

# Introduction

## WHY THIS BOOK?

For two years now, our research group, the digital economics team of Cerna, the Centre for Industrial Economics at the École des Mines, has been involved in MediaNet, an ambitious research project led by major European digital equipment manufacturers. The goal of this EU-funded project was to define the technical interfaces enabling open access broadband networks (the Internet) to deliver the widest range of digital services. Digital media distribution was then perceived as the most promising application of the Internet.

For two years, our team has striven to explain to engineers that copyrighted contents were economic objects which differ considerably from other kinds of information material. And consequently that the way to enhance their digital distribution should differ from what an engineer could imagine as the smoothest way to convey private information flows. As there were no content industries involved in the project, we had therefore to plead for their economic interest. And that is what we did. The confrontation between the technical vision of an equipment industry trying to raise the efficiency of digital delivery systems and that of economists defending the concept of Intellectual Property and its implications in a digital environment has been a quite unique and very stimulating experience.

This essay reveals the outcome of this interaction. It is a discussion tool between two industries. Its objective is to clarify for the two parties involved – the creative industries and the information technology sector – the economic characteristics of copyrighted content production and distribution: intellectual property,

sunk costs, pricing issues, vertical relations, network effects, distribution system roll-out, and markets and competition. It analyses how these characteristics, combined with national regulatory policies, shape the industrial organization of the digital content distribution systems.

The crucial point in this discussion is that relationships between the two industries are not solely based on technical flows or tasks but, more importantly, on economic objectives made explicit through contracts. From an economic perspective, contracts are the means through which the behaviour of each firm can be read, forecasted, monitored, and legally enforced. This general assumption is strongly reinforced by the fact that digital contents are defined by intellectual property rights (IPRs) which govern the contractual vertical chain. For that reason, it is essential to distinguish clearly between the compilation of technical layers aimed at optimizing a comprehensive digital delivery system and the economic organization supporting it and making it profitable. However, this task is not altogether simple.

The first difficulty lies in the fact that, from an engineering viewpoint, digital contents are information material, that is to say, digital files that can be encoded and transported through networks, with admittedly technical precautions, but just as any other information flow. Besides, while there is a fair understanding of the intellectual property rules attached to technical patents, the concept of copyright and the associated economic model remains unclear to many engineers. As a consequence, the difference between the utility function attached to copyrighted goods and that attached to communication services is difficult to perceive. We have had then to explain how Intellectual Property (IP) rules make digital content economics totally different from any other non copyrighted information services.

Another difficulty stems from the dynamics of the roll-out of information technologies: those technologies carry “network effects” which are the economic property of a good or a service whose utility depends on the number of users. Network effects occur at many stages of the vertical chain of content distribution. The network effects in the distribution chain create vertical competition between all the players to capture the rents of the utility gains. In particular, they are critical at the consumer level where investment in terminal equipment and access services takes place. An important issue is the financing of this investment and revenue-sharing between the content and the equipment industries. This competition, combined with the misunderstanding of IP rights

management and massive circumvention practices, creates confusion in assessing the economic principles of digital content distribution.

This essay seeks to clarify these controversial issues. It should first highlight the main economic patterns of the media content industry and how those patterns influence content distribution. This analysis will underlie the comparison of the various industrial organization models of the content sector and the regulatory frameworks attached to these models, in the United States and in Europe. It will then explore how these models shape the initial conditions upon which new content distribution systems are now rolled-out.

## **PRESENTATION OF THE BOOK**

Contents are copyrighted goods to be distributed under different versions to the consumer.

Because content industries are based on intellectual property rights which provide strict rules on setting up vertical relations, these industries challenge the technical vision of open digital broadband networks able to deliver any form of content to any consumer in the world. Media economics is indeed a complex matter. It requires economic tools enabling to analyse the information good industries, the vertical relations involved in distribution issues, and the network effects feeding the roll-out of information systems. Those three characteristics combined with the regulation attached to them, shape the dynamics of the media sector and its response to new technologies.

The book is organized in three main sections. The first one provides an introduction to the economic concepts underlying the digital content' market structure and related distribution problems. The second depicts the economic principles of digital content distribution. The third discusses competition issues within digital distribution systems including the home network applications. The vertical relations within the Internet chain, and its comparative advantages/drawbacks to other distribution systems will be explored all through the book and summarized in conclusions. Here is a more detailed description:

**The first section**, "Content Markets", provides the theoretical economic background adapted to study any content market issue. Content specific economic

characteristics are listed and related to the different efficiency issues affecting content industries: their protection, selection, pricing and financing difficulties. It gives also a picture of the different solutions, public or private, that are used to regain efficiency in content production and distribution.

**The second section**, “Content distribution economics”, focuses on content distribution economics. It first illustrates how the basic problem of vertical relations between a brand and a retailer applies to the content industry. The position of the content industry is then pictured by a version market matrix which has to be maximized through multiple distribution systems including terminal equipment. Competitiveness issues are addressed from the content industry side. The third section describes the economic model of networks roll-out focusing on the importance of network effects and vertical cross-subsidies. Attention focuses on how the pricing of content, vertical relation incentives, and IP rights circumvention can play the role of a vertical subsidy.

**The third section**, “Competition between content distribution systems”, examines the main patterns of terminal equipment (home network) roll-out. The case of Digital Video Recorders (DVR) roll-out illustrates how such equipment can be vertically related or not to a content distribution system. The chapter analyses competition between broadcast and broadband delivery networks within the regulatory framework of the US and the European Union. Some specific distribution systems for non-linear services such as DVDs or VoD are then analysed.

**A final section**, “A conclusion: what role for Internet distribution services?”, summarizes the main findings and provides conclusions about the present and future role of Internet networks in content distribution.

# Content Markets

We use the term content to designate cultural goods traditionally associated with physical supports: books, newspapers, photographs, records, films... But also TV shows, radio broadcasts and now multimedia Internet podcasts... For a long time, these goods have been studied within the frame of their respective industries, usually related to a physical support (record, book...) or a technical distribution system (TV, radio). Digital technologies are now dissociating the contents from the supports and requiring an overall analysis adapted to the cultural goods marketable under a digital format. Those goods are legally identified by copyrights. The purpose of this section is to examine the high specificity of copyrighted goods.

A picture of the French market (Table 1) gives some empirical order of the magnitude of content economic issues in a large European country.

*Table 1: French content markets (2005)*

<b>Content</b>	<b>Market size (bn€)</b>	<b>Total number of units sold</b>	<b>Number of titles on the market</b>
Movies* (theatres)	1	176 millions	240 new licensed releases
Video**	1.8	145.9 millions	53,475
Music**	1.5	117.4 millions	284,127
Books**	4.1	388.8 millions	447,553
Pay TV***	2.9	7 millions (subscriptions)	–
Games** (software)	1.1	32.7 millions	16,746

\*Source: CNC (forecasts) \*\*Source: GFK, Conférence Biens Culturels, 23.02.2006

\*\*\*Source: for year 2004, CNC

In 2005, the top contents sold in France were the following: the PES 5 (Play Station game, 33 million €), *Harry Potter* Vol. 6 (book, 31,01 million €), the *Gran Turismo 4* (Play Station game, 25,2 million €), *Star Wars EP. III* (video, 22,5 million €), *Anges et Démons* (book, 16,5 million €).

## WHAT IS A CONTENT?

Contents are no ordinary economic goods. Several economic characteristics make of them a concern for industrialists and a field of investigation for public authorities.

(I) First of all, contents as other information goods such as patents or trademarks, have public goods properties. Arrow [1962] first pointed out that information had two major properties of public goods: *non-rivalry* and *non-excludability*. The consumption of non-rival goods by an additional person does not decrease the amount available to others: it has no marginal production cost. Like national defence, lighthouse services or roads, information is a non-rival good. Charging any price for this type of good is welfare decreasing for society. Consumers whose willingness to pay is lower than the price are excluded whereas their consumption wouldn't have cost anything to anyone. A good is non-excludable when it is impossible to prevent someone from consuming it even when he does not pay the price for it. Non-excludability induces a deficit of incentives to create as producers anticipate underpayment. Free-riding behaviours lead to underproduction.

(II) In a second place, buyers cannot precisely determine the value of a content before they have actually consumed it. Contents fall into the economic category of “experience goods” with second-hand cars or wine. For that reason they need to be identified and advertised before they are consumed. Contents differ from other kinds of information goods or software by this intrinsic experimental dimension.

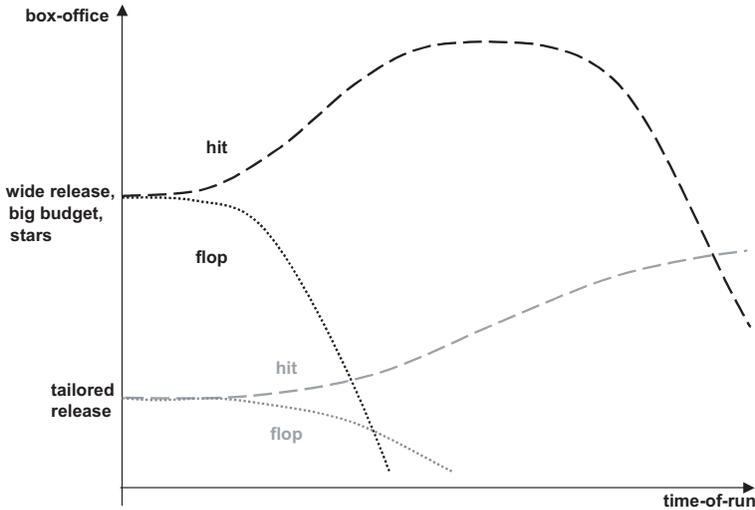
(III) The third characteristic of contents is that each of them is unique. Every piece of music, every movie, every book has its own specific qualities and reaches out to different consumers. Following this individual differentiation, contents producers have some market power: they can define their own pricing strategy (this is a “monopolistic competition” case).

(iv) Contents also present a specific cost structure: they have a low marginal cost of reproduction but high fixed costs of production. Moreover, most of the fixed costs incurred are “sunk”. They are so specifically dedicated to one activity that reallocation or resale is impossible. They are definitely lost once engaged. Contents industries produce prototypes: every film, every song, every book is different from another and is produced and promoted individually. Distribution and production costs (like scriptwriting, casting or setting costs) are totally sunk. But sunk costs can also be intangibles such as the growing marketing and advertising spending in movies’ production (that now amount between a third and a half of the total costs for a new Hollywood film). These costs will not be recovered if the project proves difficult or even if it is headed for disaster. This explains the completion of “ten-ton turkeys” in movie production, even when there are slender chances of success.

(v) Last but not least, consumers’ appreciation of a new cultural good is highly unpredictable. One of the most extensive statistical surveys to measure and explain this uncertainty has been carried out by Arthur De Vany on the demand dynamic for films in theatres. Success or failure depends from an information cascade of critics’ and spectators’ preferences that producers and distributors cannot control. He models the demand dynamic as follows. The likelihood that one consumer chooses a film is initially uniform but spectators choose sequentially and the probability of selecting a particular film is proportional to the fraction of all previous movie goers who have already selected it. Nevertheless, the dynamics of film success are much more complex than a crowded process. Quantitative contagion of demand stops as soon as qualitative valuations become available. From that moment, film revenue dynamic profiles split into a hit path and a flop path.

As the information cascade cannot be controlled, it is impossible to secure the success or to prevent the failure of a film. Advertising budget size, stars or wide release strategies (large number of theatres running the film on its release) do nothing but support the film’s initial exposure without decreasing the risk of audience failure. Indeed, information cascades intervene more quickly and with greater intensity for blockbuster strategies: successes are stronger but failures bitterer. Figure 1 below compares revenue probabilities of a blockbuster and of a film with a smaller budget, promotion and release scale. No one can tell which one will net the greater revenues.

Figure 1: Comparison of revenue probabilities for a blockbuster and a smaller film



The economic efficiency of content industries can be defined as the situation where all profitable creative projects are carried out. But the specific economic characteristics listed above lead to a deficit in the number or in the quality of creative products for society. The next paragraph analyses in detail content market inefficiency issues and the range of available private and public solutions.

### HOW CAN CONTENT MARKETS BE EFFICIENT?

What are the efficiency issues and solutions in content markets? This paragraph analyses efficiency issues in detail resulting from the specific economic characteristics of contents. It also examines the range of available solutions to regain efficiency in content markets. These solutions may be provided privately by individual or coordinated industrial players as well as by public authorities, either in a complementary way or in a substitutable one.