

Background and Position Paper on d-Cinema

Prepared for 'The Independent Exhibition Sector and the Challenges of Digitisation' Conference, hosted by the ICAA in Barcelona, the 5th and 6th March 2010.

The beginnings of digital cinema

The first commercial digital cinema screening took place in May 1999 in the USA. The first six years of the business were characterised by research and development into the technology of making digital cinema a technological and commercial reality. However, after a failed rollout by Technicolor, it became clear that the market needed some reassurance that the technology would be backed up by some guarantees that it would not become rapidly obsolescent, while at the same time avoiding a multiplicity of formats and the logistical chaos that would ensue.

The early drivers behind the digitisation of cinemas were print cost savings and reduction of piracy. The US studios in particular were interested in eventual print costs savings, given that the 35mm print replication market is worth around \$2bn a year, and the studios account for around three-quarters of that (i.e. \$1.5bn). Assuming a saving of 75 per cent through using digital prints, this equates to \$1.125bn of savings a year.

The issue of piracy is less clear to put a value on. However, it is worth noting that in the original standards specification document (outlined below in DCI section), over half was given over to security in creating and delivering the digital file. For the creators of DCI, the issue of piracy was paramount.

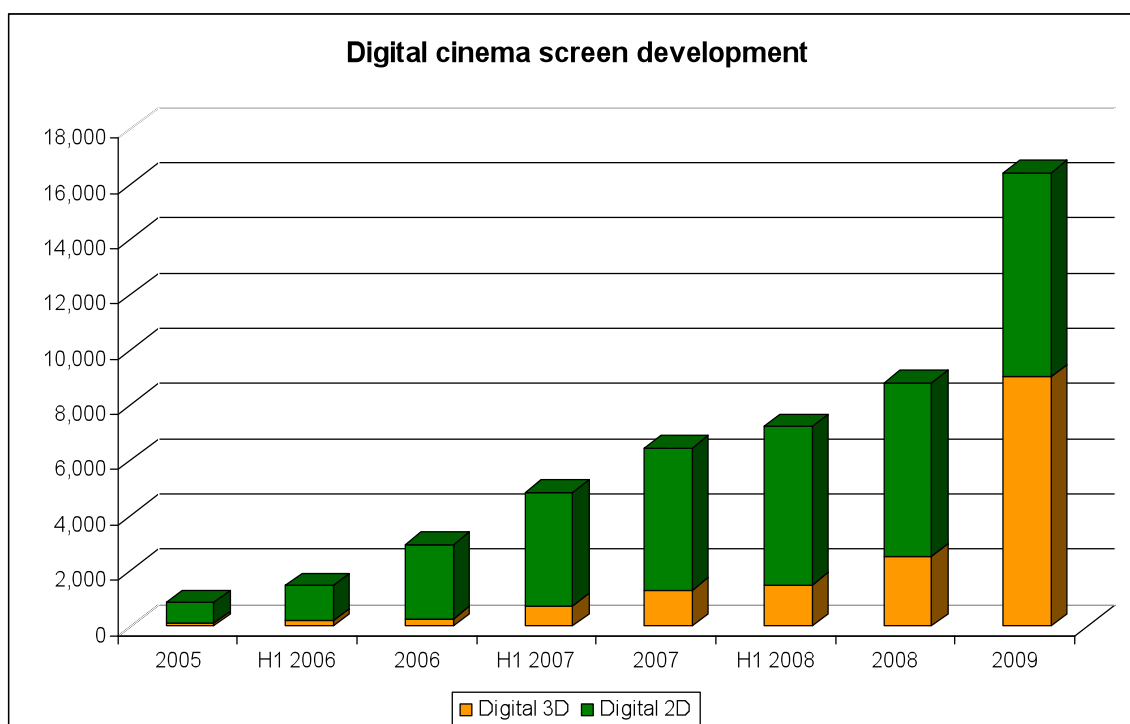
Digital Cinema Initiatives (DCI)

The result of these observations was the joint venture created in 2002 by the US studios, known as Digital Cinema Initiatives (DCI). In June 2005, DCI published its first set of specifications for a digital cinema standard. The intention was to replicate the universality of 35mm, with a single format that was advanced enough to meet the needs of cinema screens and keep cinema in the forefront of the movie-watching media. The US exhibitors trade body, NATO, responded with a paper of their own bringing the exhibitor point of view, which was also informed by the European body representing cinemas, UNIC (the most recent communiqué from UNIC regarding digital cinema is found here: [http://www.unic-cinemas.org/cp/UNICs position on dig cinema dec09.pdf](http://www.unic-cinemas.org/cp/UNICs_position_on_dig_cinema_dec09.pdf)).

Since this date, there have been revisions to DCI (<http://www.dcinovies.com/specification/index.tt2>), and an additional specifications document dealing with digital 3D. The specifications that DCI laid out are forming the basis for the standards-making process working its way through the International Standards Organisation, and within the working groups of Society of Motion Picture and Television Engineers (SMPTE). This process is now a global one, and national and European organisations, such as EDCF and CST, play an integral part of it.

Digital cinema development since DCI

There are 16,405 digital cinema screens around the world, an increase of 86.4 per cent over 2008, with further growth to come in 2010 as digital 3D pushes the market towards a 35mm-free cinema sector. This means that 14.8 per cent of the world's modern cinema screens are now digitized, of which 9,000 are also equipped with digital 3D (55 per cent of total digital screens). The eventual and inevitable conclusion of full digital cinema will take the best part of another decade to complete fully, although some key driver countries will be all-digital well before then.



Source: Screen Digest

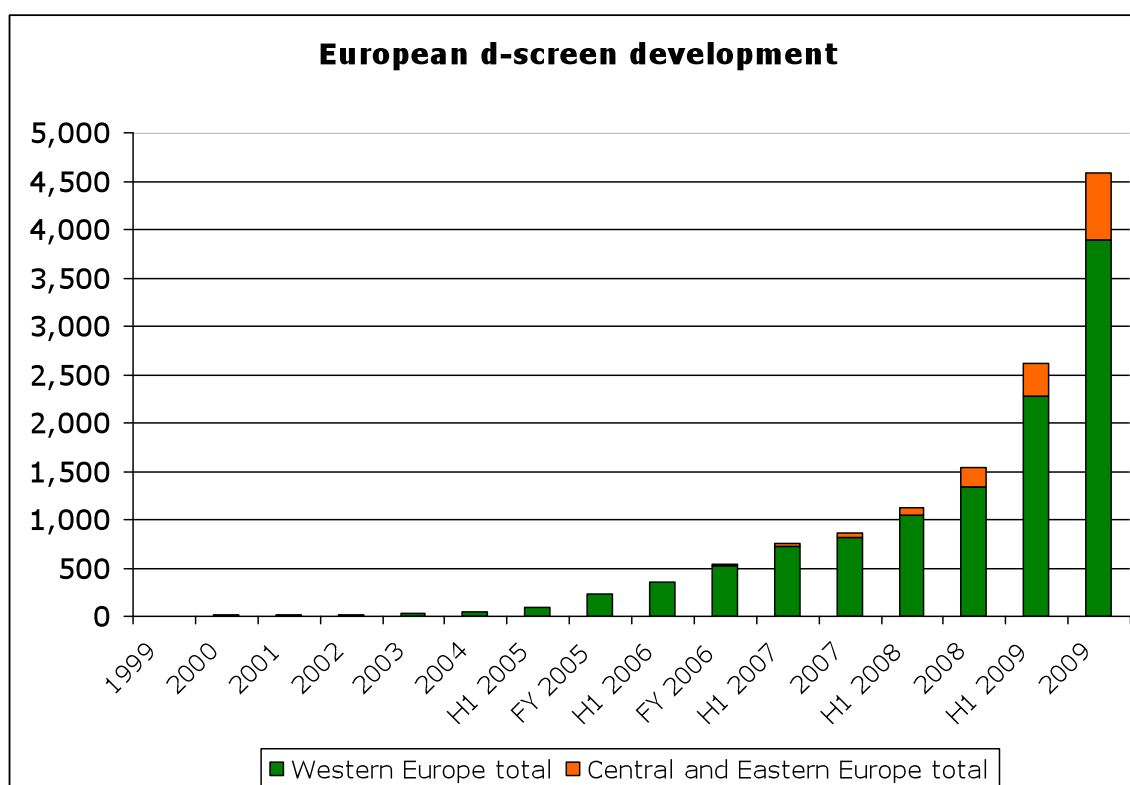
The effects of the credit crunch are highly visible in the development of digital cinema. When the financial crisis hit in October 2008, it put on hold several major circuit-wide digital deployment deals that were close to fruition, creating a 'wait-for-the-recovery' mentality that is still in place for a full-scale 2D digital conversion. If 3D had not been so popular, digital cinema in general would be, if not on hold, then proceeding at a much slower pace, having a knock-on impact on a whole swathe of technology and commercial support companies. The net growth of 2D screens is far less than overall digital installations. In 2009, there was a net growth of all screens of 7,605 d-screens, of which 6,473 were equipped with 3D (85.1 per cent) and only 1,132 went in as 2D only conversions. Where there is growth, it is either by government action, especially in China, which accounted for 40 per cent of net 2D screen growth, or as a result of a VPF-backed circuit-wide conversion with a third party deployment entity, such as CGR in France (Arts Alliance Media), Cineplex in Austria (XDC) and Apollo Cinemas in UK (Sony).

However, in nearly 2010, the effects of the credit crunch seem to be wearing off, especially with DCIP moving towards a roll-out after JP Morgan was charged with raising the necessary finance to convert its 15,000 screens and successfully raising \$660m in late February. US deployment entity Cinedigm also received a \$100m commitment for financing its second phase

in autumn 2009, and European digital cinema group XDC received the backing of the European Investment Bank and other entities in February 2010 for EUR65m. This progress is a good sign for the ability of cinema circuits to begin the rollout of digital screens in 2010 and beyond.

Development in Europe

The digital cinema screen base jumped in 2009, largely due to the rush to install 3D equipment. There are now 4,580 d-screens in Europe, of which 3,890 are in Western Europe and 690 in Eastern Europe. The growth in d-screens in 2009 over 2008 was 196.1 per cent. The growth in 3D installations in Europe was 505.9 per cent.



Source: Screen Digest

The largest d-cinema market in Europe is now France, after a very active 2009. The territory lagged behind in d-cinema a few years but the announcement of UGC's digital conversion plan with Ymagis in February 2010 signaled the end of the intellectual battle in France, although there is still much to do in terms of actual installations. Following France comes the UK, a digital pioneer after the Film Council's intervention in 2005/06, and Germany, which has embraced digital 3D (like every other country) even if the single market model proposed by the FFA is still to get off the ground. Of the smaller countries, Austria is the furthest advanced following the conversion of market leader Cineplex with XDC, and likewise with Portugal (and Lusomundo). Belgium has long been a digital pioneer, thanks to the presence of Kinopolis and to a lesser extent Utopia Group. Russia and Poland are the only Eastern European countries among the most advanced in Europe as a whole.

Leading European d-cinema screens

Rank	Territory	2008	2009
1	France	254	959
2	UK	310	642
3	Germany	164	525
4	Italy	78	415
5	Russia	98	331
6	Spain	58	286
7	Austria	119	239
8	Poland	56	191
9	Portugal	36	178
10	Belgium	107	142
11	Netherlands	36	105
12	Ireland	46	101

Source: Screen Digest

The transition period

The transition period is a term to describe the period of time when a market is converting to digital cinema. By definition, it is a time of dual formats and increased complexity of logistics, and a key area of public policy is to focus on minimizing the transition period, in order to smooth the transition. The concept of a transition period can be quite nebulous, in that it affects different parts of the market at different times and different ways. In terms of the global market, there are over 16,000 screens converted to digital projection technology and it is clear we are well in to a transition process. However, in financial terms, we are less advanced, with many exhibitors yet to sign a digital conversion deal. Technology-wise, we are far more advanced, and with a decade of R&D, an ongoing standardisation process, and several years of operational reality, the technology of digital projection is more or less complete. In operational terms, the transition is less advanced, with flexibility and depth of scheduling (including new forms of content) not fully understood or utilised. The key to the transition period is in understanding that it needs to be minimized.

THE BUSINESS MODEL

Currently, there is only one viable commercial model for financing the conversion to digital cinema other than simply buying the equipment outright which is not an option for most exhibitors (but has been for some). This is the virtual print fee (VPF) model. The VPF mechanism came about mainly because distributors were not willing to consider a change in the film hire terms through which they make their contribution to funding.

The Virtual Print Fee (VPF) model is effectively a subsidy for digital conversion from the private distribution sector to the private exhibition sector. However, it is possible for the model to co-exist with publicly-inspired models, as the Norwegian conversion proves. The VPF was

developed in the United States, and at that time, was developed with a commercial cinema economic model in mind. The VPF mechanism is not an imposition from the USA, as European and Asian entities have also developed business propositions based on the VPF idea. However, the VPF has needed reworking to some extent to fit a European model, and as the CNC plan highlighted, to the core idea of a distributor subsidy to exhibition can be added a series of exceptions and rules that bring the VPF model in line with local market conditions. It may be easier to think of the VPF as simply a distributor contribution to digitisation.

The VPF is a fee paid to a third-party intermediary each time a film is shown for the first time in a cinema. The fee can be reduced on a weekly sliding scale. It constitutes a proportional contribution to the overall costs of conversion, topped up by an exhibitor contribution (at least as proposed in Europe) and possibly contributions from other finance sources, such as screen advertisers and public funding. The distributor bears the cost of the VPF on top of the cost of the digital print.

The VPF system is based on calculations and the commercial practices of a 35mm environment, in order to make this transition possible. Therefore, it is an irony that the model intended to take us into a digital future for cinema, ultimately perpetuates the 35mm business model. Thus, the distributors will not begin to see real savings on print costs until the VPF payments are over, and exhibitors will not be able to make full use of the inherent flexibility of digital cinema until the equipment is fully theirs and they can use it how they wish.

Digital Releases

There are two stages to a true digital cinema environment:

1. Replacing 35mm projectors with digital projection systems
2. Creating a digital distribution infrastructure, using either satellite or terrestrial (or both) to digitally deliver films and other content to cinemas.

To operate a digital cinema requires having films delivered in digital format. Currently, most films are still delivered by courier on hard drive, replicating the 35mm delivery system but this is changing. The true benefits of digitisation will not be felt until content is delivered digitally.

However, despite the early stages of this infrastructure, the process of mastering and delivering films in digital format is firmly underway. The UK has become the most advanced territory for digital theatrical distribution in the world. In 2008, 227 first-run films were released fully or partially in a digital format, accounting for 43.1 per cent. This is almost double the previous year and quadruple compared to 2006. In 2009, that number is estimated to rise to around 375, or 75 per cent of all first-run films that will be available in digital. This includes nearly all studio content, and a large number of independents are also working in digital, some exclusively so.

In France, the situation is less advanced, with the French digital cinema service Manice evaluating that there were 84 films released in a digital format, but this is well up on the 50 in 2008 and with the conversion of over 1,000 screens in France to digital, this figure is likely to go up. The most active digital distributor was French for the first time, with Pathé releasing 12 films in digital.

Digital film releases

UK	2004	2005	2006	2007	2008	2009
Number of first-run films released	450	467	505	525	527	535
Digital releases	8	11	59	123	227	375
% of content released in digital format	1.8	2.4	11.7	23.4	43.1	70.0
France	2004	2005	2006	2007	2008	2009
Number of first-run films released	559	550	589	573	555	550
Digital releases	2	14	11	30	50	84
% of content released in digital format	0.4	2.5	1.9	5.2	9.0	15.3

Source: *Screen Digest, CNC, Manice*
 data in italics are estimates

However, what these two figures show is that the type of screen digitised has an effect on how much content is digitised. The UK's Digital Screen Network had an objective of increasing admissions to specialised films, through the use of digital projection. The scheme digitized 240 screens, in large circuits and in small single-screen independents and all over the country. This had the effect of forcing the smaller distributors that used these smaller screens to follow the market, and begin providing digital prints to digital screens. This shows clearly how the market works: distributors follow screens. If the screens they use on a regular basis are digital, distributors will provide digital prints. This highlights the fallacy involved in the argument that there is no point digitizing a cinema screen, as there is no content to put on it.

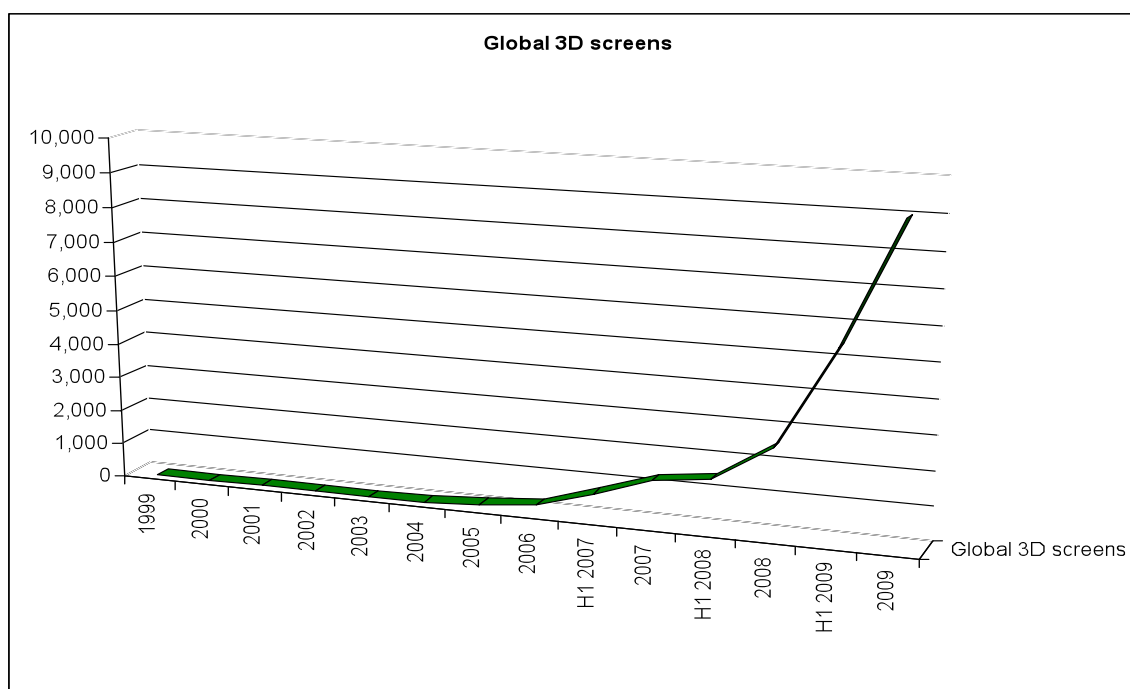
An area of concern is that very few European distributors are signed up to a long-term provision of content agreement, via the VPF mechanism. However, the above argument can be extended to companies, as well as individual titles. In October 2009, two European distributors signed VPF deals with European deployment entity XDC. The reasoning is that XDC has signed up the major exhibitors in Austria and Portugal to its VPF rollout programme (in Austria, it was Cineplexx and in Portugal, it was Lusomundo), and the two distributors in question (Polyfilm in Austria and Valentim de Carvalho Multimedia in Portugal) are leading domestic distributors in those two territories and serve these exhibitors on a regular basis. They now calculate that it is in their financial interest to sign such a deal, as they know they will be providing digital prints.

Digital 3D

The arrival of Avatar in cinemas represented a key moment for digital cinema. The market for digital 3D movies has been developing since the release of the first digital 3D movie, Chicken Little, in 2005. The early signs were good as these films highlighted the financial attraction of this new technology: early films in 3D were taking three times the per screen average of the 2D screening of the same film. Whether this was sustainable was at question, but the momentum behind 3D increased and the number (and quality) of titles increased.

The installation of digital 3D-equipped screens increased each time there was a new 3D film coming out, and to be 3D, an exhibitor first needs to be 2D. Therefore, 3D to some extent drove 2D digital cinema installation. However, this changed in the run up to Avatar (released in December 2009), when cinemas clearly decided that the extent of the 3D market was such that they wanted to be a part of it. More importantly, exhibitors could not afford to exclude themselves from this subsection of the box office market. 3D revenues accounted for over 15 per cent of the box office market in the UK in 2009, and this figure is rising year on year.

In June 2009, according to Screen Digest, there were 5,500 3D equipped screens in the world. By the end of 2009, the global total had almost doubled to 9,000.



Source: Screen Digest

With the 3D screen base developing, forecast to reach 19,000 screens by 2014, and standards developed for the distribution of such 3D content, to ease the logistical problems with multiple formats, attention is turning to production of 3D films. While the studios lead the way, especially in the animated field, there are initiatives that suggest Europe will become a player in this arena. In the private sector, the recent deal between Studio Canal and Nwave, a Belgian producer of 3D films and led by Ben Stassens (Fly Me to the Moon), positions Nwave to become a key supplier of 3D content to cinemas. There are also public initiatives to support 3D production, such as the CNC's 3D production fund.

The interest in 3D is also being maintained by wider interest in other media, such as home entertainment, TV, advertising and gaming. Broadcasters, such as Sky, are busy testing 3D production and audience reactions for sport and events in cinemas, in readiness for the arrival of 3D TV. Sky will launch such a service within the next few months, although standards are not yet finalized.

Alternative Content

Alternative Content, in the context of cinemas, is non-movie programming that can be played on screen. Digital cinema has enabled this development. For cinema exhibitors, the main rationale behind alternative content is to increase occupancy in cinemas at off-peak times, and make more effective use of the cinema space. Effectively, this development has turned the cinema into a semi-broadcast medium. In addition, it has also allowed the cinema to become a multi-arts venue, showing other live and recorded performances and art forms in a cinema auditorium.

According to data from Screen Digest, Alternative Content will be a small but significant revenue stream for cinema exhibitors, worth a predicted \$526m globally by 2014, from a level of \$45.7m in 2008, but ultimately revenues from non-theatrical programming in cinemas could exceed \$1bn. This level would still represent less than five per cent of gross global box office levels. European markets are active in this area, even if the USA currently accounts for two thirds of revenues, but this will change as the wider digitisation process continues.

Digital 3D will also drive the development of alternative content in cinemas. Live-action concert films, such as Hannah Montana and U23D, led the first experiments with 3D for alternative content. This area is now growing as some broadcasters, such as Sky and ESPN, lead the way by preparing content for upcoming 3D TV channels

Deployment Entities

A deployment entity can come in several guises, but they all exist to facilitate the conversion to digital by arranging finance, signing distributors to the scheme, sourcing and negotiating equipment deals, installation of the mix, ongoing maintenance and 24hr support for exhibitors. Increasingly, deployment entities are offering

There are several types of deployment entity currently operating. The first into the market were the private companies, such as XDC, Arts Alliance Media, Cinedigm, Ymagis, Sony, DFL and GDC. There are now also deployment entities acting on behalf of individual exhibitors, such as DCIP in USA, DCK in Korea, and DDA which represents the UK’s Odeon Cinemas. Public models, such as Norway, will also create or use a third-party deployment entity.

	Target screens	Committed/installed screens	Studio backing
Cinedigm	14,000	5,000+	6
Arts Alliance	8,000	900	5
DFL (IRL)	500	101	4
Sony DCSS	9,000	11,000+	4
XDC	7,000	1,300	6
DDA (UK)	1,600	NA	4

DCIP (USA)	15,000	15,000	4
DCK (KOR)	400+	300+	3
GDC	6,000	:	5
Ymagis	5,500	300+	4

Source: Screen Digest

There are 109,000 modern cinema screens in the world (a modern cinema roughly translates as those screens that will be converted to digital), and there are VPF third-party schemes covering 67,000 screens (or 61.5 per cent). In Europe, there are VPF deals covering around 22,600 screens (plus a proportion of Sony's target screens). In Europe, there are roughly 30,000 screens, of which 27,800 are in Western Europe and 2,200 in Central and Eastern Europe (not including Russia and Ukraine).

Public plans

The pioneer of public plans for digital cinema is the UK. The UK Film Council's Digital Screen Network was created in 2005 using public funds (around £12m) to install 240 digital screens, in line with DCI specifications as far as possible at that time, with the aim of increasing admissions to specialised films over a four-year period. At the end of the period, exhibitors will have the option to acquire the equipment for its residual value. The UK Film Council has also recently established a pilot-funding stream for digitising cinemas and other venues in rural areas. This scheme is not necessarily funding d-cinema standard equipment (conforming to DCI specifications), but also includes low-end projectors for film clubs.

The pioneer of the full market approach is Norway, which is currently close to the full roll-out of digital cinema across the whole territory. This is made easier by the fact that over four-fifths of cinema screens are controlled by municipal authorities and therefore do not have conflicting competitive interests.

There are several publicly-backed plans for digital conversion currently in place in the continent. In France, the CNC put forward a plan to digitise a majority of territory's cinema screens, using a specially-created fund backed by the Virtual Print Fee. The plan was rejected by the French Competition Authority, whilst conceding that there is a problem that needs solving when it comes to digital cinema.

- 1) the Authority acknowledges that there is a problem of general interest for those cinemas that may not be able to finance the equipment by themselves and are outside the business model of third parties;
- 2) The CNC fund would have been in competition with commercial third parties and would have benefited from the situation of CNC as the regulator of the sector and as benefiting from a financial guarantee from the State;
- 3) the fund would have collected VPFs whose amounts would be disconnected from the market and would have represented a larger amount of State aid than initially considered;
- 4) alternative solutions should be examined, with the Competition Authority suggesting direct subsidies, financed by a tax on digital prints.

For its part, the CNC has rejected the idea of a tax on digital prints, because it would remove

the principle of neutrality of programming. In parallel, the French plan is also being considered by the European Commission.

The CNC has come back with a counter plan that aims to avoid the legal issues involved in the Commission's ruling.

The German model has been through several incarnations, and suffered from local politics, getting caught up in a wider legal action against a levy on tickets that funds the local film agency, FFA. The FFA had previously agreed to contribute around EUR40m (\$55.2m) in a total market (EUR300m/\$413.7m) conversion. Following on from the DSN outlined above, in the UK, the Cinema Exhibitor Association has established the Digital Funding Group, which has expressions of interest from over 500 screens and is moving towards a tender process. In Italy, a proposed tax credit for purchase of digital cinema equipment is currently being studied by the European Commission Competition Directorate. The Netherlands is developing a plan based on a Virtual Print Fee (VPF) mechanism. The model being developed by a working group has received initial approval from its stakeholders.

Scandinavian governments are all actively looking at the issue of digitisation. The prime mover here is the Norwegian plan to digitise the entire sector, which has agreed VPF deals with the US studios, and is expecting to rollout across the country in April, having run tenders for installation and management of the rollout. The Norwegian example seems like a case of best practice and a model for others to follow. However, Norway is not analogous to other European countries for several reasons. The cinema sector is largely in public hands (municipal authorities) and this means that the public agency is able to align the interests of the cinema sector. Secondly, Film & Kino was able to bring a relatively large amount of money to the total deal, guaranteeing the distributors an attractive VPF level.

Finland is one of those European countries in which the Government is making special efforts to support digitalization in cinemas. In Finland, the Finnish Ministry of Education and Finnish Chamber of Films are developing a 'roadmap to digitisation', with an initial limited budget of EUR2m (\$2.8m). Most digital screens in Finland either derive income from public support or more recently the income generated from 3D. The Finnish government recognises one of the main benefits of digitalization is that it can help re-generate small and medium-sized cinemas in rural areas, by providing other local, national or international content and more immediate access to popular films. As at end 2009, 48 screens (fifteen per cent of the total number of screens) had already been digitized. In Sweden, discussions are still ongoing about digitization, led by the Swedish Film Institute. There are now 61 d-screens in place, of which 30 are financed by the SFI. In Denmark, there also discussions led by the Danish Film Institute as to how to support the market in digitisation. So far, there has been no firm action but the market has moved on to some extent as Arts Alliance have signed up a group of independent cinemas to a digital conversion scheme, largely driven by their desire to install 3D equipment.

In Eastern Europe, several countries are moving ahead with public involvement, which is even more necessary given the high numbers of single screen cinemas remaining. The Czech Republic is a good example of the complications at stake in Eastern Europe, where older municipal single-screen cinemas are prevalent, even though newer multiplexes may account for a majority of the admissions. The Czech Republic has a working group established by the Ministry of Culture developing a strategy, and local municipalities (which control around two-thirds of screens in Czech Republic) in some areas have already equipped their local cinemas. In summer 2009, the Czech Cinema Fund provided exhibitors with CZK 45m (EUR1.75m) in the

form of repayable loans for exhibitors to part-finance their digital equipment. The fund committed to financing a maximum 50 per cent of the purchase cost with the exhibitor paying the remainder.

In Hungary, the government equipped some cinemas with 1.3K projectors for local film distribution, but that will not be more widely replicated given the way forward must be with DCI-spec projection equipment. The Polish plan, proposed originally by the Audiovisual Producers Chambers of Commerce, is now being developed by the Polish Film Institute. In addition, the Cinema Development Foundation from Krakow has started a regional cinema digitisation network, co-financed with the EU and regional funds.

At a pan-European level, the cinema support fund, Europa Cinemas, has over 50 members with digital screens, many of which are in the UK. The organisation has an annual conference, in which one day is given over to a digital cinema workshop for its members. In addition, Europa Cinemas has a fund for digitization. Lastly in 2008, the European Commission established a working group of experts to study digital cinema and their subsequent approach.

Independents: at risk screens?

There is a recognition that the digitization of the independent cinema exhibition sector will require some creative thought. The indie problem, such as it is, is firmly on a public policy agenda but the problem has not yet been clearly defined. For example, Arts Alliance has recently signed up a group of Danish independent cinemas and a similar group of Dutch exhibitors (ABC) in 2008. The French deployment entity Ymagis has also signed a number of smaller independent cinemas to their programme, as well as major French circuit UGC. This suggests that there is more to the notion of 'at risk' cinemas than just being indies. The key is really the business model of the cinemas in question, and can it fit into the VPF model, which is the prevailing model in the market. This makes it more difficult to determine the true effect of digitisation on the independent sector. The actual risk comes more from the type of cinema and the business model in place. The main difficulty is to define what is an independent cinema, and within that definition, which ones are then at risk. Think Tank research, using data from the European Audiovisual Observatory, into this subject highlights that an alarming number of screens can be classified as at risk, and not fitting into the VPF model. It is difficult to determine with out a detailed analysis by country, but the following methodology can be used as a guide.

A starting point is to take the number of one and two screen cinemas in Europe. There are nuances, as always, in that some single screen cinemas can fit into a commercial model, as the deal with Danish and Dutch indies above shows. However, in basic terms, there are 6,079 single screen cinemas in Europe and 1,126 two-screen cinemas (2,252 screens). This makes a total of 8,330 single and two-screen cinema screens in Europe.

In this simplistic evaluation, there are also 3-5 screen cinemas that may fit into a VPF model or may not, depending on the business model they employ. There are a further 5,664 screens that fit into this category. This brings us to a total of approx 14,000 screen that can be considered to fit into a broad 'at risk' category. It is clear that not all these are at risk, but as an initial gauge of the number of screens we are talking about, it provides food for thought.

Another way of looking at this is to gauge that existing VPF deals potentially could cover 24,000 screens in Europe, and yet there are 30,000 screens to be digitised. This suggests that there are 6,000 screens at risk. This does not take into account the possibility that not all deployment entities will reach their targets, but again, it is a useful guide.

This means that the number of screens at risk is probably somewhere between a floor of 6,000 or a ceiling of 14,000.

For every screen that does not fit into a commercial model, a solution has to be found in the public sector. It is also important that the type of cinema that comes into the 'at risk' category is also highly likely to be the type of cinema showing a high proportion of European content. The issue of digital cinema, then, has much wider implications on European film policy and the success of European films, than simply funding the replacement of mechanical projectors with a digital equivalent. The stakes are high, in that a significant proportion of cinema could disappear from the cinema landscape, reducing the income generated at the box office by European films, and therefore, reducing the amount invested in European film production, and the content available to European distributors. This presages a serious shrinking of the European film sector, if not handled correctly and promptly.