

# Preface

The markets for digital information—this means both software applications and all sorts of content (from blogs via images, films and games up to scientific articles and patents)—are different than markets for non-digital goods. When a non-digital good is purchased, it physically changes hands from the seller to the buyer. On the other hand, goods on information markets stay with the seller, buyers merely receiving a copy. Trade with digital information, which we call “I-Commerce” (in the sense of E-Commerce with information), mainly occurs with the aid of networks, particularly the internet. The products are thus characterizable as network goods. Here, too, there are particularities: network goods may have their basic value (for an operating system, this value might be, for instance, that it allows applications to run on a computer), but they receive an additional value via the number of their users (the more the better for the network) and via the number of complementary products (in our example: application programs that run on the operating system). A further particularity of these markets is the technically illegal “swapping” of digital information. To put it provocatively: there is theft on a scale that puts most other markets to shame. In light of the network effects (the more users the better), though, this does not have to be detrimental to the market in question—to the contrary, sometimes it can be useful.

Markets for digital information are the prototypical markets of the information and the knowledge societies or—following Manuel Castells (1996)—the network society. Many an author thinks we are on the threshold of an entirely new culture, the “multimedia culture” (Rauch, 1998). Such a transition to a new form of society or even culture goes hand in hand with a change in social values, a new sense of legal boundaries and a modified code of ethics. It is in front of this background that information markets develop the economic goods proper to them.

This book mainly deals with five research questions:

- A. What particularities are displayed by pieces of digital information as economic goods?
- B. In what environment (society, law, ethics) are information markets located?
- C. What digital goods are traded on information markets?
- D. What competitive strategies are pursued by providers on information markets?
- E. Which role is played by piracy and the illegal information market?

## The Spectrum of Digital Information Goods

In the early days of scientific endeavors toward the information market (from the nineteen-sixties onward), led by Peter F. Drucker (1959), Fritz Machlup (1962) and Marc Uri Porat (1977), among others, this concept is defined very broadly, encompassing all non-manual work. The delineation of the “knowledge worker” from all others was a rather arbitrary one (Webster, 1995). We consider to be more realistic. The approach of demarcating information markets works with two salient characteristics: on information markets, *digital* (or at the very least: generally digitizable) *information* is traded via the usage of *networks* (such as the internet).

Information markets are embedded in societal structures. This is why it is necessary to consider the conceptions and manifestations of the information, knowledge or network society. We will also lead an intensive expedition through the territories of information law. Considering the importance to information markets of free access to knowledge, of privacy and of dealing with intellectual property, it is unavoidable to take a look at information ethics.

Our book extensively analyzes the products and submarkets of I-Commerce. We look at products, the steps taken toward their production, their buyers as well as their providers’ business strategies. An initial overview exemplifies the multitude of digital products:

- Business, market and press information,
- Legal information: norms, cases, annotations, citation services,
- STM information (scientific, technical and medical information): STM literature, bibliographical information services, facts,
- Search engines and content aggregators,
- Web 2.0 Services: sharing services, social bookmarking, knowledge bases, social networks,
- Commercial online music services,
- Internet TV,
- Digital games: “classical games”, gambling, videos games, Massively Multiplayer Online Role Playing Games (MMORPGs), social games, games with a purpose,
- Software: products: system software, middleware, application software (each either as individual or as standard software), services: consulting and implementation services, software as a service.

Many goods—such as search engines and Web 2.0 services—are offered for free. The providers generate revenue by selling their customers’ attention to advertisers. This is why internet advertising is an important subject to us. We are dealing with banner advertising, target-group-specific and personalized advertising, in-game advertising, permission-based marketing, context-specific advertising (such as “sponsored links” in search engines) and viral marketing.

## I-Commerce: Mechanisms, Value Net, Strategic Variables

Competitive advantages are of great importance for information providers who want to be successful on information markets, in “I-Commerce”, just as they are important to all providers on all markets. It is, however, necessary to account for the special characteristics of information goods in order to represent information providers’ strategic positioning and courses of action. Three aspects are of central importance:

- the economic particularities (mechanisms) that occur in relation to information goods,
- the value net (stakeholder configuration), as well as
- the specific strategic variables that information providers can apply to gain competitive advantages.

From an economic perspective, is there anything special to be detected in information goods? Four *mechanisms* play a central role:

- dominant fixed costs,
- distinct information asymmetries,
- pronounced network effects and
- the tendency toward mutating into a public good.

In information goods, the production of the *first copy* is extremely expensive, compared to the cost of its reproduction. If we consider the sums expended upon a music title or movie, we will soon arrive at sums of several tens of thousands, or even millions, of Dollars. Once the software, the album or the film are finished, however, they can be reproduced nigh-on perfectly for a few Cents only. Furthermore, the transmission costs are very low for digital information goods. If a fast internet connection on a flat-rate basis is a given, data can be sent and received with no additional cost. This relation between very high fixed costs to very low variable costs leads to a pronounced unit cost reduction. This means that average costs per unit decrease very quickly when production numbers rise—boosted by the rapidly decreasing average fixed costs.

It can often be observed in information goods that one side of the market is better informed about the quality of its products than the other. A software provider knows his product, whereas the layman cannot assess its quality prior to a purchase and only partially afterward. Even an information professional should run into problems rating the quality of a search engine’s sorting algorithms to any degree of exactitude, since providers of such search tools (let’s say: Google and Yahoo!) may disclose a lot about patent writs, while keeping the details of their practical application tightly wrapped. Such unbalanced distributions of quality information is what we call *information asymmetries*. The value of an information good, e.g. the blueprint of a new production method or a chemical formula, can only be judged for good once the information has been received and processed (experienced). Once the information is in one’s possession, however, the question becomes how high one’s willingness to pay still is. In contrast to a new pair of shoes, information cannot be fully inspected prior to a purchase. Every kind of closer inspection leads to a disclosure of (parts of) the information, which runs

counter to the provider's interests. Kenneth J. Arrow (1962, 615) has described this problem as an *information paradox*: "[...] there is a fundamental paradox in the determination of demand for information; its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost."

When buying an information good, it is often of great importance how many other users this good already has. If you want to buy a word processing or spreadsheet application, you will think long and hard about whether to buy the product of a small provider, which is not very widely used, or to whether to turn to the market standard. Before buying an operating system, it is important to know what application software it supports. Buying the program that is most prevalent offers distinct advantages, e.g. in the possibilities for swapping files or helping one another solve any problems that might arise. The case is similar for films, books or music. A provider like Amazon is successful because a lot of customers cooperate (partly without being aware of it), generating basic information for recommendations via their clicking and buying behavior or consciously submitting ratings and comments. Facebook is mainly used because many others also use it, and because the individual can maintain many friendships or other contacts in this way, even internationally. Perhaps one or the other user also uses Facebook because of its neat additional offers, such as the games. Hence, in information goods the decisive factors are how many users the product is able to bind (*direct network effect*) and how many related products are available on the market (*indirect network effect*).

Whether goods are to be classed as *private* or *public* is decided, according to standard economics textbooks, via the two criteria of user rivalry and the principle of exclusion. User rivalry or user competition is what we call when usage of a good deprives others of the option of using it as well. Information goods can be used by many people without being used up, or consumed. An information good does not decrease with usage. When a person acquires a certain knowledge via processing information, this does not decrease the odds of another person acquiring the same knowledge. As opposed to many other goods, one need only think of a pair of trousers or a chocolate bar, the same information can be used by a multitude of people at the same time. There is thus generally no user rivalry in the traditional sense. It is more appropriate for the characterization of information goods to focus on changes to the benefits enjoyed by user (in terms of software) and informed party (in terms of content), respectively, when an information good is widely distributed. These changes can be very aptly described via network effects. They can be positive when the existing network becomes more valuable due to its increased usership, i.e. when its participants are increasingly better off. This is the case, for example, when one is able to communicate with a growing number of people about certain events or in a certain language. The network effects can also be negative, however, when the growth is to the participants' detriment. An undesired communication of a private or business secret would be a fitting example for this scenario. The principle of exclusion is not applicable to public goods as it is to private ones. This means that people who are unwilling to pay for usage of a good cannot be excluded from using it anyway. This is a grave problem for information

providers in particular, since information goods are easily distributed without the provider being able to control it. This goes both for information that started out being known in a small circle (e.g. plans concerning a new research result in the R&D department) and, particularly, information that has already been widely released (e.g. in the company bulletin or even as a specialist publication via open access). The further usage of such information goods can hardly be controlled by the provider anymore. Information goods thus display the strong *tendency to become public goods*.

Each of the four economic mechanisms of information goods described bears a great potential for *market failure*. Market failure is what the economist talks about when the market results are less than ideal when compared to a reference model. Following microeconomic standard textbooks, we would even have to suppose that no market can be created for information goods at all. Several examples illustrate this problem.

What company will offer goods that cost large sums to produce but for which it is unclear whether they will ever reach the high unit sales required in order to recoup these costs? Big providers with a large market share have a distinct advantage in this scenario. What's more, the copy costs are not only very low for legal users, but also for all illegal ones, which means that one must always expect the distribution of pirated copies to impair legal sales.

What provider wants to be active on a market where he will have to disclose his product to the customer for processing prior to a sale? Potential customers want to be as certain as possible that they will like the music, film, book etc. or that the software will suit their purposes.

Who wants to enter a market as provider where the customers will tend to settle for a product that is widely used rather than a high-quality product? Established providers enjoy immense advantages.

Who is prepared to offer goods on a market where one cannot, only with great difficulty, make sure that the buyers will actually pay for their usage? And what customer pays for a product that he could also have for free?

The starting point to *Competitive Strategies of Information Providers* occurs via the introduction of the instrument of industry analysis. In order to systematically comprehend an industry, there is the so-called "Five Forces" model developed by Porter (1980). According to this model, there are five fundamental forces that, put together, make up the attractiveness of an industry. Individually, they are the rivalry between the competitors extant in the industry, the market power of suppliers and buyers as well as the threat posed by replacement products and potential competitors.

The Value Net model by Nalebuff and Brandenburger (1996) is much better suited to describe the stakeholders active on an information market, however. This model stresses that there are not only competitive but also cooperative relationships in a market, and that they are of great importance to business success. This combination of competition and cooperation—co-opetition—ends, in contrast to Porter's Five Forces model, in a slightly modified model of market analysis. Nalebuff and Brandenburger speak not only of forces that threaten profitability, but also of

a *Value Net*, in which different agents are able to create values collaboratively. Apart from the usual stakeholders, like customers, competitors and suppliers, which Porter also talks about, the Value Net explicitly makes allowances for cooperative relationships.

Complements play a hugely important role on information markets, since it is always necessary to have some form of end device in order to be able to use digital information goods. Music files cannot be used without a player, eBooks cannot be read without a reader and application software is useless without a computer. How then, taking into account the particularities of information goods, can value nets be designed in such a way that they can lead to competitive advantages? In every textbook, strategic considerations end with the question “What is the basis on which companies develop their competitive advantages?” Here, too, the doyen of strategy, Michael Porter, has wielded enormous influence. He shaped strategic management by stating that companies generally have two strategic alternatives for gaining competitive advantages: the differentiation strategy and the cost/price leadership strategy. Porter’s fundamental thoughts on positioning are directed at traditional markets, however. Since information goods are clearly different from traditional goods, they also require different competitive strategies. Porter’s strategy alternatives do not become obsolete, but they have to be used in new variants on information markets. In their fundamental work “Information Rules—A Strategic Guide to the Network Economy”, Carl Shapiro and Hal R. Varian (1998) offer multifarious starting points that are of great importance for information providers’ strategy development. Their work has strongly influenced the debate about strategy, particularly from the perspective of the software industry. We worked out a total of seven strategic variables that are of towering importance for information goods:

- Timing of Market Entry,
- Pricing,
- Compatibility Management (Standardization),
- Complement Management,
- Copy Protection Management,
- Signaling,
- Lock-In Management.

These seven aspects are *strategic variables* due to being “manageable”, i.e. subject to entrepreneurial influence. Such decision variables, or action parameters, can be used by companies in such a way that certain goals can be reached, relating for instance to market share, brand recognition or revenue.

The three aspects introduced above (mechanisms of the information market, value net and strategic variables) are summarized in a model, complemented by the technological (e.g. provision of broadband connections) and the institutional environment (e.g. the configuration of copyright). With the help of this model (see p. 358), information markets can be analyzed and design recommendations deduced.

It is possible, for example, to use the strategic variable *timing of market entry* to influence the different stakeholder groupings. Thus the timing of the market entry

affects customers' willingness to pay, suppliers' readiness to collaborate, complementors' interest in creating complementary products as well as the competition's endeavors toward creating competing offers. The stakeholders' actions, in turn, influence the degree to which economic mechanisms take effect on information goods. If many customers decide to buy a new product, this will attract followers who also want to have the product. Such direct network effects can be observed quite clearly in the case of the recently released iPad. At the same time, expectations for a large number of customers affects the offer of complements. Indirect network effects arise, such as publishers' eBook offers for the iPad.

The mechanisms can also be addressed directly via some strategic variables, such as *copy protection management*. A software, for instance, which is brought on the market early in a beta version without copy protection—a fairly common practice, by the way, in release changes by Microsoft—can spread very quickly but also uncontrollably and is thus pretty much to be regarded as a public good. So here too, network effects begin to work. Direct network effects arise via exchange of data in new formats or early communication about the software, indirect ones via complementary product developments, as can be very nicely observed in the number of apps, which were developed with great speed at the time of the iPhone's release.

Another example for a direct influence on the mechanisms can be seen in *signaling*, which is when preannouncements are made concerning a product release, for example. This can be used to reduce information asymmetries by giving customers early information about a new product and its release date. At the same time, though, this can increase information asymmetries, if for example the competitors' hand is forced because they are unable to accurately estimate what features the new product will have.

Feedback may act from mechanisms to stakeholders. A broad offer of *complements* (e.g. movies in the HD format) boosts further sales of HD TVs. A greater demand in turn gives the provider pricing latitude. This serves as an example for the reaction of a stakeholder grouping to the strategic variables, in this case *pricing*.

There are also, however, direct reactions of mechanisms to strategic variables. Thus network effects play a crucial role for a successful *market entry*. The stronger they are, the harder it will be for a pioneer to survive, since neither customers nor complementors want to make an early commitment.

## Piracy on Information Markets

Piracy occurs massively in information and knowledge societies. The production of illegal copies with no loss in quality challenges—thus the industry associations—many of the traditional business models for information goods. The music industry in particular complains of massive losses in revenue due to the multitude of illegal access paths to the information good music. Why do people bootleg? There is a variety of reasons, such as gender, age, income, technical know-how, availa-

ble bandwidth or legal alternative offers. To put it very simplistically, male students can be termed the core group of pirates.

The question as to what concrete damage piracy causes, however, must be deemed an open one from a scientific point of view. A large number of studies from the music industry have arrived at differing results. They run the gamut from extremely strong negative effects, where every illegal copy substitutes a purchase, to positive effects, where illegal downloads even boost legal sales. If we take into consideration the studies' quality, we can see that negative effects cannot yet be cleanly proven.

What are information providers' scopes for design in the face of piracy? Educational work is to be preferred to criminalization, and a further tightening of copyright appears counterproductive. The central factor is the offer of attractive (legal) commercial offers in connection with innovative pricing models and new, creative usage options of the information goods for sale.

### **Remarks on Citations**

A short note on the literature cited: Since the chapters each represent a unit, the sources are listed at the end of a chapter. For reasons of space, there is no summary of all cited sources at the end of the book. Sources from the internet are always marked "online". Due to the length of many URLs, we decided not to state the exact Web address. The interested reader will locate such sources via his or her search engine of choice. These websites are up to date as of early 2011.

Some of our quotations are in their original version in German language. All those quotations were translated by us.

### **Target Groups**

This book is the result of the cooperation between an economist and an information scientist. We thus aim to address fellow scholars and all students of both disciplines. *Information Markets* is a comprehensive overview of the state of the art of economic and information-scientific endeavors on the markets of digital information—software as well as content. We address the following groups in particular:

- Economists (economics and business administration),
- Library and Information Scientists,
- Computer Scientists,
- Students of these disciplines,
- Professionals on the markets for information.

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