The Journal of Arts Management, Law, and Society

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/vjam20

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To cite this article: Anne-Britt Gran & Terje Gaustad (2022) Digitizing Cinemas – Comprehensive Intended and Unintended Consequences for Diversity, The Journal of Arts Management, Law, and Society, 52:2, 101-116, DOI: 10.1080/10632921.2021.2018374

To link to this article: https://doi.org/10.1080/10632921.2021.2018374

Published online: 18 Jan 2022.

THE JOURNAL OF ARTS MANAGEMENT, LAW, AND SOCIETY
2022, VOL. 52, NO. 2, 101–116
https://doi.org/10.1080/10632921.2021.2018374

Routledge
Taylor & Francis Group

Digitizing Cinemas – Comprehensive Intended and Unintended Consequences for Diversity

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ABSTRACT
This article concerns digitization of film distribution and exhibition in the entire cinema sector in Norway, its comprehensive consequences for diversity - seen from the perspective of cultural policy. The results of analyzing complete cinema statistics for three years (2008, 2013 and 2017) indicate that the digitization process "from film reels to film files" contributes to strengthened diversity in terms of repertoire, distribution and new audiences. For policy makers, cinema operators and researchers, the study presents positive intended and unintended consequences of digitizing the cinema sector. These positive consequences offer cinema operators new opportunities when it comes to repertoire diversity.

KEYWORDS
Comparative digital cultural policy studies; digitization; diversity; cultural policy; movie theaters; cinema; unintended consequences

Introduction

This study explores anticipated and unanticipated, intended and unintended, consequences of digitization of the entire cinema[1] sector in Norway, with special focus on repertoire diversity, which is a main objective in media and cultural policy globally. Other forms of diversity objectives, such as democratic distribution and the demography of the audience, will also be discussed.

The application of digital technology in cinemas is primarily about replacing the old analogue celluloid film reels, which had to be physically transported from cinema to cinema, with digital film files that can be downloaded from the internet. This is an innovation in the logistics for circulating film copies, which is handled by the film industry's distribution sector, and in the exhibition sector, where cinemas apply complementary technology in the form of projection machinery. It may therefore be seen as a technological disruption in the cinema value chain with content implications (Salvador, Simon, and Benghozi 2019). Digital technology enabled both American blockbuster movies, new Norwegian films and niche films to be displayed at all Norwegian cinemas at the same time. In the analogue era, rural cinemas had to wait for days and weeks for film reels to become available from bigger, and thus prioritized, central cinemas as these reprogrammed to newer releases. Effectively, many rural cinemas were second-run theaters. From a cultural policy perspective, the objective of this digitization was to improve the conditions of the cinemas outside the big cities.

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In this particular technology application, only the cinemas themselves, and the distributors supplying them with films, are using the new technology, not the cinema audience. Yet, we find that digitization had major consequences for repertoire diversity and cinema operation, and this can be seen as the latest illustration of how relationships between technology innovations and content are particularly worth investigating in the cinema industry, which is the most technology-based of the historical cultural and creative industries (Benghozi, Salvador, and Simon 2017)

The adaption and application of new digital technology in the culture and media sector are comprehensive and unpredictable; it is always likely that unanticipated and unintended consequences will occur – positive as well as negative effects. Norway became the first country in the world to digitize all cinema exhibition and distribution between 2009 and 2012 – for both public and private cinemas. Of all European cinemas, only 70 percent were digitized by 2012 and from 2015 digitization slowed down with the share flattening out at 93 percent (EAO 2019). Norway is therefore a particular/critical case in that regard, since the whole cinema market was digitized in a period of a few years, including marginal cinemas that often lag in the digitization processes elsewhere. Furthermore, the Norwegian cinema-owners' association, Film & Kino (2012) (Film & Cinema), continuously updates their database containing both the repertoire and the tickets sales in all Norwegian cinemas. This enables analysis of the entire cinema repertoire (including titles and nationalities), all screenings and the number of visitors before and after digitization, both at the national level and at a more regional and local level, and we will explore both in this article.

Today, almost a decade later, we can identify a number of anticipated and unanticipated, intended and unintended, consequences of this particular digitization process. The Norwegian case is also much more similar to other European countries than it has historically been. Its unique municipal cinema system, which established a high share of publicly owned and operated cinemas, has gradually been dismantled since the turn of the century (Solum 2016). Therefore, due to the international nature and the common transnational patterns of cinema markets (Finney and Triana 2015), consequences we identify in Norway are most likely similar to those experienced elsewhere. However, these consequences are typically difficult to identify accurately as much of the necessary data on availability and ticket sales is kept confidential by cinema chains and distribution companies. The availability of data in the Norwegian system provides us with a unique opportunity to investigate the actual outcome of digitizing cinema exhibition and distribution. This article is therefore a significant contribution to "the promised land of comparative digital cultural policy studies" introduced by Roberge and Chantepie (2017, 295). Our findings will be relevant for other countries where digitization of the cinema sector is taking place right now, even if the entire sector is not digitized as a whole, as was the case in Norway.

Our main research questions are: What are the consequences of digitizing the film reels for diversity of physical distribution (the number of cinemas) and the cinema repertoire? How did the smaller rural cinemas meet digitization in terms of programming? The article aims to identify important consequences of digitization for diversity, relevant to ongoing digitization processes in both the movie industry and in national cultural policy. Overall, we focus on the interconnections between digitization processes, cultural policy and diversity. Digital culture, digital distribution and consumption have been in the periphery of cultural policy for years in European countries, but this is slowly changing, also in the research field (Roberge and Chantepie 2017; Chantepie 2017; Hylland 2020; Valtysson 2020). In the latest white paper on cultural policy in Norway (Norwegian Ministry of Culture, 2019) there is a separate chapter on digital opportunities. The topic of "digitization and diversity" and the role of cultural policy is of recent date (Gran et al. 2019a; Gran, Røssaak, and Kampen Kristensen 2019b), and our article on cinemas is another contribution to this digital diversity discourse.

Digitization, cultural policy, and diversity dimensions

Ever since UNESCO's formation in 1946 diversity has been a central concept for cultural policy (Throsby 2010), both within and between countries around the world (Švob-Đokic and Obuljen 2005). The current international understanding of the idea of cultural diversity today could be drawn from UNESCO's Convention on the Protection and Promotion of the Diversity of Cultural Expressions (UNESCO 2005).

In Norway cultural diversity has been a key priority for the government's cultural policy for years. Even though most national cultural policy arguments for cultural diversity are independent of industry technology, the reality is arguably that technology affects cultural diversity, as this article will demonstrate.

The research was carried out as part of a large transdisciplinary project entitled *Digitization and Diversity*, funded by The Norwegian Research Council's KULMEDIA program (2015–2019). An analytical systematization of specific diversity dimensions is developed in this project, dimensions that can shed light on how digitization affects the culture and media sector.[2] One dimension addresses in particular the *repertoire* of contents and forms of digitized cinemas. Another dimension concerns *demographic diversity;* class, gender, nationality, age, etc. In our case, who made the film, in which language and for what type of audience segment? The last diversity dimension used in the cinema case is about *distribution and dissemination channels*, and it concerns the diversity of both digital and traditional channels, where the digitized cinemas can be considered as both digital and analogue (still a physical arena).

Using different dimensions on diversity, combined with theories on unanticipated and unintended consequences, intended and unintended consequences, we analyze the comprehensive consequences of digitizing the Norwegian cinemas.

Theoretical perspectives on the consequences of technology application

The theoretical perspective concerns the different and comprehensive consequences of digitizing the film reels in cinema distribution, a digitization that was part of a cultural policy initiative. The consequences may be anticipated or unanticipated, intended or unintended, positive or negative, as well as both positive and negative at the same time, for different stakeholders and players.

Theories about unintended consequences of social action (Merton 1936; Boudon 1982), of diffusion of innovation (Rogers 1995), and of technology and application of technology (Ash et al. 2007; Nworie and Haughton 2008) have gained renewed interest since new digital technology unfolds within all sectors of society. The categorization of different types of such consequences is complex, involving many elements and somewhat overlapping; intended or unintended, anticipated or unanticipated, expected or unexpected, desirable or undesirable, probable or improbable, direct and indirect, positive or negative (Boudon 1982; Baert 1991; Rogers 1995; Ash et al. 2007; De Zwart 2015). Roger's theoretical framework on diffusion of innovation (as digitization in the cinema sector is) and its anticipated and unanticipated consequences is particularly relevant for our purpose, and we are inspired by how Roger was systematized by Ash et al. (2007) when analyzing digital technological application in hospitals. The analytical model below is simplified and adjusted for our purpose.[3] The application of new digital technology in our case is performed by the cinema operators, and not by the visitors/users, as is the case when it comes to streaming services in the creative industries and online consumption in general. The aggregated behavior of the operators produces anticipated and unanticipated consequences, intended and unintended, some positive and some negative.

Below is a model that responds to the theoretical framing we need in analyzing the consequences of digitizing the entire cinema market in a nuanced way: the diversity dimensions (Figure 1).

The advantage of distinguishing between anticipated and unanticipated consequences at an overall level is the possibility to nuance between positive and negative consequences within each of them. Most often the term "unintended consequence" is used only for *negative* consequences (as in Roger 1995 and Ash et al. 2007), but we want to emphasize that unintended consequences may also be positive, as our Norwegian cinema case will show. Anticipated intended consequences are obviously positive (the aim is achieved), but they may also be negative (De Zwart 2015), which in our model is referred to as "tradeoffs." This is a calculated risk taken by both politics (negative for certain voter groups that are "sacrificed") and in business (for example job losses). Anticipated tradeoffs must be separated from unanticipated negative unintended consequences which no one had seen coming. It is impossible to avoid unanticipated negative unintended consequences *in advance*; if we could, they would not in fact be unanticipated. When unanticipated negative unintended consequences occur, the means against them will always be retrospective - as firefighting. Some service innovations result in unanticipated consequences of *both* the positive and negative kind - we refer to them as two-sided (concept of Ash et al. 2007). Two-sided consequences can also arise between anticipated intended consequences (the objectives) and unanticipated

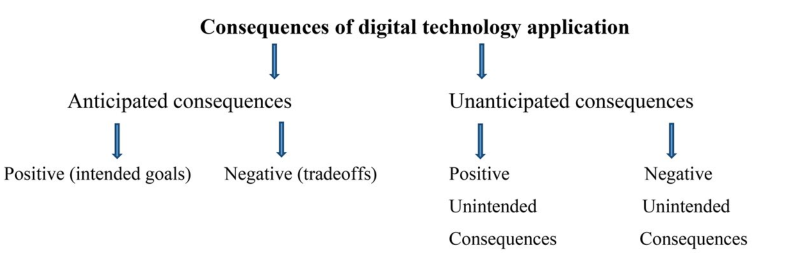

Figure 1. Theoretical model of consequences of digital technology application.

negative unintended consequences, both of which occur simultaneously: intended goals are achieved, *and* the innovation simultaneously has negative unintended consequences in other ways (either for other groups or on other levels in society). When it comes to digitization of the cultural sector, we expect an increase in such two-sided consequences in the future.

Methodology

Complete data for each year is collected from Film & Kino's central database. All distributors and cinema owners continuously enter information into the database, and this provides us with data on all film titles released in Norwegian cinemas. For each title it includes nationality[4], distributor and national premiere date, plus on a per cinema basis: release dates, number of screenings and total attendance. Hence, it provides unique insight into the complete and actual cinema offerings and sales, which is particularly valuable for diversity-studies dependent on observing niche title releases and attendance. Each cinema is identified so that we can categorize these as central or rural based on a centrality index developed by the statistical institute of Norway (Statistics Norway 2018).

We have analyzed repertoire and attendance figures for three full years: 2008, 2013 and 2017. 2008 was the last full year with the old analogue system, 2013 was the first full year with digital systems installed in all cinemas, and 2017 was the first full year without Virtual Print Fee (VPF) payments, a contractual mechanism used for distributors' contribution to financing the digitization. 2017 was therefore the first full year with both digital technology and a pure digital business model. We include data for all films that premiered within the respective year.

Consequently, films that premiered toward the end of the previous year and played into the year covered are excluded, and similarly, films that premiered at the end of a covered year and played into the following year, are included. This approach to defining annual repertoire allows us to study a 12-month repertoire without cutting into any film's release cycle, and we avoid errors from releases and attendance figures cut short.

In addition, we performed a qualitative interview with the CEO of Film & Kino, Guttorm Petterson, to better understand the results of our quantitative analyses.

The story of digitizing the Norwegian cinemas 2009–2016

The key cultural policy argument behind the state's participation in the public-private collaboration of digitizing Norwegian cinemas was not cultural diversity in the form of repertoire diversity, but in the form of retaining a diverse cultural offering in rural/regional areas by preventing cinema closures. The government pointed out that about 10 percent of cinema screens represent 90 percent of the turnover, and that these screens most likely would be digitized within few years also without any government support. Distributors would then realize significant savings from abandoning costly physical film prints only serving these digital screens. As a result, smaller rural cinemas would not be served and forced to close. References to repertoire diversity in the government's white-paper were limited to how it allows for alternative uses, such as streaming live theater and concerts, and how digital technology enables smaller cinemas to access new releases without delay. Prior to digitization, in 2006, smaller cinemas had to wait, on average, 45 days from the national premiere to receive a film print. In Film & Kino's own strategy document for digitizing cinemas, however, repertoire diversity was explicitly included as an objective. It states that the digitization must secure the distribution of niche titles.[5]

The digitization of Norwegian cinemas started in 2005 when Film & Kino decided to start digital cinema trials and must be seen in the context of international developments at the time. When the major Hollywood studios, through their Digital Cinema Initiative (DCI) joint venture, first decided on a digital standard for cinema distribution and exhibition in June 2005, it seemed apparent to many that an international wave of cinema digitization would follow. The question had turned from *if* to *how* cinemas should be digitized. And as the DCI standards eliminated much technical uncertainty, the organization of the digitization process – and particularly the financing – was the remaining key question.

The government's white paper, published in the spring of 2007, addressed these questions (Norwegian Ministry of Culture 2007). At that time two different trial projects, initiated by Film & Kino in the spring of 2006, were in the process of digitizing a total of 21 screens from 15 different cinemas, or about 5 percent of the national cinema capacity. The white paper concluded by recommending public support for the digitization, provided that industry parties also would contribute financing equal at least to their anticipated savings realized by going from analog to digital technology. In 2008 Film & Kino decided to participate in the financing on behalf of the cinemas, and started negotiations with distributors, first the Hollywood studios and then local distributors, for establishing a so-called Virtual Print Fee (VPF). Generally, a VPF is a contractual mechanism between cinema operators and distributors, whereby distributors, who save money on physical print costs and transportation, pass some of these savings on to cinema operators in the form of a fee for each engagement of a film, helping offset the cinemas' costs of digital conversion (Laemmle 2017). When all agreements were reached on the VPF arrangements in the spring of 2010, this completed the basic three-party financing of the digitization process between state, cinema owners and distributors.

The most intensive rollout period followed over the next two years, and by 2012 the digitization process was completed, two years earlier than anticipated in the white paper of 2007. Two factors in the digitization of Norwegian cinemas especially influence repertoire diversity. First, and quite particular for Norway, is the collective approach to the process. Cinema owners were all represented by Film & Kino. Consequently, all cinemas were included and there was no significant lag between the large, central cinemas and the smaller, rural cinemas.

Second, and not particular for Norway, the application of the VPF mechanism for distributors' contribution to the financing meant also carrying over part of the analog business model into the digital era. The flat fee charged to distributors for each engagement creates a fixed cost per engagement, similar to that of creating and transporting a physical print. The fixed cost associated with each engagement may have discouraged distributors from offering smaller or niche titles to rural cinemas. These cinemas have by nature smaller audience bases, and if the distributor's share of ticket sales is not sufficient to cover the flat VPF-fee, which could be likely for a niche title, the distributor will take a net loss from the engagement. Hence, the VPF sometimes resulted in "film-refusals", when smaller cinemas requested niche titles that distributors refused to deliver when anticipating net losses from an engagement.

The VPF was lifted in 2016 when the sum of VPF-payments had covered the distributors' share of cinema digitization financing. This is why we also measure the repertoire, the number of screenings and of visitors in 2017.

Results and analysis: Identifying consequences of digitizing the cinemas for diversity

We have identified both positive and negative consequences of digitizing the cinema for diversity – seen from a cultural policy perspective. We start with the main goal of the whole process: to safeguard the physical cinema infrastructure in Norway, an intended and organized action taken by the Ministry of Culture in collaboration with cinema operators and distributors. This relates to the diversity dimension concerning distribution in our analytical framework tools. Then we look at the effects of digitization on the repertoire itself, which titles that were shown before and after the film reels were replaced with files, both at a national level and divided between rural and urban cinemas. We also examine attendance to see how consumption is spread across the whole repertoire.

Anticipated and positive intended consequences: The cinema infrastructure survived, more titles were shown, and among them more niche movies

Three parties were involved in the digitization of the Norwegian cinemas, and they had both coinciding and different objectives with the application of new technology. The state, represented by the Ministry of Culture, and the cinema operators, represented by Film & Kino, had an explicit goal of maintaining the regional distribution system of cinemas - the very infrastructure of the distribution. Film & Kino also had an explicit goal that digitization secure the dissemination of niche titles. Distributors, both the Hollywood-subsidiaries and independents, had a strong incentive to digitize due to the cost reduction that new technology would provide - it is much cheaper to distribute files than reels.

The cinema infrastructure, understood as the number of cinemas in both urban and rural municipalities, was preserved (see Table 1). Despite major disruptions in the Norwegian home video market during this period, including the rise of streaming services and the fall of the DVD/Bluray-formats (Gaustad 2019), there was only a three percent decline in the number of cinemas from 2008 to 2017. The rural infrastructure, which it was the prime objective to maintain, was actually strengthened with a few cinemas from 2013 to 2017 and ended less than one percent down for the whole period.

Despite a relatively constant number of cinemas, the total number of screenings increased by 23 percent and the number of screenings per cinema was up 27 percent. Each cinema is thus utilizing its physical facilities better than before, giving the audience more choices as to when to visit the cinema. The increase was particularly strong for rural cinemas, for which the number of screenings was up 41 percent from 2008

Table 1. Number of cinemas and screenings in 2008, 2013, and 2017, and percentage change from 2008.

	2008	2013	change	2017	change
Number of cinemas					
Nationally	216	210	−3 %	209	−3 %
Rural cinemas	138	134	−3 %	137	−1 %
Urban cinemas	78	76	−3 %	72	−8 %
Number of screenings					
Nationally	302 108	339 749	12 %	371 128	23 %
In rural cinemas	57 961	71 634	24 %	81 640	41 %
In urban cinemas	244 147	268 115	10 %	289 488	19 %
Per cinema	1 399	1 618	16 %	1 776	27 %

to 2017. Through our interview, we learned that before the digitization, many of these cinemas closed down during the summer, which is a slow period in the Norwegian cinema market. Moreover, some were operating only certain weekdays. With better access to a variety of current titles, permanent year-round operation became viable for more cinemas. In sum, digitization has significantly strengthened the rural cinemas' dissemination of films.

Audience attendance numbers have also increased by 18 percent for rural cinemas. This is against a national trend of slight decline, with total numbers down five percent in the period (see Table 2). Yet, even in the rural cinemas attendance per screening was down, since the number of screenings increased more than attendance. It is thus primarily the physical, not human, infrastructure that is better utilized with digital technology.

Considering the objective of the cinema owners' organization, as the government's deployment entity responsible for the digital rollout, to secure the distribution of niche titles, we look at the nationality of the films released. Nationality is a relatively crude measure of 'niche', yet it is one of the constituents to which we in Europe principally refer when defining films, also in terms of diversity (Kulyk 2020). American films are typically associated with blockbuster popularity, while European films often fall into

Table 2. Attendance in 2008, 2013, and 2017, and percentage change from 2008.

	2008	2013	change	2017	change
Number of titles shown					
Nationally	352	403	14 %	489	39 %
Rural cinemas	251	242	−4 %	355	41 %
Central cinemas	325	361	11 %	421	30 %
Number of titles shown					
Norwegian titles	61	75	23 %	95	56 %
US titles	158	162	3 %	173	9 %
Other foreign titles	133	166	25 %	221	66 %
Other foreign titles in rural cinemas	79	67	−15 %	141	78 %
Number of cinema distributed titles					
Norwegian titles	35	42	20 %	48	37 %
US titles	29	29	0 %	43	48 %
Other foreign titles	18	48	167 %	42	133 %
Other foreign titles in rural cinemas	2	14	600 %	18	800 %
Number of screenings by nationality					
Norwegian titles	62 519	69 515	11 %	61 246	−2 %
US titles	194 164	230 199	19 %	242 921	25 %
Other foreign titles	45 425	40 035	−12 %	66 961	47 %
Other foreign titles in rural cinemas	6 665	5 277	−21 %	12 444	87 %

the art-house bracket. As Norwegian films include both national blockbusters and niche titles, we use “other foreign” (i.e., not Norwegian nor US) as a proxy for niche titles.

From 2008 to 2017, the number of other foreign titles released increased by 66 percent. This is a strong indication that the objective of securing the distribution of niche titles was met. Moreover, the surge in other foreign films shown was strongest in rural cinemas, where the number increased by 78 percent (see Table 3). Here, however, the number first dropped by 15 percent from 2008 to 2013, due to “film-refusals” following from the VPF system, before it more than doubled from 2013 to 2017 after the fee was dropped. This consequence was anticipated by Film & Kino, and a support system for releasing niche titles in smaller cinemas had been put in place to offset the effect. A fuller picture of the availability of niche titles for cinema patrons emerges when we also consider the number of screenings cinema operators give these titles. The total number of screenings for other foreign titles increased by 47 percent from 2008 to 2017, and for rural cinema the number was up 87 percent. Both numbers are well above the average increase in screenings for all titles (23 and 41 percent). Again, there was a dip in 2013 due to VPF.

Unanticipated and positive unintended consequence: Rise in cinema-distributed niche and minority films

One driver toward greater diversity that was largely unanticipated was the rise in films distributed by the cinemas themselves. Cinema- or self-distribution means that cinema operators license titles directly from producers or foreign distributors, arrange for delivery of the digital files, and market the films to their patrons (Gaustad, Gran, and Torp 2020). It represents a pull-version of distribution initiated by cinemas rather than the push-version initiated by local distributors. Cinema operators cater to specific local demands, and examples include locally produced low-budget films that do not warrant a national release, foreign titles shown in original versions (without subtitles) to first- and second-generation immigrants or foreign guest workers, and thematic mini-festivals addressing local interests and demands. From 2008 to 2017 the number of cinema-distributed titles increased by 63 percent, and the growth was particularly strong for other foreign titles with an increase of 133 percent (see Table 3). The corresponding number of screenings grew by 36 and 369 percent. Prior to digitization, operators of rural cinemas hardly self-distributed any foreign films at all. In 2008 only two foreign (non-US) titles were self-distributed by their operators. By 2017 this number had grown to 18. The admissions to cinema-distributed films grew even more, indicating that cinema operators successfully targeted the demand and tastes of its local audiences. For Norwegian and US titles admissions doubled while for other foreign titles it went up tenfold.

With digital cinemas, operators have been able to apply cinema-distribution for a variety of purposes. Our interview revealed that some have arranged local thematic film festivals, with for instance a week of niche horror films. Others have used the opportunity to serve specific demographics in their local community. For instance, one cinema operator in an area with many Lithuanian workers started to license films directly from Lithuania, screening them in their original language without subtitles.

Table 3. Repertoire in 2008, 2013, and 2017, and percentage change from 2008.

	2008	2013	change	2017	change
Attendance					
Nationally	12 103 513	11 759 393	−3 %	11 536 658	−5 %
Rural cinemas	1 718 319	1 982 140	15 %	2 034 046	18 %
Urban cinemas	10 385 194	9 777 253	−6 %	9 502 612	−8 %
Attendance by title nationality					
Norwegian titles	3 350 205	2 713 819	−19 %	2 245 043	−33 %
US titles	7 269 518	8 102 581	11 %	7 930 551	9 %
Other foreign titles	1 483 790	942 993	−36 %	1 361 064	−8 %
Attendance for cinema distributed titles					
Norwegian titles	7 576	11 127	47 %	15 466	104 %
US titles	2 849	2 455	−14 %	5 776	103 %
Other foreign titles	1 027	7 563	636 %	12 065	1075 %

With this move they filled up the cinema with this specific demographic in a time slot that would normally have seen low attendance figures.

Tradeoff (anticipated negative consequence): An overall concentration of film supply and consumption

Despite more titles and screenings of films that typically do not fall into the popular blockbuster category, the Norwegian cinema market has overall moved toward greater concentration during the period of digitization. Market concentration is typically evaluated by looking at the relative share of sales above or below a certain rank percentile, and the Gini coefficient is a commonly used metric (see, e.g., Brynjolfsson, Hu, and Smith 2010). Applied to cinema repertoire it is a relative measure of statistical dispersion where the value zero means that all films would get the same number of screenings and where the value one would mean that a single film got all screenings. We find that the repertoire Gini coefficient based on actual screenings has inched up steadily from 0.73 in 2008 to 0.77 in 2017 (see Table 4). The concentration expressed by the repertoire Gini coefficient has thus been increasing from an already high level.

The attendance Gini coefficient, measuring the concentration of audience attendance among the titles released, is even higher, but has been relatively flat over the period, moving from 0.84 in 2008 to 0.85 in 2017. Only US titles have seen increased attendance (up nine percent). Other foreign titles experienced a decline of 8 percent, despite significant increases both in the number of titles and the number of screenings.

Discussion

We will now discuss whether the consequences are positive or negative in a diversity perspective. What diversity dimensions are affected by digitization? And how can these be assessed - positively or negatively - and for whom? We have previously mentioned that a cultural policy perspective is the basis, when we consider whether consequences are positive and negative. This means in concrete terms the perspective of the Ministry of Culture, which had the distribution of films throughout the country as its goal, and the perspective of Film & Kino (at that time dominated by municipal cinemas) which also had niche film as a stated objective.

Table 4. Gini coefficient measures of concentration.

	2008	2013	2017
Repertoire Gini coefficient (all)	0.73	0.75	0.77
Attendance Gini coefficient (all)	0.84	0.83	0.85

The research tradition on unintended consequences has tended to focus only on the *negative* consequences. In this project, we have also found certain significant positive unintended consequences of the digitization of the film reels in the cinema sector.

Two-sided consequences

The same technology application can have both positive and negative anticipated and unanticipated consequences at the same time. In digitization of the creative industries, we have seen that digitization can lead to a stronger blockbuster concentration both in terms of repertoire and audience (Elberse 2013), *and* digitization can lead to a longer tail with more diverse niche content (Anderson 2006). Both theories assume that physical limitations on the supply side are greatly reduced or even eliminated by digital technology, but they differ on the demand side. Elberse (2013) argues that consumers facing a great variety of content in digitized services may become overwhelmed, confused and frustrated by the choices and as a consequence floc to popular and known content, and she provides empirical evidence from the publishing, music and film industries in support of her theory. Anderson (2006), on the other hand, emphasizes that digital technology contributes to reducing consumers' search costs, making it easier to find content that suits their particular preferences. Empirical evidence of long tail effect is also found in the same industries (see, e.g., Bourreau et al. 2013; Peltier and Moreau 2012). When digitizing film reels in the cinema sector, these two phenomena occur simultaneously. We find increased blockbuster effect in the concentration of both screenings of and visitors to American blockbusters, and we find a new long tail containing several cinema-distributed titles of minority films in original languages and other niche films.

Increased screening and visitor concentration of blockbusters, at the expense of Norwegian films and niche films, is interpreted as an anticipated, but negative consequence for diversity (homogenization), a so-called *trade off.* When blockbuster movies became available simultaneously across the country, it was likely that more people would see them. Since they draw large audiences compared to niche movies, audience concentration of American blockbuster was a highly likely effect. Such a blockbuster effect is of course only negative in a cultural policy perspective; from the point of view of the American distributors (Disney and others), this consequence is of course not negative in any way.

This reminds us that it is also a matter of power and perspectives; it is not a definitive answer to what are positive and negative consequences of technology application. It must be asked for whom. The long tail with several cinema-distributed niche titles, and ditto increased number of screenings, we consider to be positive consequences for diversity, seen from a cultural policy perspective. It is part of a seemingly paradoxical development where the number of titles and screenings of "other foreign titles" increase while attendance declines, which may be explained by shifts within the category toward more titles from the far end of the long tail. There are more titles and screenings with very small and narrow target groups. For instance, foreign films shown in their original language have a limited scope, but they hit the target audience very well. The fact that few people watch these films, relatively speaking, does not change the fact that diversity is increasing both in terms of repertoire and demography.

While increases in the number of theatrically released films have been observed elsewhere in the wake of digitization (see, e.g., Waldfogel 2017), the long tail of cinema-distributed films is an unanticipated and a positive unintended consequence, as growth in the number of niche and minority films fulfills a cultural policy goal of diversity in both repertoire and audience groups. That is, there is a strengthening of our aesthetic-expressive diversity dimension, and of the cultural demographic dimension, since these films draw a new audience to the cinemas.

Site-specific programming and the role of cinema managers

The digitization process from reel to file means in practice greater opportunities for cinema operators to program the repertoire themselves without going the way of the distributors. The digital files offer a new freedom. We call it site-specific programming, since it enables a much greater differentiation of repertoire programming in different parts of the country. It enables the cinema operators to be in close dialogue with the local community and show films on request, should they be Norwegian films that are particularly relevant (local film producers, local documentaries, location, etc.), have themes that some groups are particularly interested in, or be films for the minority population in the original language.

This technology application reminds us of Friedman's theory of globalization and localization (Friedman 1990). In our case, it is the globalization of digital files on the net that enables localization of the repertoire; programming of cinemas may be hyper local, site-specific and very diverse. There is a great potential for a more bottom up and democratic programming adapted to the individual place and its audience. However, it depends on whether the cinema managers want to, and have the competence to, use this opportunity or not. Figure 2 is a systematization of our findings in the theoretical framework of consequences and the diversity dimensions.

Other concurrent changes

Finally, over this ten-year period there have of course been other structural changes within and outside the cinema sector that may have affected repertoire and attendance. Most, like the shift in home video consumption from DVD to subscription streaming services, are international trends that will have similar effects on the cinema sector in most countries. Two, however, are specific to the Norwegian case and thus demand addressing:

First, the gradual dismantling of the municipal cinema system continued during this period. While the share of private cinemas remained stable at around 30 percent from 2008 to 2017, the nature of the private sector changed. In 2008 it was still dominated by small nonprofits motivated by providing cinema to local patrons. Following the digitization, in 2013, commercial cinema owners and operators expanded significantly and acquired former public monopolies in the largest cities. This

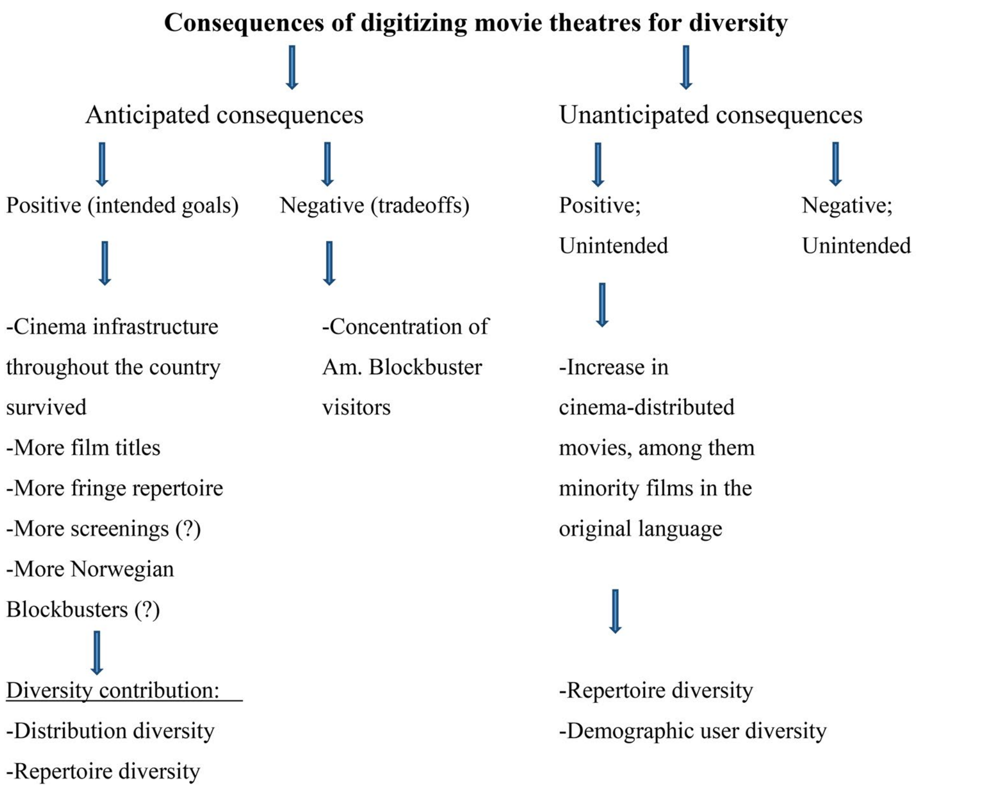

Figure 2. Summing-up figure of results in the theoretical framework.

transformation of the private sector is reflected in its share of total admissions, which grew from 19 to 56 percent in the period.[6] This may have contributed toward the overall concentration of film supply and consumption, but we do not believe it has significantly influenced our main findings. Municipal cinemas in the larger cities have traditionally been operated according to mostly commercial principles, functioning as revenue sources allowing municipalities to invest in parks, pools, concert houses, etc. Privatization therefore had less impact on operations than one might otherwise think.

Second, during this period more municipal cinemas were integrated into new cultural centers that typically also house libraries, cafes, various multi-purpose rooms, and where the movie theater is designed also for live performance purposes. These settings might lend themselves better for creating special film events or local festivals than the traditional single screen cinemas, which may have partly contributed to the growth in cinema distributed titles.

Conclusion and further research

Seen from the perspective of cultural policy, our findings from analyzing complete cinema statistics for three years (2008, 2013, and 2017) show that the digitization process “from film reels to film files" contributes to strengthened diversity in terms of distribution, repertoire and new audiences. The positive consequences are both anticipated and unanticipated, and we did find positive unintended consequences as well; a significant increase in repertoire diversity of a local and site-specific kind. These positive consequences offer cinema operators new opportunities when it comes to programming. We did find one anticipated negative consequence for diversity, a so-called tradeoff: a higher share of the cinema audience visits American blockbusters now than before digitization.

Given the need for further research, we will point to the following topics:

- Case studies to help us understand why some cinema operators utilize new possibilities to program niche titles for their local audiences, while others do not use this opportunity to strengthen repertoire diversity.
- Expanding the scope of the research downstream along the value chain to include digitization of the cinema-audience relationships. How do cinema operators utilize new digital means to build relationships with new and diverse audiences?
- And upstream, how do new opportunities for theatrical releases affect production of niche titles? Existing research on the American market covering the same time period suggests that digitization has caused a strong growth in production of niche titles that do not receive theatrical distribution (Benner and Waldfogel 2020), but we still do not know how the theatrical opportunities for such titles identified here do affect diversity in film production.
- The theoretical framework of anticipated, unanticipated, intended and unintended consequences should be explored for other digitization processes in the culture and media sector, regardless of which actors are involved (private or public) and what the objectives are.

Notes

1. In this article "cinema" refers to theatres where films are shown for public entertainment and not to the production of films as an art.
2. These dimensions where developed by the project initiators, Anne-Britt Gran and Eivind Røssaak at an early stage (www.bi.no/dnd) and are used in various ways in our publications. See among others Gran et al. (2019a).
3. Ash et al. (2007) also use the level of desirable and undesirable consequences from Rogers, where "*negative* unintended consequences" in our model belong to the "unanticipated - undesirable - unintended consequences" category in theirs. What we call "*positive* unintended consequences" belong to "unanticipated desirable consequences (serendipity)". In short, we preserve desirable /undesirable consequences under the categories of positive and negative intended consequences and positive and negative unintended consequences. The level of direct or indirect consequences in Ash's model (8 variables) is excluded in our model, since we find our quantitative data insufficient to analyze each of them.
4. For international co-productions the nationality of the main co-producer is used.
5. From *One Year Evaluation of Digitizing Norwegian Cinemas*, October, 2012, Oslo: Film & Kino.
6. See Yearbooks 2008, 2013 and 2017, Film & Kino (available at: https://www.kino.no/incoming/article1294921.ece, accessed April 16, 2021)

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Norwegian Research Council under Grant number 247602, the KULMEDIA-program.

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