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Mapping Digital Cinema in the Kingdom: The Transition from Analog to Digital Technologies in the Thai Film Industry

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ABSTRACT

This article aims to map and analyze the processes that lead to the conversion from analog machineries to digital technologies within the Thai film industry during the decades 2010-2020. The infrastructures and practices that define Thailand's contemporary digital film industry result from a series of transformations that occurred when analog film technologies were disposed of in favor of digital technologies. The first part of the research analyzes the role of local audiovisual infrastructures and leading players involved in the film industry, while the second and conclusive part of the study focuses on the disruptive changes that occurred after the digital turn and underlines the main consequences of it. Ultimately this study points out how the digital turn has been mainly managed by the local oligopolies of the exhibition sector and was caused by introducing a specific technology: DCP or Digital Cinema Package.

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Introduction

Despite the fact that digital technologies have been part of Thai film cinema since the early 2000s[1], at the turn of the year 2013/2014, the Thai film industry abruptly switched its entire production pipeline from analog to digital. Until the last months of 2013, the Thai film industry adopted hybrid workflows: if production and post-production often employed digital technologies such as digital cameras and editing software, the final master for distribution remained analog 35 mm prints until that date; starting from 2014, analog film prints almost ceased to exist.

This paper will examine those processes to shed some light on how the digital turn happened in such a sudden and irreversible manner by placing the assimilation of new technologies and related sociotechnical changes at the center of the study.

It is important to anticipate that even though the digital turn in the Thai film industry can be traced to 2013-2014, when digital screening technologies were abruptly introduced in Thai Cinemas, this paper will also introduce a few relevant historical events of legislative and economic nature that characterized the film industry from the early '80s to the present day. In other words, the transition from analog to digital technologies did not took place as a smooth and stepwise process, but rather a disruptive transformation that finds its roots in the Thai film industry's deep structure.

Ultimately, it is essential to remark that this paper investigates the recent past to inspect ongoing technological processes critically and does not claim to predict future evolutions of the cinema sector. Instead, the final pages of the study will point out a few considerations that emerged during the analysis.

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[1] Paksa wayu (2004), directed by Monthon Arayangkoon, is the first Thai feature film entirely post produced with digital technologies.

Method

The landscape delineated in these pages results from a series of interviews conducted with about twenty renowned professionals of the Thai film industry (see Appendix A for list of interviewees) and have been cross-checked with an analysis of the few available data of film production, distribution and exhibition in the country. The interviewees are members of the film production, post-production and distribution sectors and Thai film scholars.

It is essential to underline that the Thai film industry lacks proper records, and the data gathered for this research were fragmented and often required oral confirmations from the various interviewees. So far, the only national source that proved to be reliable and that was able to provide accountable data on film production is the Film censorship board, under the Ministry of Culture; that being said, even though the censorship board keeps track of movies screened in Thai cinemas, it does not have a proper record of feature films actually produced in the country nor surveys the technologies employed for the production of such films. Overall, it has been rather difficult to find detailed information on the Thai film industry and ultimately this research is mostly based on accounts reported by the interviewees.

The arguments presented in these pages have been primarily elaborated, adopting the theoretical framework of the Social Construction of Technology, SCOT Theory, as a leading guideline. Therefore, the analysis outlined in these pages has been conducted, starting by framing the main socio-economical actors involved in the process and defining their involvement in the technological transition.

The interviews, that functioned as main source for the study, have been conducted in the perspective of the SCOT approach (Bijke, 1997): first defining the leading forces involved in the processes and secondly analyzing how those forces influenced the creation, the acceptance and assimilation of a certain technology or technological process, in this specific case digital film.

The contemporary landscape: Oligopolies, independents, Hollywood

In order to map the evolution of technologies involved in cinematic practices, the first necessary step is to underline the fundamental forces that dominate the contemporary film sector in the country and those active players that enforced the assimilation of digital technologies and contributed to their social construction. The following paragraphs will introduce the leading players involved and briefly outline the main events that historically led to the contemporary landscape.

One of the main characteristics of the Thai film industry is its inherent tendency towards an oligopolistic system. After World War II, Bangkok based Sino-Thai middle-class entrepreneurs progressively gained control over the whole film sector, replacing what had been until that moment an exclusive enterprise of the Thai aristocracy. Film agencies became a business in the hands of the new bourgeoisie while the other critical forces of Thai socio-political life, the military and the royalty, gradually abandoned direct involvement in the film industry. Thai governments started to show a lax attitude toward the cinema sector. Since the early ’80s, except for film censorship and a couple of legislative attempts to limit the unchallenged power of Hollywood distributors, Thai civilian and military rulers limited their intervention in the film sector by adopting a relaxed open market approach and letting the film industry virtually self-regulate. Inadequate investments[2], low taxations[3], and cloudy legislations increasingly become endemic features of the Thai film industry. These peculiar conditions enforced the rise of the two dominant players in the contemporary Thai film industry: the local oligopolies and Hollywood.

The oligopolies represent a small group of film conglomerates owned by members of the capital upper-middle class, often Sino-Thai descendants that progressively centralized the market under their control and became undisputed

[2]“Although Bangkok was now fully determined to make the most of the film industry as a tax collector, it was careful not to upset the "open door" stance imposed by the United States. As a rule, film tariffs were kept very low. Up to 1959, the rate was US$0.10 per 100 feet, a rate in effect since the 1930S. In 1959, it was adjusted to US$O.II per meter, which remained the rate until 1976” (Boonyaketmala, 1992, p. 74).

[3] “After World War II, while practically all the prime ministers of Thai- land paid lip service to the necessity of promoting a stronger indigenous film-production system, none actually launched effective policies to that end” (Boonyaketmala, 1992, pp. 73-75).

leaders in the 1980s[4]. These companies changed and reorganized their assets several times over the past forty years, but they constantly played a leading role over the three main segments of the film industry and market: production, distribution and exhibition. The leading companies that dominated the contemporary Thai film industry in 2020 are rival SF and Major Group that undisputedly dominate the exhibition sector; Sahamongkol Film International, Thailand's leading film distributor, and the three leading production companies, GMM Grammy, GDH559 and 5 Stars, which need the support of one another and often stipulate deals according to mutual needs. Notably, exhibitors and distributors often also operate as producers; M pictures, for example, is another prominent production and distribution company, and it directly operates as a subsidiary of Major Cineplex Group.

While the distribution and exhibition sectors are entirely in the hands of these dominant film conglomerates, the production segments still present a few independent production companies that often find funds, distribution and credits within international circuits. A small group of dedicated independent filmmakers and theaters operate outside the dominant circuit and counterbalance the film oligopolies' overall commercial approach. A prime example of Thai independent filmmakers is the internationally awarded director Apichatpong Weerasethakul, who oddly remains largely unknown to the average Thai audience.

The business model of the oligopolies, in particular the two leading cinema exhibitors, is predominantly based on the distribution of Hollywood feature films. Even though every year a considerable number of truly autochthonous movies is produced (see Table 1), the exhibition of American films indisputably holds the most considerable portion of the film market. With a yearly average of 75.0% market share over the past two decades[5], Hollywood has established itself as the true driving force of the contemporary Thai cinema business.

Table 1 Screens, Digital Screens and Film Produced in Thailand 2008-2017

Year	Total Number of Screens	Digital Screens	Films Produced
2008	737	18	54
2009	-	44	37
2010	752	82	49
2011	-	-	53
2012	846	-	-
2013	-	813	-
2014	969	961	60
2015	1,055	1,055	59
2016	1,154	1,154	38
2017	-	-	32

Hollywood productions have prevailed on Thai screens since the birth of the media itself, and the reasons explaining the dominance of American companies over the Thai film industry are multiple and find their roots in the lasting relationships between the two countries (Sukwong & Suwannapak, 2001).

Before exposing Hollywood's role on the digital turn in the Thai film industry, it would be necessary to add a few considerations about how the local oligopolies established their influence over the market and how film technologies and practices were directly involved in shaping this process.

The first consideration regards a specific event that marked a structural rearrangement of the local film industry, and it is probably the most representative episode of the cloudy legislative

[4] "By the first half of the 1980s, an independent filmmaker could speak of "The Big Four Monopolies:" Apex Productions, Five-Star Productions, Sahamongkol Films, and Go Brothers. All of which were active in exhibition and Sino-Thai operated" (Boonyaketmala, 1992, p. 86).

[5] World Film Market Trends 2000-2020, European audiovisual Observatory, Cannes film market. With an in-depth look it can be observed that Hollywood is actually progressively increasing its market share: in 2019 the market share for locally produced feature films was only 15%.

and taxation system that characterizes the Thai film market. In 1977, the Thai government led by professor Tanin Kraivichian, admittedly inspired by the right-wing ideology of "King, Nation, Religion", attempted to limit the power of foreign distributors and boost the local industry by increasing the tariffs for imported films. The duty on foreign films was raised from the original 0.11 dollar per meter of printed film stock to 1.50 dollars per meter, making the import of foreign films a less profitable business. The new protectionist taxation on imported films led to a temporary boycott from the Motion Picture Export Association of America (MPEAA) that, for about four years, virtually stopped sending copies of American films to Thailand. As a consequence, the number of locally produced films increased conspicuously, and the industry saw the emergence of numerous newcomer filmmakers who would become key figures in the following decades of Thai cinema. The drought of American films in Thailand didn't last long, and in 1981, Hollywood distributors lifted the boycott and progressively re-established its dominance on Thai screens. The triumphant return of Hollywood films in the country was enforced by the structural changes that the local exhibition-distribution system faced as a consequence of new legislation. During the boycott years, to fulfill the lack of content caused by the sudden disappearance of foreign films, local distributors and exhibitors turned into producers themselves. By controlling the entire chain of film supply, from production to screening, a handful of local companies could increase their profits exponentially and steadily centralize under their control most of the aspects involved in cinema practices within the country.

These events had a disruptive impact over the industry, causing the disappearance of most of the local independent producers and, contrary to government expectations, over the long term, there was no substantial increase of locally produced films[6] . Towards the end of the century, only a few big companies continued to produce films in Thailand, but their core business returned to be the more profitable distribution and exhibition of American movies. This system allowed them to control transversally every aspect of the film business and transformed those companies into de-facto oligopolies. Oddly, the Hollywood comeback was facilitated by the decree itself that simplified the method of tax collection, but also created a counterproductive technical loop-hope: "The decree did not distinguish between positive and negative films. This meant that it was possible to greatly reduce the tariff per copy by bringing in the internegative, which could then be reproduced in a local laboratory, a practice widely used. As this loophole was never eliminated, the measures inaugurated by the regime were anything but a radical departure from the conventional Thai governmental approach to the film industry" (Boonyaketmala, 1992, p. 84).

A second consideration that helps explain the rise of the oligopolies concerns the specific sector that should be regarded as the dominant force in the Thai film industry: theatre chains. In the early '90s, multiscreen complexes started to replace stand-alone cinemas in urban centers worldwide, predominantly screening American productions, while run-down, stand-alone cinemas that kept operating upcountry screened B-grade locally produced films (Chaiworaporn, 2000, p. 156).

The closure of "Scala" theater, the last stand-alone cinema in central Bangkok, in July 2020, certified the death of traditional single screens in the country and the end of an era. The multiplexes boom and the introduction in 1993 of a new tax regulation on film import that reduced costs from USD1.50 to 0.40 for every meter of film marked Hollywood's final victory over Thai cinemas.

As it will be thoroughly explained in the following pages, the digital turn also enforced the dominance of multiplexes over the film business. When theaters had to move from analog projectors to digital screens, most of the smaller independent cinemas could not sustain the expenses and were forced to shut down while bigger theatre chains were able to meet the expenses and covert their screening rooms.

In the economic sphere, the contemporary core business of Thai cinema is based on American films screened in multiplexes. Locally made films can get a tiny piece of the pie if produced and distributed by the same companies that hold shares in the exhibitor sector, while independently produced films, production companies and independent screening rooms can hardly survive.

"...despite an almost alarming rise in the number of screens resulting from the multiplexing,

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[6] In terms of films produced by year, the end of the twentieth century marked one of the worst moments in Thai cinema history. The last decade of the century saw a progressive drop of the number of locally produced movies reaching the, almost, negative historical record of merely 9 feature films produced in 1999.

the industry entered into the monopoly era. No fledgling director in Thailand can rise without making a deal with one of the major companies, all of which control some aspects of the business" (Chaiworaporn, 2017, p. 158).

Since the primary method of analysis adopted to frame this paper theoretically is the social construction of technologies, SCOT, it is essential now to highlight that the key actors that shape every aspect of the Thai Film industry include its technological developments and, as expounded in the following section, the digital turn influenced by both local exhibitor oligopolies and Hollywood distributors.

The Digital Turn

When defining the main stakeholders involved, to better investigate the Thai Film Industry's digital transition, it is important to highlight which specific digital technologies played a significant role and proved relevant in defining the digitization process itself.

Starting from the early 1990s, the global film industry's digital turn has been defined by the progressive introduction of a wide range of technologies that at first integrated and later substituted analog film stocks and analog film machines. Implementing these new technologies had the primary objective of managing and improving the utilization of the whole process's pivotal element: digital files. As for most film industries worldwide, significant shifts in film production workflows can be traced back to the beginning of the twenty-first century, when post-production software and digital cameras started to be integrated into film production workflows. Even though both these types of machineries played a fundamental role in the development of the Thai film industry, this analysis will consider only digital post-production technologies and not further elaborate on the implementation of digital cameras. The main reason for this methodological approach is that since post-production software was introduced and integrated into film workflows earlier than digital cameras, it can provide a much more comprehensive timeline of when and how digital files became an integral part of the pipeline.

Adopting this perspective also points out how post-production facilities and film laboratories played a crucial role in the transition from analog film prints to digital files. The advent and assimilation of intermediate digital technologies started first (in Thailand as in the rest of the world) in post-production facilities, and thus, they represent the best possible evidence of the digitization process and its development. Digital cameras are certainly an essential component in the international digital film industry; however, their deployment became an integral part of the workflows and finally replaced the use of film stocks only when the digital turn was fully implemented in other sectors. In other words, digital cameras have been improved over the years in parallel to other technologies; however, they cannot be considered the leading cause of the turnover itself. The fundamental procedure that defines the life, characteristics and endurance of movies as physical objects should be traced in the mastering process, the final step of the post-production pipeline where films are given a tangible form for distribution and theatrical releases.

Furthermore, considering movies as physical objects designed to be screened in front of an audience necessitates, at this point, three cardinal theoretical factors that would help adequately frame the digital turn analysis in the following pages.

The first is that the screen-audience relation ultimately matters the most when investigating films as a cultural and social expression. Films are made to be watched and exist as a visual spectacle and as a physical manifestation when projected in front of an audience.

The second factor is that the screen-audience relationship is enabled by the technologies employed for distribution and screening purposes, and these technologies ultimately define the life of a movie in both practical and ontological terms. Films need physical carriers and technological apparatus to be watched; films exist and survive in time through carriers, digital or analog.

The third factor is the assumption that adopting this theoretical perspective ultimately justify the role of film distributors and exhibitors as the primary social forces involved and, in other terms, validate what has been stated in the previous pages regarding the SCOT method of analysis. Films as physical objects are primarily controlled by those that distribute and show them to an audience.

By establishing the theoretical framework, relevant technologies and the key players involved, we can finally investigate the Thai film industry's digital turn by first pointing out "the symptoms" that define it and, in a second step, reveal its cause. Considering the adoption of the social construction of technology as the leading theoretical framework for this analysis, the author of this paper suggests here to acknowledge as symptoms of a technological process, those tangible, relevant events that stress evident changes in the audiovisual industry but do not directly explain the processes per se. In the digital turn, the main symptoms are: the replacement of analog film projectors with digital screens, the closure of film laboratories and the renewal of production and post-production workflows.

Since a pivotal role has been attributed to the exhibitor sector, the most evident manifestation of the digital turn in Thai cinema is certainly the disruption of film screening practices. Starting from the mid-2000s, the conversion from analog projectors to digital screens happened almost simultaneously worldwide; in less than ten years, Thailand drastically reshaped theatres and completely abandoned analog screening practices. The radical change to digital screenings can be clearly illustrated through some basic data comparison (see Table 1). In 2010, with over a total of 752 screens in the country, only 82 were digital. In 2016, all 1,154 screens in the country were digital. Narrowing down the scope, it can be observed that the most significant change took place especially around 2013/2014, when the number of digital screens grew exponentially. In 2013, the number of digital screens suddenly rose to 816 nationwide and in 2014, of a total of 964 screens, 961 were already digital. In other words, within less than five years, screening practices moved entirely to digital, and the critical biennium when this took place seems to be 2013/2014.

Besides, it should be noted that over 600 analog screening rooms disappeared, or in many cases, were reconverted to digital. Still, this meant numerous stand-alone theaters ceased to operate. The number of screens is not directly related to the number of theaters, and, even though data on this section are patchy and unclear, it appears to be evident that the conversion to digital screening practices caused the final closure of numerous stand-alone cinemas. The record number of 1154 screens in 2016, countrywide, is easily explainable with the rise of multiplexes, the latest type of centralized cinema enterprise held by the film exhibition oligopolies.

The closure of film laboratories and the changes in production workflows are closely intertwined. Generally speaking, Thailand was relatively slow in assimilating digital technologies in filmmaking workflows. Editing software was the first digital technology to arrive in the country, and except for a few pioneers experimenting with them, it took several years before local filmmakers fully embraced digital files and post-production software. The first digitally post-produced movies of the Kingdom started to appear around 2004, but most of the post-production laboratories kept working solely with analog technologies during the following years. Even though offline editing slowly became part of the workflow, high-end feature films continued to be mastered and printed only on 35 mm film stock.

Several post producers interviewed for this research confirmed that the twenty years between 1994 and 2014 were a golden age for analog post-production in Thailand. By the late '90s, the local audiovisual industry became a regional hotspot for filmmaking and film processing as neighboring countries lagged in terms of skills and technologies. Bangkok post-production houses and film laboratories were thus able to attract commercial feature films and TV commercials from all over the region. Numerous facilities were based in the capital, some of them an integral part of the oligopolistic system (Kantana) while others operated more internationally (The Post Bkk, Technicolor). The whole industry, including both big conglomerates and independent filmmakers, homogeneously proceeded in the slow, gradual assimilation of digital intermediate technologies and apparently didn't feel the urgency of moving their workflows to an entirely digital pipeline.

The three masterpieces of the director mentioned above, Apichatpong Weerasethakul, produced and post-produced in Thailand, are symptomatic of the digital implementation in production and post production, and they can be schematically employed to illustrate the main chronological steps in the transition from analog to digital:

- 2005 "Syndromes and a Century" was entirely shot on 35 mm film stock, edited/color timed analogically and distributed on 35 mm prints.
- 2010 "Uncle Boonmee Who Can Recall His Past Lives" was shot in 16 mm., edited and colored digitally and distributed on 35 mm prints.
- 2015 "Cemetery of Splendor" was entirely shot, post-produced and mastered digitally.

Within less than ten years, the whole film industry switched from an entirely analog workflow to a fully digital audiovisual pipeline. If in 2005, movies were processed employing film stock from production to distribution, by the beginning of 2015, the entire film industry was operating solely with digital technologies. This also implies that by 2015 most of the film laboratories had dismissed their analog machineries and moved to a fully digital pipeline, and in many cases, they were even forced to shut down. Technicolor Bangkok, for example, permanently closed precisely in the early months of 2014, a clear symptom that significant changes were happening. It is relevant to underline here that over the entire film production and post-production pipeline, the only phase that remained analog for a more extended period of time is film printing. Movies started to be filmed and edited digitally in the early 2000s, but they kept being printed on film stocks for mastering until 2014 when this practice abruptly disappeared. The mastering process stayed analog longer than any other step of the film pipeline, and the reason behind it represents the real cause of the digital turn and is strictly related to the exhibitor sector.

The core issue of the process, the cause of the digital turn, can be outlined with a simple but essential question: How could a relatively small, underfunded and heavily unregulated industry adapt to this radical technological shift in a relatively short period?

The answer to this question can be found in the events that occurred around the end of 2013, when DCP[7], Digital Cinema Package, took over as the new and unique carrier for film distribution. As mentioned earlier, the crucial passage in the analog to digital transition can be defined by a significant change in the final step of the post-production pipeline: the introduction of digital carriers, DCP, and the substantial disposal of film stock as primary carrier for cinema distribution. Comprising the entire digital turn, these events saw as the main and only protagonists, the two actors broadly described above: exhibition oligopolies and Hollywood distributors.

For almost a century, the practice of sending internegative stocks and using them to print positive copies for distribution remained the standard procedure in Thailand. Hollywood agents would send only one internegative print to Thai distributors, who would print as many positive copies as they needed. When distribution agreement terms would later expire, Thai operators would destroy every positive copy they created and send the internegative back to the US. This seemingly irrelevant technical procedure characterized the entire industry since to follow the policies required by American distributors, theatre chains could only function if they kept operating analogically: to exhibit analog films, they would need analog film projectors. Consequently, local post-production studios, especially those heavily involved in the printing process, followed the same analog workflows and mainly employed analogical machinery for film processing. The rest of the industry, including the production sector, had to adhere to these practices, and this might help to explain why Thai film producers were at first reluctant to shoot native digital movies: if at the end of the pipeline, the movie would be printed analogically, they might as well have shot the film on film stock.

Everything suddenly changed in the last months of 2013 when American film agents abruptly declared that they would no longer ship internegatives and move to digital distribution by sending movies via Digital Cinema Packages, DCP. Films then suddenly stopped being films, and the Thai film industry had no other option than to deal with it.

The shift to DCP was implemented almost simultaneously worldwide. Numerous national industries developed over the years in a coordinated and strategic preparation for what was coming. For example, through specific initiatives such as IRIS and EURIMAGES, the European Union supported digital cinemas' development within its member states through continuous training and direct financing since as early as 2003. Large countries, such as France and U.K., in 2008 were already equipped with respectively 253 and 303 digital screens (European Audiovisual Observatory, Media Salles, 2009). Nevertheless, Thai film industry had to adapt to the changes imposed by Hollywood within a short period, without a proper plan or adequate support from the main stakeholder, Hollywood, or the central government. Hollywood film distributors and the local oligopolies are the forces that, respectively, caused and managed the final step of the digital turnover in Thailand. Hollywood imposed the change; local film exhibitors implemented the transition and the industry adjusted. The introduction of DCP technology caused, in fact, a series of significant correlated changes that marked the final step in the complete assimilation of digital technology by the Thai film industry.

Thus, screening practices were entirely renovated. Within a couple of years, the two leading theatre chains removed every single opto-mechanical projection device and replaced them with digital projectors.

While the oligopolistic exhibitors could sustain this expensive transition financially, most of the few remaining smaller stand-alone cinemas could not afford the digital conversion and were forced to shut down, especially upcountry. On the other side, a few independent screening rooms, running exclusively digital projectors, started to appear in the capital. The fracture between independent cinemas and leading exhibitors increased further. The dominant monopolies were finally able to conquer every corner of the country by screening American productions and unifying audience taste nationwide while the few independent cinemas (that is, Lido, House Sam Yan, Bkk Screening room) focused on intellectual, urban spectators with a “d’essai” type of programming.

[7] Digital Cinema Package (abbreviated as DCP) is a digital film print with a unique data format for picture and sound. The Digital Cinema Initiative, a partnership of the major Hollywood studios, has defined DCP specification in the “Digital Cinema System Specifications” in 2002 to standardize digital cinema distribution worldwide and set up a format that would be easy to handle and safe in terms of piracy. DCP files contain video, audio, subtitles and various metadata. More pieces of information can be found at: https://www.dcimovies.com/

The introduction of DCPs also led to new taxation forms and new deals on the screening minimum guarantee. Curiously, several financial aspects regarding taxes on the new digital practices are yet to be settled, like the conundrum on Virtual Print Fee, VPF, that, introduced in 2013 for a defined period of five years to economically support exhibitors for the conversion to digital technologies, is still enforced in 2020.

The exhibition practices were not the only sector of the industry affected by those changes, as the introduction of DCP technologies triggered a sort of chain reaction that forced every other sector of the film industry to finally embrace digital workflows in toto. One of the main consequences fundamental to this study is the disappearance of analog practices, knowledge and machines consequential to the closure of film laboratories. By the end of 2015, every post-production facility in Bangkok ceased operating with analog technologies. Some, such as Kantana and the Post Bkk, dismissed most of their analog machines, like scanners and printers, while other film laboratories, for example, Technicolor, which had as its core business printing copies of Hollywood films, abruptly closed its local office.

Thus, in 2020, only one company, G2D, continues to operate analog film machines, but this admittedly constitutes only a very minor part of their operations.

The imposition of DCP technology marked the end of analog film processing in Thailand, the end of an era and the disappearance of numerous crafts and skills that characterized cinema since its early days.

Conclusions

The advent of DPC technology marked the real beginning of the Digital Cinema Era in Thailand, and by the end of 2014, analog film technologies seemed already a thing of the past. A few additional considerations on this matter are necessary here to wrap the theoretical framework into which these processes took place and underline the role of the critical player that saved analog film technologies and knowledge: the Thai Film Archive.

The first consideration is that the two key players involved in the process, oligopolies and Hollywood, managed the whole transition almost independently. Even though significant changes could have been predicted at least ten years earlier, there was no government intervention or coordinated preparation for the digital turn. Once Hollywood distributors made the transition mandatory. The two leading theatre chains managed by themselves the whole transformation of their venues and consequentially of the entire film production pipeline. These facts are symptomatic of how the Thai film industry was dependent on Hollywood decisions and how it is still fundamentally controlled by the oligopolies of the exhibitor sector while, on the other hand, the government has avoided becoming involved in movie sector developments. Once exhibitors and distributors finally accepted the digital format for distribution, every other digital film technology became part of the filming workflow. Even though the benefits of employing digital cameras had been known for years, the integration of these machines became entirely accepted only when it was taken by the leading monopolies at the top of the production pyramid. Thus, it is quite evident that theatre chains in Thailand drive the industry and consequently, they define the timing and procedures of assimilating certain technologies.

Secondly, considering that the study was conducted by adopting the SCOT theoretical framework as the primary analysis method, it is essential to point out that the audience was not involved in the transitional process. Consumers, or better spectators, are the main social force that uses and enjoy films in theatres; films are made to be consumed by the audience, and screening technologies are the vehicle through which audiovisual products are ultimately experienced. According to the analysis conducted so far, film audiences did not participate in the assimilation of digital Di cinema, i.e., in other terms, they had no role in the negotiation of screenings practices. The leading technology involved in the digital turn was not socially constructed but rather imposed for economic reasons, a placid imposition welcomed by spectators without resistance. It can be assumed that most spectators did not even notice the transition and smoothly accepted the new mode of experiencing films; moreover, the changes mainly affected the modes of film production, but for the most part did not alter how the audience experiences movies.

As film scholar T. Elsaesser stated in his founding text, "Film History as Media Archeology," on some level, it is business as usual.

"The film industry, for nearly a hundred years, has been delivering the same basic product, the full-length feature film, as the core of the cinematic spectacle and the institution of cinema. Technological innovations there have been all along, but they have always been absorbed and accommodated, possibly reconfiguring the economics of production, but they have left intact the context of reception and the manner of programming. Digitization does not appear to have changed this state of affairs" (Elsaesser, 2016, p. 254).

The third and last consideration concerns the Thai Film Archive's role after the disruptions caused by the digital turn. The end of analog film processing and the sudden obsolescence of optomechanical technologies (OMT) marked a major disruption in cinema history and promptly placed films produced before 2014 in the realm of media archaeology. Film stocks rapidly became a format no longer relevant for the industry, and the consequential dismantling of film laboratories meant the loss of the technical skills necessary to handle analog film formats and machines. Once film laboratories closed, many of the professionals that worked in these facilities retired, taking with them all the knowledge that took years to be acquired but was suddenly no longer required. Furthermore, the transition to digital screening practices that the entire exhibitor sector went through within a few years meant that film produced before 2014 could not be longer watched unless they have been digitized. The oligopolies that own those films are partially digitizing their audiovisual collections, but most of the Thai films produced in the past are still preserved on analog carriers, waiting to be digitized or never be watched again.

By cleverly understating the critical and historical changes that the audiovisual media has been going through, The Thai Film Archive has played a pivotal role in saving and preserving those precious, disappearing skills and technologies. The Thai Film Archive has hired some of the skilled personnel from the dismantled film labs and also has acquired discontinued analog technologies for film printing and analog film screening. Today, the Thai Film Archive is one of the few places in the whole of South-East Asia that can handle analog film post-production workflows and, with its three brand new screening rooms, is the last surviving theatre in Thailand where analog projecting practices are still fully operational.

Thanks to the Thai Film Archive's actions, Thailand has saved century-old knowledge and secured for the future this invaluable audiovisual heritage.

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Appendix A: List of Interviewees

Chalida Uabumrungjit, Director at Film Archive Public Organization Thailand, 03/02/2020 and 04/12/2020

Sanchai Chotirosseranee, Deputy director at Film Archive Public Organization Thailand, 03/06/2020 and 03/12/2020

Paul Spurrier, Screenwriter, director and manager at Friese-Greene CineClub (Bangkok, Thailand), 18/06/2020

Sarinya Manamuty and Nicholas Hudson-Ellis, Founders and Managers of Bangkok Screening Room (Bangkok, Thailand), 19/06/2020

Panu Aree, Director of acquisitions at SAHA MONGKOL Film international (Bangkok, Thailand), 30/06/2020

Sirindra Mongkolnavin, Managing Director at LIDO CONNECT (Bangkok, Thailand), 02/07/2020

Pawarisa Nipawattanapong, Audiovisual Archivist at the Government Public relations department PRD (Bangkok, Thailand), 02/07/2020

Weston Thomson, Director of post-production at G2D (Formerly TECHNICOLOR) (Bangkok, Thailand), 03/07/2020

Anchalee Chaiworaporn, Independent researcher on Thai Cinema, 04/07/2020

Lee Chatametikool, Editor and owner White Light post production (Bangkok, Thailand), 10/07/2020

Picha Srisansaneem, Director of Photography and owner at Cinetoys (Bangkok, Thailand), 13/07/2020

John Galvin, Former consultant and colorist at Kantana/Spice shop/De lura, 23/07/2020

Adadol Ingawanij, Professor of Cinematic Arts at University of Westminster (London, UK.), 29/07/2020

Wiwat Lertwiwatwongsa, Manager at Documentary Club (Bangkok, Thailand), 16/08/2020

Bede Chang, Manager at Imagine Ritrovata Asia (Hong Kong), 21/08/2020

Adrian Wood, Manager at Restoration Asia, 10/09/20 and 28/09/2020

Visute Poolvoralaks, CEO at GMM Thai Hub, former Chairperson at MPC (Thai Producers Association), 17/09/2020

Piyapan Choopetch, Director, Former Film editor at Kantana (Bangkok, Thailand), 24/09/2020

Pornchai Wongsriudomporn, M Picture CEO (Bangkok, Thailand), 24/09/2020

Dome Sukvong, Founder and former director of Film Archive Public Organization Thailand, 04/12/2020

Kong Rittdee, Deputy director at Film Archive Public Organization Thailand, Journalist and Film Critic, 19/11/2020