retained by Kerasotes (Kerasotes Theaters, 2010). To understand the ways in which the Big Three are solidifying their position at the top of the motion picture theater business, we need to consider the business operations and ownership structures of the Big Three exhibitors as well as the specific ways they working together to control digital cinema.

The largest theater chain belongs to Regal Cinemas.[8] Regal claims to "operate the largest and most geographically diverse theater chain in the United States," which includes the wholly owned subsidiaries of Edwards Theaters, Hoyts Cinemas, and United Artists Theater Company chain (Regal Entertainment Group, 2010). Regal Entertainment Group is the ultimate owner of all Regal properties, including the aforementioned wholly owned subsidiaries. The company's theaters are located solely in the United States where the company has a presence in 39 states as well as the District of Columbia. The highest concentration of theaters is located in the state of California where the company owns 97 theaters. Furthermore, Regal's theaters are located in 44 of the top 50 markets in the United States, giving the company a significant presence in major urban areas.

Table 1.2

Top Ten Movie Theater Chains in the United States and Canada

Company	Screens	Sites
Regal Cinemas	6,778	549
AMC Entertainment	4,612	307
Cinemark USA[9]	3,769	293
Carmike Cinemas	2,288	250
Cineplex Entertainment Ltd. Partnership	1,337	132
Kerasotes Theaters	933	95
National Amusements	920	67
Marcus Theaters Corporation	657	52
Hollywood Theaters	536	49
Rave Motion Pictures	473	30

Note. From National Association of Theater Owners (NATO), retrieved March 15, 2010 from http://www.natoonline.org/statisticscircuit.htm

The second largest exhibitor is AMC Entertainment, which provides one of the more interesting and complex cases for the purposes of this study. AMC Entertainment is owned by Marquee Holdings Inc., which is owned by J.P. Morgan Partners (BHCA) L.C. and other funds affiliated with J.P. Morgan Partners and Apollo Investment Fund V, L.P.

[8] Unless otherwise noted, the information for this section has been taken from the 10-K filings for the Big Three and their associated companies.

[9] Note that these figures apply only to Cinemark USA and does not include Cinemark's international theaters. In total, the Cinemark chain operates 424 theaters with a total of 4,896 screens.

Marquee Holdings Inc. conducts no business operations of its own, but serves strictly as a holding company for AMC Entertainment. The merger of Marquee Holdings into and with AMC Entertainment occurred at the end of 2004, and AMC Entertainment underwent significant structural transformations beginning in March of 2005. AMC Entertainment began divesting itself of theaters located in foreign markets, such as Japan, Hong Kong, Spain, Portugal, Argentina, Brazil, Chile, and Mexico. In addition, Marquee Holdings acquired LCE Holdings Inc., which served as the parent company for the Loews Cineplex Entertainment Corporation. Interestingly, LCE Holdings was formed by investment funds associated with Bain Capital Partners, Spectrum Equity Investors, and The Carlyle Group, all of which are major private equity firms. The resulting theater chain owned by AMC Entertainment includes the Loews and General Cinema brands, and AMC Entertainment now owns theaters in 30 states as well as the District of Columbia in the United States. Similarly to Regal, AMC's theaters are located in major urban markets throughout the United States. In addition, AMC owns theaters in Canada, France, and the United Kingdom as well as a partial interest in two theaters located in Hong Kong.

The third of the Big Three is Cinemark. Cinemark owns itself as well as the Century Theaters chain. However, Cinemark is unique from the other two of the Big Three in its geographic scope. Cinemark owns theaters both domestically and internationally. Domestically, the company owns theaters in 39 states with its largest presence in the state of Texas where it owns 79 theaters that account for 1,024 screens. As opposed to the major urban markets served by Regal and AMC, Cinemark's domestic theaters are primarily located in mid-sized markets. As a contrast to its domestic theater operations, Cinemark owns theaters in major urban Latin American markets, including

Brazil, Mexico, Chile, Columbia, Argentina, Peru, Ecuador, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, and Guatemala. Most significantly, 72% of Cinemark's international theaters have no direct competition from other theater operators, giving the company a monopolistic position within those markets (Cinemark Inc., 2010).

While each of the Big Three has unique characteristics, the size and scope of their operations become staggering when considered as a collective. The Big Three account for nearly 40% of the total screens in the United States, and the inclusion of Cinemark's international theaters provide an additional 130 theaters with 1,066 screens in thirteen Latin American countries.[10] Furthermore, the Big Three maintain a connection to a major financial institution via J.P. Morgan's ownership of AMC. The connection to J.P. Morgan allowed the Big Three to receive $525 million to aid in the rollout of digital cinema projection systems (DiOrio, 2009). Aside from their access to capital resources, however, the Big Three have controlled the transition to digital cinema in other important ways.

The Big Three have pooled their resources to effectively control the transition to digital cinema systems through two joint venture operations. The first joint venture, known as Digital Cinema Implementation Partners (DCIP), is an independent corporation that secures funding and negotiates agreements with major film studios for the implementation of digital cinema systems. The second joint venture is known as National CineMedia (NCM), which serves as an in-theater advertising network and distributor of

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[10] According to statistics from the National Association of Theater Owners for 2009, the Big Three account for 39.2% of the total indoor screens and 38.6% of the total screens. When AMC acquires Kerasotes, the Big Three will control approximately 41.7% of the total indoor screens and 41% of the total screens.

non-feature film content. In what follows, I discuss these two joint ventures in greater detail by focusing on their business operations.

All business operations of the Big Three related to digital cinema take place through DCIP. Accordingly, each of the Big Three maintains an equal voting interest in the company, which was created to finance, procure, and deploy digital cinema projection systems. Primarily, the company negotiates with film studios and financial institutions to secure funding for the digital transition. As producers and distributors of digital films, studios will save on costs associated with shipping material film prints to exhibitors. Consequently, studios have agreed to pay virtual print fees to exhibitors to offset the savings of shipping material film prints. These virtual print fees will be collected by DCIP through its subsidiary Kasima. In addition, DCIP announced it had secured a total of $660 million for the rollout of digital cinema systems, which includes $445 million from major financial institutions, such as J.P. Morgan, GE Capital, Sumitomo Mitsui Banking Corporation, Barclays Bank, Credit Suisse, Morgan Stanley, Bank of America Merrill Lynch, Deutsche Bank, and Citi (Digital Cinema Implementation Partners, 2010). Undoubtedly, these financial institutions see digital cinema as a viable investment opportunity.[11] In addition, DCIP offers to lease digital cinema equipment to other exhibitors that negotiate agreements with DCIP. This provides the Big Three with one way to control the diffusion of digital cinema projection technology to competing exhibitors. Since smaller independent or regional theater chains do not have access to the types of funding provided to the Big Three via DCIP, those exhibitors may rent digital

cinema equipment from DCIP if they are unable to secure independent funding for the transition. While DCIP is primarily focused on the financing and deployment of hardware for digital cinema projection, the second joint venture of the Big Three provides a means to exploit content-related business operations.

Through the second joint venture, National CineMedia (NCM), the Big Three offer an in-theater advertising network as well as distribution of non-feature film content through its subsidiary Fathom Events. NCM is slightly different from DCIP in its ownership structure. Whereas the Big Three own DCIP equally, they hold differential ownership stakes in NCM: Regal owning 25%, AMC owning 18.5%, and Cinemark owning 15%, which accounts for a total of 58.5% ownership. The remaining 41.5% is owned by National CineMedia Inc., which serves as a holding company for the operating company National CineMedia LLC. Through the operating company, NCM develops, produces, sells, and distributes content that is exhibited via its on-screen pre-feature program called *FirstLook*. The advertising programs featured in *FirstLook* primarily come from national advertisers, but the NCM network allows local vendors to purchase advertising spots within the program cycle. In this sense, the *FirstLook* program operates in a manner similar to local television broadcasts, whereby local vendors may purchase advertising time from the network affiliate but national ads are also featured. In addition, NCM offers advertising programming for display in theater lobbies, thereby immersing moviegoers in what might be called pre-show "advertainment." The advertising

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[11] Consider, for example, the inclusion of GE Capital in this investment group. GE owns both GE Capital and NBC-Universal, which owns Universal Studios.

operations of NCM account for 88% of its total revenue, but NCM also distributes non-feature film content to its network of theaters through its Fathom Events subsidiary.

Fathom Events markets and distributes alternative content throughout the NCM network. Alternative content, in this sense, refers to non-feature film content, such as live and prerecorded special events like contemporary music concerts, theatrical performances, and sporting events. For example, programming recently offered by Fathom Events included live performances at the New York Metropolitan Opera, Glenn Beck's *The Christmas Sweater: A Return to Redemption*, a live concert performance by The Black Eyed Peas, a live performance of *A Prairie Home Companion*, *Rifftrax* Live, the Floyd Mayweather versus Juan Manuel Marquez boxing match, and a screening of the documentary *Living in Emergency: Stories of Doctors Without Borders*, which was followed by a live discussion with some of the doctors featured in the documentary. In addition, Fathom Events enables theater space to be used for a variety of other purposes, including corporate meetings, training seminars, or religious services. In order to access the events offered by Fathom and the advertising network provided by NCM, exhibitors must enter into an exhibitor services agreement (ESA) that grants NCM exclusive rights to sell advertising as well as meeting and communication services in their theaters.

In sum, the Big Three control the digital transition in two important ways: at the level of finance and hardware as well as at the level of digital content. Through AMC's close ties with J.P. Morgan, the Big Three secured the financing necessary to equip their theaters with digital cinema projection technology. Furthermore, NCM and Fathom Events provide advertising revenues and alternative content to theaters owned by the Big Three. Any other exhibitor wishing to benefit from access to the premium alternative

content offered by Fathom Events must sign an agreement that grants NCM exclusive rights to sell advertising as well as meeting and communication services in their theaters. Unless independent or regional exhibitors are able to secure independent financing for the implementation of digital cinema projection technologies in their theater chains, they may be forced to subscribe to the services offered by the Big Three. In such a system, independent and regional chains may become dependent on the Big Three for access to the benefits promised by digital cinema.

CHAPTER 5

DISCUSSION

Throughout this thesis, I have shown how corporations have effectively controlled periods of technological change. I began with a discussion of two examples from film history, whereby corporations used periods of technological change to solidify their position atop the film industry. Specifically, I focused on the Motion Picture Patents Corporation's (MPPCo) control over film projection technology as well as the control of sound technology by Electrical Research Products Incorporated (ERPI), a subsidiary of AT&T's Western Electric. In each case, corporate control of these technologies reshaped the structure of the film industry and ushered in a hierarchy of power, whereby smaller firms were forced to comply with user agreements that would grant them access to the new technology of the larger firms. In using these two case studies as an historical background, I showed how similar practices are taking place today as film exhibitors experience the transition to digital cinema projection technologies.

I demonstrated how Regal Cinemas, AMC Entertainment, and Cinemark – collectively referred to as the Big Three – have combined their resources to control the transition to digital cinema through two joint ventures. On the one hand, the Big Three have created DCIP to secure the funding and hardware necessary to equip their theaters with digital cinema projectors. On the other hand, the Big Three have created NCM, which serves as an in-theater advertising network as well as a distributor of non-feature film content. Fathom Events, a subsidiary of NCM, specifically focuses its business operations on marketing and distributing alternative content that can be exhibited to theaters that subscribe to the service. In order to gain access to NCM's services,

including the alternative content offered by Fathom Events, exhibitors must enter into an agreement that would grant NCM exclusive rights to sell advertising as well as meeting and communication services within the theaters of its subscribers.

The two joint venture operations of the Big Three provide an interesting turning point for the film exhibition business. The Big Three have now formally entered into business operations that have historically been detached from film exhibition, such as distribution operations now being conducted by NCM and Fathom. This fact becomes particularly striking when one considers the historical practice of fully integrated film studios providing access to premium first-run feature films only to those theaters owned by the studio.[12] Historically, this type of business practice led independent exhibitors to lobby for antitrust legislation, which eventually came in the form of the Paramount Decrees. This, of course, begs the question as to whether independent theaters or regional chains will be adversely affected by the business practices of the Big Three. For the moment, the trend toward greater consolidation within the film exhibition business does not seem likely to slow down. Therefore, the film exhibition business is becoming structured according to a distinct hierarchy of power. The Big Three have firmly established oligopolistic control over other regional and independent theater chains. Indeed, AMC Entertainment recently announced its acquisition of Kerasotes Theaters, one of the largest regional theater chains in the Midwestern United States. At the time of acquisition, Kerasotes was a subscriber to NCM and Fathom Events. Despite the resources provided by NCM and Fathom, Kerasotes did not have access to the same types

of funding provided to the Big Three, which raises another important issue when considering the digital transition.

As stated in the introduction to this thesis, one of the primary reasons that the transition to digital cinema projection systems was such a slow process was due to a lack of funding. Studios and exhibitors simply could not agree on who ought to be responsible for funding the implementation of digital projectors. The Big Three received an initial $525 million to fund the transition within their theaters due to their connection with J.P. Morgan. Subsequently, the Big Three received an additional $660 million with $445 million coming from J.P. Morgan and other large financial institutions. These funds were handled by the DCIP joint venture. Access to this type of funding has placed the Big Three at a significant advantage compared to independent and regional cinemas. Without the ability to fund the transition to digital cinema projection technology independently, smaller theaters have sought alternative means for procuring digital cinema systems. Moreover, exhibitors who wish to access the content offered by Fathom are required to sign agreements with the Big Three via NCM, thereby providing the Big Three with access to advertising revenues within the theaters of their competitors. In this sense, AMC's purchase of Kerasotes may provide the first example of similar events to occur in the future as the new hierarchy of power takes shape in the film exhibition business.

The Big Three exhibitors received funds from J.P. Morgan and other financial institutions but, in order to understand the current fiscal state of film exhibitors, we need to consider some historical context. Theater construction boomed beginning in the late

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[12] Studios were vertically integrated in production, distribution, and exhibition as well as horizontally

1970s and continued into the 1990s. Specifically, theaters were being turned into multiplexes and megaplexes featuring numerous screens per theater. Moreover, newly constructed theaters were conveniently located in commercial zones with many attached to shopping malls. To reduce initial investment costs associated with theater construction, exhibitors chose to lease space from shopping center developers. By saving on construction costs and remaining financially stable during the 1980s, exhibitors attracted investment from the financial community (Guback, 1987). Theater construction continued into the 1990s and many older theaters were refurbished to attract consumers to a unique viewing experience. Thus, cup holders, large seat backs, extravagant lobby designs, restaurants, and even gourmet food in some cases became part of the standard movie-going experience. Eventually, continued construction and refurbishment during the 1990s caused many exhibitors to become overextended financially. As a result, nine of the largest theater chains in the United States filing for chapter eleven bankruptcy status in the early 2000s. When one considers this fact, the increasing consolidation of ownership in the film exhibition business is understandable as exhibitors restructured their business operations and ownership structures. The transition to digital cinema provides another key moment to restructure the industry along distinct power lines.

Overall, I have attempted to establish the foundation for a more nuanced political economic analysis of film exhibition here by focusing on the current transition to digital projection systems. The transition provides one way to understand the current structure of the film exhibition business, as well as the ways in which the Big Three are controlling

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integrated in exhibition through the ownership of a theater chain.

the digital transition. Fueled by investment money from J.P. Morgan, the Big Three are solidifying their position atop the hierarchy of power in the film exhibition business. With access to significant amounts of capital, the Big Three are able to undergo the transition to digital cinema systems more quickly than other theater chains. In addition, the Big Three are conducting business operations that will force other theater chains to become dependent on their services in order to access exclusive content, such as the New York Metropolitan Opera, live sporting events, concerts, and other types of special programming. Therefore, the careful planning and implementation of technological change by corporations provides an opportunity to restructure the industry according to the terms of those controlling the technology. While I have contextualized the current transition to digital film exhibition within two historical case studies of technological change in film exhibition, a more nuanced analysis could focus on other important aspects of technological change. In what follows, I discuss possible areas for additional research.

To begin, a more solid theoretical understanding of digital technologies would establish an important conceptual framework that places digital technologies within the dialectical relationship between capital and democracy. I would argue that such a framework ought to stress the social aspects of technology rather than purely technical characteristics. Technology and the process of digitization can enable greater access to creative or cultural goods but, in order for this to take place, the technology needs to be truly participatory. Otherwise, digital technologies simply further the expansion of capital relations.

Within the context of digital cinema, digital projection technology has the potential to exhibit progressive forms of digital content, including locally produced media, non-commercial, avant-garde, alternative, or radical media productions. If digital cinema technology were used for these purposes, then theater chains could provide an exhibition outlet for independent media producers working with digital equipment, thereby truly democratizing the film industry. Independent and smaller theater chains could also use digital technologies to network with one another in creative ways, which would establish a reliable distribution network for independent producers. However, the Big Three have carefully coordinated the transition to digital cinema in order to provide a reliable network of theaters for the exhibition of exclusive content, particularly Hollywood films in 3-D format. In this sense, digital film exhibition simply becomes another format for recycling and repackaging intellectual property held by the major media conglomerates like News Corporation, Time Warner, Disney, National Amusements, and General Electric.[13]

In order to truly democratize theatrical digital cinema, a reliable theater circuit would need to exist for the exhibition of independent content. However, this begs the question as to whether the traditional form of theatrical exhibition remains a viable outlet for independent content, especially when online distribution and access provides a much easier means to accomplish such a goal. These are precisely the issues that a more solid theoretical understanding would account for as well as undertaking a more broadly based

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[13] As of this writing, General Electric and Comcast have preliminarily agreed upon terms to transfer ownership of NBC-Universal. If the deal is consummated, Comcast will assume 51% ownership and General Electric will retain 49%.

interrogation of the ways in which exhibition and access play an important role in media economics.

Secondly, my case studies have demonstrated how corporations and their subsidiaries have carefully orchestrated the process of technological change within film exhibition, but each case study occurred within a unique historical context. For example, I briefly discussed how the costs associated with starting a production or exhibition company were very inexpensive when film projection technology was first introduced. Anyone with access to a camera and space for exhibition could easily enter the film industry. Indeed, Edison faced competition from hundreds of independent producers and exhibitors looking to profit from the high demand for filmed entertainment. This was precisely the reason for the formation of the MPPCo.

By pooling the members' patents, the MPPCo threatened to sue independent producers and exhibitors for infringement upon patented devices and materials. Rather than engaging in a legal battle with Edison and the MPPCo, many producers and exhibitors simply chose to shut down their operations. Those producers and exhibitors that wanted to continue operating would need to abide by licensing agreements established by the MPPCo. In this sense, technology that was being used on the periphery of the burgeoning film industry became centered in the core, which was comprised of powerful corporations looking to exploit the commercial potential of projection technology.

Similarly, the Big Three are concentrating digital projection technology within their theater chains and restricting competitor's access to the technology by requiring rival exhibitors to abide by licensing agreements. Only by agreeing to these licensing

agreements can rival exhibitors gain access to the content provided by NCM. Consequently, the licensing agreements allow the Big Three to derive revenue from advertising sales within rival theaters. In sum, the process of structuration during times of technological change remains the same even though each change occurs within different historical contexts.

Thirdly, I have focused specifically on the digital transition within the United States. The global transition to digital cinema is underway as well. Neither Regal or AMC own theaters outside the United States, but Cinemark owns properties in Latin America. Moreover, we know the Big Three have received substantial amounts of capital from J.P. Morgan and other financial institutions to accelerate the rate of implementing digital cinema systems. Further research tracing the ways in which capital, digital projection, and digital content is being distributed around the world would provide important insights into the global digital transition. Such research may reveal significant interconnections among the corporations controlling and financing the digital transition at the national and international levels.

The establishment of a global digital cinema network will have important implications for international film distribution. Depending on the scope of digital integration, we may witness a significant change in the spatial and temporal dynamics of film distribution. For example, digital cinema could make possible the simultaneous release of films on a global basis. Arguably, this could reduce or eliminate piracy. The effectiveness of this tactic, however, is dependent on differing national contexts and the results remain to be seen.

Fourthly, aside from the spatial and temporal aspects of a global analysis, additional research might also concentrate on other areas associated with the digital transition, including companies specializing in digital cinema system integration. I have discussed the digital cinema system implementation services provided by DCIP, but DCIP is not the only company providing such a service. The Cinema Buyers Group, which is controlled by the National Association of Theater Owners, has contracted AccessIT[14] as the preferred vendor for digital cinema system installation for its smaller and independent member theaters in North America (National Association of Theater Owners, 2008). Aside from AccessIT, Kodak and Technicolor also offer digital cinema implementation services and similar firms exist worldwide. Corporations like these can provide an additional area for research that could yield interconnections among those corporations, the corporations controlling digital cinema, and global financial institutions. The full extent of these interconnections is currently difficult to discern because the transition is still underway both domestically and internationally. As the transition takes shape internationally, we will need to interrogate these types of interconnections within national contexts while remaining conscious of the global connections as well.

Fifthly, the types of programming made available through the use of digital film prints and digital networks deserves closer attention. After all, the rhetoric surrounding digital cinema focuses on its ability to provide exhibitors with greater choice in the types of content shown in their theaters. I have briefly mentioned a few examples of content

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[14] The contract for digital cinema installation was awarded to AccessIT, but the company changed its name to Cinedigm Digital Cinema Corporation in 2009. The company is publicly traded and specializes in

exhibited in digital format, but digital cinema systems enable theatrical space to be used for many different types of purposes. If digital film exhibition truly democratizes the film industry, then we ought to be able to document creative and alternative uses of digital cinema space. Rather than simply providing space for corporate meetings, recycled film texts, or advertainment, digital cinema space can be used to connect citizens around the world. This scenario seems unlikely, however, since it would require Hollywood and the Big Three to relinquish a certain amount of control. On the other hand, independent or alternative media producers may choose to license their content to NCM, which would give them a substantial theatrical release for their independent content. A systematic examination of the types of programming made available by NCM would determine the degree to which such collaboration is possible.

Finally, further research will also need to address the implications that the digital transition will have for laborers working in the film exhibition business, especially projectionists. Projectionists skilled in the assembly of material film prints and maintenance of film projectors will face significant challenges. In fact, skilled projectionists may be out of a job altogether as the industry begins to distribute digital film prints. Presently, material film prints are far from obsolete, but the implementation of digital cinema systems eliminates the need for skilled projectionists. Traditionally, films have been sent in canisters that contain reels of film stock. Projectionists then splice the film print together as well as the trailers that will precede the feature film. Once assembled, the film is placed on a spool and threaded through the projector.

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services associated with the transition to digital cinema, such as technology, software, finance, and content delivery.

Projectionists are also trained in troubleshooting in case any part of the system malfunctions. At the end of the theatrical run, the film print is disassembled and shipped back to the distributor. Digital film prints, on the other hand, are currently delivered in three different ways: via satellite uplink, fiber-optic cables, or by shipping a hard drive containing the film. In each case, the exhibitor simply needs access to a decryption key to access the film. In this sense, accessing digital film prints operates similarly to downloading a file to your computer, which eliminates the need for skilled laborers. Those projectionists wishing to keep their jobs may find recourse in receiving training for digital projector maintenance and operation. However, the effects of the digital transition raise some serious issues regarding the nature of technological change and its effects on the labor process.

The transition to digital film exhibition provides an important and germane moment for political economic analysis. The film exhibition business is becoming structured according to a distinct hierarchy of power. Specifically, the Big Three exhibitors in the United States are controlling digital cinema at the levels of finance, hardware, and content. In order to gain access to the services provided by the Big Three, exhibitors must surrender rights to sell advertising within their theaters. Such exclusionary business practices are reflective of previous technological change when the film industry was restructured according to the terms set by powerful corporations and their subsidiaries, such as the MPPCo, General Electric, or AT&T's Western Electric and E.R.P.I. The fact that the Big Three exhibitors are working together to control digital cinema in the United States certainly calls for more research and detailed analysis as the digital transition continues in the coming years.

The digital transition will have significant consequences for the relationship between exhibitors and film studios as well as the studios' parent companies. If the largest movie theater chains become fully digitized, studios and their ultimate owners will further usurp the rulings of the Paramount Decree in 1948 that ordered the divestiture of theater operations. I foresee a more concerted effort to reintegrate movie theaters into larger media conglomerates, which Time Warner and National Amusements, owner of CBS and Viacom, have already done. Undoubtedly, the justification for further reintegration of theaters would allude to the cornucopia of digital technologies capable of providing access to content. Theatrical exhibition, then, would simply provide one of many options for accessing content, and media conglomerates would claim that reintegration is a logical step in removing old barriers that inhibit free trade. To resist greater consolidation and control within the particular context of film exhibition, we need to understand the underlying logic of the Paramount Decrees, which stressed barriers to open competition and exclusionary business practices. We need to reassert the importance of open competition, diversity, and democracy in ever-consolidating media industries.

The transition to digital cinema projection technologies is still an ongoing process and the novelty of the film viewing experience promised by digital cinema may not continue to entice consumers. While the Big Three are establishing a network of theater space that can be used for new and unique purposes, the vast majority of productions shown using digital cinema technology have not substantially altered the movie-going experience. Old films have been recycled in digital or three-dimensional formats, as was the case for Disney's re-release of *Toy Story* in 3-D. Audience members pay an

additional $3 to $7 for ticket prices when attending special events or three-dimensional exhibitions. Currently, some audiences seem willing to pay the additional cost for the aesthetic experience, but I do not expect audiences to continue paying higher ticket prices, especially for recycled content. On the other hand, News Corporation's *Avatar* was produced specifically to showcase the capabilities of three-dimensional cinema. While the film was a success at the box office, the aesthetic novelty of the film needs to be kept in perspective. *Avatar* was produced specifically for three-dimensional exhibition from the first day of production. By contrast, most films are still produced for two-dimensional exhibition, but films released by major studios have been converted into three-dimensional formats to profit from higher ticket prices. For example, Time Warner's *Clash of the Titans* was released in three-dimensional format even though the film was not intended for three-dimensional exhibition.

While we may not yet understand the full implication of the transition to digital projection, we can certainly find examples from history that underscore the tendency of corporations to control periods of technological change. Popular rhetoric and corporate publicity campaigns tend to emphasize a unique aesthetic experience. However, we need to consider the intersection between aesthetics and economics. When one considers the ownership structures and business operations of media conglomerates, technological change simply provides an additional means for exploiting the intellectual properties held by those firms. Within the specific context of the film exhibition business, technological change has historically allowed a few corporations to restructure the industry according to their terms. Although technological change can enable increased creativity and greater democratization, these ends are not met when digital technologies are controlled by

capital and corporate interests. In this sense, corporate control provides an example of continuity throughout periods of technological change.

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