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BUSINESS MODELS AND AUTHORS' RIGHTS IN THE INFORMATION ECONOMY

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Abstract

This paper will discuss some special features of the information economy. The information economy is based on information products and services, whereas the traditional economy is based on farming, industrial production of material goods, and labour-intensive services. The information economy is sometimes claimed to be a completely new economy, governed by other economic laws than the traditional economy. This is not true. However, there are some cost parameters that have changed drastically in the information economy. For example, the Internet has lowered the marginal cost for reproduction and distribution of information products to almost zero. This makes it difficult for producers of information products to combine an attractive price for the products, while recovering high development costs. Some companies, e.g. Google, have successfully introduced new business models adapted to the new needs. Many other companies in the information economy, e.g. media companies and publishers, still need to innovate and improve their business models. There are also needs for changes and innovations in legislation, especially in the field of copyright and authors' rights, where the damaging effects to society of the monopoly powers granted by the existing laws have become apparent. New legislation should focus more on the needs of authors and customers, and less on the wishes of business-people involved in the processes between the authors and the customers. Open access and open source are two interesting new concepts and business models for intellectual products (scientific papers and software, respectively), which seem to have great potentials for the future development of the information economy.

Keywords: information economy, business models, authors' rights, information products, information services, pricing, infrastructure, public goods, collective goods, bundled businesses, open access, open source

1. Introduction

New business models are needed for the production and marketing of information-based products and services. Innovative entrepreneurs, like the founders of Google, have understood this, and have been extremely successful in designing and implementing new business models. Other important actors in the same field, notably publishers and the media industry, are lagging long behind and do not yet seem to have fully understood the new conditions for information products, caused by the advances of information technology and, in particular, the Internet. They are acting defensively, e.g. by chasing "pirates", instead of exploiting the new opportunities in a

constructive way.[1] And they are not alone. According to a recent article in a Swedish business journal, a large number of CEO:s in major Swedish companies are still puzzled how companies like Google can be so profitable, although they provide information products and tools for free.

In the beginning of this century it was popular to claim that the IT boom will lead to a "new economy". However, the information economy is not really a "new economy" in the sense that classical economic theories should have become outdated and invalid. But certainly the typical values of some important parameters have changed drastically, mainly because of the extremely low marginal costs for producing and distributing additional copies of information products. The new parameter values lead to new interpretations of economic theories and laws in a market economy. Some aspects of the new situation are actually known from more traditional areas in the economy - like how to finance and charge for public goods and infrastructure (bridges, roads, railroads etc), where the investment costs are high, whereas the cost of using the infrastructure, once it is in place, may often be relatively low.

2. Background

The information economy is the latest phase in the advancement of a society's economy. In the information economy, the development and use of tools based on information technology has become extremely important and contributes more and more to economic growth. Tools based on information technology, such as computers and computer software, typically amplify the power of the human mind by facilitating intellectual processes. During the preceding industrial era, the development and use of another category of tools facilitated rationalisation and automation of manual processes, producing material goods. Before that, in an economy based on agriculture and natural resources (mining, forestry, etc), manpower was the dominating production factor. Manpower is still an important production factor, but now more so in the service industry. Human brainpower has of course always been important, not least for the progress that has taken place in the development of the economies, and in the transitions from one type of economy to another. However, with the rapidly increasing availability of powerful information services, the impact and productivity of human brainpower has increased drastically, and will continue to do so for the foreseeable future.

In summary, a society's social and economical development may be structured into four phases:

- Phase 1. This phase is dominated by agriculture and exploration and exploitation of natural resources. The goods produced are food, raw materials, handmade tools, and energy.

- Phase 2. During this phase manufacturing of goods, as well as tools and machines to assist in the production of food, goods, and energy, becomes more and more important, and more and more efficiently done, first by specialised craftsmen, later on a larger scale by specialised factories, using tools and machines, which are

[1] Threatening customers and potential customers with law suits may seem odd in the first place. Moreover, there is actually little, if any, scientific evidence that the decline in sales of music CD:s is caused by illegal downloading of music from the Internet. Downloading of music from the Internet may rather stimulate the sales of CD:s as well as tickets for live concerts. See [Findahl 2006] and [Marshall 2004].

themselves manufactured by other factories. Manual labour is replaced or supported by machines, thus increasing the productivity of each worker. Also the farmers are empowered by machines, produced by the manufacturing industry, and thus the productivity increases in the agricultural sector, too.

- Phase 3. During this phase, the production of food and physical products and tools have become so automated and rationalised that a relatively larger share of the economy can be devoted to the production of services. Services were needed also during earlier phases of the socio-economic development, but during those phases many services could only be demanded by relatively few rich people, and by businesses. Since farmers and workers have now become more productive and therefore earn more money, they are able to demand and pay for more services.

- Phase 4. During this phase modern information technology, in the shape of computers, computer software, and communication networks, is introduced and used on a large scale in all sectors of society. While the traditional, mechanical technology amplifies the physical capabilities of man, information technology amplifies mental and intellectual capabilities. The information technology has enabled large-volume production and consumption of non-expensive products and services, based on information. Computers are typically much faster and less error prone than human beings in performing mental operations. The human being is still superior in tasks requiring imagination, innovation, and unplanned and sometimes unexpected initiatives, but even in performing such tasks, people may increase their efficiency by using advanced tools based on information and information technology.

Through the history, the relative importance of different sectors in the economy has changed dramatically. For example, agriculture accounts for only a few percent of the gross national product of an advanced society, and the manufacturing industry is going the same way as agriculture. There is an increasing demand for social services in modern societies. A major problem here is how to finance this demand for labour-intensive and often publicly financed services without increasing taxes to unacceptable levels. Inexpensive information technology and information services could play an important role to improve the productivity and efficiency in service production – as we have already seen in white-collar work both in the industry and in governments on different levels.

3. The information economy – a new economy?

Is the information economy a new economy? During the IT hype in the beginning of this century, it became common to talk about a "new economy", where the traditional laws of economics did not apply any longer. Entrepreneurs and venture capitalists used the term to defend huge investments in companies which had yet everything to prove. Year after year these companies produced only losses, and for many of them this was virtually the only thing they had produced, when the bubble became apparent and exploded. Only those who sold their shares in time became rich.

In reality companies belonging to the information economy, whichever they are, are governed by the same economic laws as other companies in a market economy. There is nothing mysterious about information technology from an economic point of view. Nevertheless, use of information technology will make it

possible to create production processes and produce products and services that have certain characteristics, values of certain parameters, if you like, which are different from those of more traditional production processes, products, and services. Here are some examples:

- A traditional industrial process produces physical objects, e.g. cars. The individual objects produced may be very similar indeed – they may be seen as instances of one and the same type – but even so, each instance will require a non-negligible amount of resources to be produced: raw material, labour, machine capacity, etc, and these resources are associated with non-negligible costs per produced instance, or unit. In contrast, information products produced, disseminated, and consumed by means of information technology may be instantiated, or reproduced/copied, at almost no cost at all. Moreover, information may be consumed (used) without being at all consumed (worn out), that is, an information product may be used over and over again, while remaining completely intact.

- A traditional service process is heavily dependent on human labour. Unlike physical products, a traditional service cannot be stored; it must be produced and consumed at the same time; example: a receptionist answering a question from a client. In contrast, a web-based self-service system can be used by many users simultaneously, without the presence of a human producer of every instance of the service – other than the self-serving consumer of the service herself.

[Lee 2001] argues that electronic commerce is more than just another way to sustain or enhance existing practices. "Rather", he claims, "e-commerce is a paradigm shift. It is a "disruptive" innovation that is radically changing the traditional way of doing business. The industry is moving so fast because it operates under totally different principles and work rules in the digital economy." Lee proposes an analytical framework for assisting e-commerce planners and strategic managers in assessing the critical success factors when formulating e-commerce business models and strategies. The framework suggests five essential steps for e-commerce success: redefine the competitive advantage; rethink business strategy; re-examine traditional business and revenue models, re-engineer the corporation and Web site; and re-invent customer service.

New frameworks and guidelines for developing business models adapted to the specific needs of an information economy may certainly be very helpful both for researchers and practitioners. At the same time, such new frameworks and guidelines do not necessarily have to contradict classic economic theories that have evolved over a long time, and which have survived many changes in society, technological and others. Thus theories and models like those presented in [Samuelson 1948], [Samuelson 2009], [Dupuit 1844], [Prest and Turvey 1965], and [Kotler 1967], may still be valid, by and large.

One of the laws of classic economics tells us that, under perfect market conditions (perfect competition, profit-maximising sellers, buyers with full information, etc), the price of a good will be equal to the marginal cost of producing another instance (unit) of the good. See, for example, [Clifton 1977], [Lee 1998], and [Mas-Colell, Whinston, and Green 1995].

In the examples above, from the information economy, the marginal cost of producing another instance of the good (the information product, the web-based self-service) is very close to zero. Thus, even if the producer is profit-maximising, the

price should be very close to zero, too. This situation is very common in the information economy, but very unusual in the traditional economy based on traditional production of goods and services.

Obviously the conditions just described create certain problems for companies that want to be profitable in the information economy. Probably the most important problem arises from the fact that even if the marginal cost of producing another instance of a good is very close to zero, the cost of producing the first instance, or rather the original or the (proto)type, the generator of all instances, is often quite high, as high as it would be for a prototype, or generator, of a traditional physical product or service. In the traditional economy, these costs may be treated as investments, which are distributed over a large number of produced instances, in such a way that the effect on the price of each unit of the product or service becomes very small, relatively speaking. But when the marginal cost is close to zero, even a small share of the total investment cost will have a considerable percentage effect on the price per unit, and the producer will not be able to maximise profits by applying a traditional scheme for distributing the investment costs over the instances expected to be produced and sold. The traditional investment cost allocation scheme will lead to (a) less than optimal sales, and less than optimal profits for the producer, and (b) higher than optimal prices, fewer buys, and lower than optimal total satisfaction among the potential consumers of the good.

The dilemma just described is not completely unknown in the traditional economy. A similar situation often occurs for infrastructural goods like roads, railroads, bridges, networks for telecommunication, electricity distribution, etc. Here again the dilemma is that charging the customers more than the marginal cost of using the infrastructure will lead to underutilisation of the infrastructure, and a loss for the collective of customers (and producers), and for society as a whole. When the infrastructure is already in place, the cost of using it is often relatively low, and charging the customers extra every time they are using the infrastructure, in order to recover the investment, will inevitably decrease the usage of the infrastructure, and may actually even decrease the total revenues for the owner of the infrastructure, thus giving a negative rather than a positive contribution to the coverage of the investment costs.

Different solutions have been tried to solve the dilemma concerning traditional infrastructures. A common solution is to finance investments in infrastructure over the government budget. The users of the infrastructure will then pay for the infrastructure collectively, in their role as taxpayers; at the same time this financing regime will not deter any individual from using the infrastructure, once it is in place. This will lead to close-to-optimal usage of the infrastructure, assuming that the marginal cost of using it is zero or very low. If this is not the case, the infrastructure users should pay the marginal cost of using the infrastructure every time they use it.

Another method of financing infrastructures is to form so-called Public-Private Partnerships (PPP). This method may reduce needs for the government to borrow money, and it may have advantages from the point of view of risk management, but it does not seem to solve the basic problem of preventing underutilisation of infrastructures because of too high prices for using them once they have been created. For example, the Arlanda Express railway to Arlanda Airport outside Stockholm is the result of a PPP-project, but the price of the train tickets is so high that most private persons prefer to take a bus, their own cars, or even a taxi to the airport, which creates more air pollution than necessary, a so-called external diseconomy.

Information (and knowledge) exhibits the characteristics of a public good or a collective utility: non-rivalry and non-excludability. See [Samuelson 1954]. Non-

rivalry means that consumption of the good by one individual does not reduce availability of the good for consumption by others. Non-excludability means that nobody can be effectively excluded from using the good.

From a holistic point of view (and as pointed out above) some ways of financing the production of a public good may lead to under-consumption of the good, once it has been produced and is available for everyone. More generally, production and consumption of public goods are associated with so-called externalities. An externality occurs when an economic activity causes costs or benefits to parties who are not directly involved in the activity. See [Pigou 1920] and [Baumol 1972].

4. Production, dissemination, and marketing

Here we shall present a number of illustrative examples of production, dissemination, and marketing of intellectual goods and information-based products and services.

4.1. Music: live and recorded

The music industry was one of the first industries to discover (or rather not to discover) the new parameters and the new realities of the information economy as compared with the economy they had got used to. Thanks to their power over the composers and artists, and the monopoly created by authors' rights, music publishers could continue to charge their customers high prices for recorded music, although market prices for reproduction and dissemination of electronic products approached zero thanks to the developments of information technology. When the market forces anyhow started to work through especially young people's sharing of electronic products via the Internet, the music publishers responded by defensive and even repressive actions, making maximum use of taxpayers' money through the legal system, augmented by private police forces. A more constructive response could have been innovative initiatives, turning the technical advances to their own advantage, rather than seeing them as threats to be defeated.

The situation became absurd; it must be unique in history that an industry becomes the worst enemy of its own customers, at least on such a large scale. Music sharing and downloading via the Internet flourished, strengthened by the fact that the music industry voluntarily refrained from entering this potentially huge and profitable market. Even composers and artists revolted and made their work available free of charge on the Internet, getting free, self-amplifying publicity in return, making themselves attractive for profitable live concerts and other engagements; they sometimes even increased their sales of music recorded on traditional media like CDs. It should be noted that the revolting composers and artists were the same as those whose authors' rights the hypocritical music publishers pretended to protect. It is true that they made everything to protect and defend authors' rights – but they did this, not for the sake of the authors, but for their own comfort and wellbeing through excessive profits that they did not deserve, and actually never got, because of the sharp downturn in the sales of their traditional products.

Another argument, often put forward by music publishers to defend the high prices for their digitally produced and reproduced products, is that it is very costly to market and promote music, especially music made by relatively unknown creators and performers. Here again the music publishers only demonstrate that they ignore or oppose alternative marketing methods enabled by modern information technology. We will return to this issue in our discussion of new business models.

This is not to say that all music publishers were evil and greedy. Some of them may only have been stupid and ignorant. Some music publishers explicitly defined information technology as being outside their core business; thus they failed to recruit talented and innovative information technology experts, who could have helped them to see the possibilities in the new environment, not only threats. Instead they spent money on non-productive recruitments of lawyers and private Internet detectives.

4.2. Literature: books and journals

Publishers of literature have behaved in much the same way as publishers of music, which may be natural, since both music and literature are intellectual products with well established technologies for reproduction, dissemination, and marketing.

The new information technology has not been equally threatening to publishers of literature as it has been to music publishers. Printed books and journals still have certain advantages from a customer's point of view, which are not so apparent for traditional physical media used in the music industry (vinyl records, magnetic tapes, and compact discs).

Even if the publishers of literature have not been so dramatically challenged by new technology and new forms of reproduction and dissemination, they have, like their colleagues in the music industry, missed many opportunities of exploiting the new technology in a positive way, rather than applying defensive and repressive measures.

For a customer of literature, especially non-fiction literature, it is not always easy to choose between a traditional medium (e.g. a printed book or a journal) and an electronic medium (e.g. an Internet website or an electronic document downloaded from the Internet). Many of us still prefer printed books and documents in order to get an overview and to browse. On the other hand, electronic media are easier to carry, search, and combine with other sources; for example, few books, if any, have tables of contents and indexes that may compete with the free-text search capabilities automatically available for electronic documents.

For scientists and social researchers it gives prestige and academic qualification to get articles published in well regarded printed journals. On the other hand, this somewhat archaic publishing procedure usually takes long time, often several years, and in the end the published article becomes less available to professional colleagues and other potential readers than an article made available free of charge via the Internet. An interesting feature of scientific journals is that most of the expertise necessary for the production of the journal is provided free of charge by the academic experts: authors, referees, and even the scientific editors; only the technical editors and the staff of the publishing company are paid. At the same time the customers of the journals, the readers, are often the same as the authors and scientific editors, but as customers they have to pay. It should also be noted that articles submitted to an electronic journal, made available free of charge on the Internet, could easily be subject to the same rigorous reviewing procedures as articles submitted to a traditional journal, printed and disseminated by a traditional publisher.

4.3. Official statistics

Official statistics are statistics about different aspects of a society (economic, social, environmental, etc), typically produced, compiled, and published by national statistical agencies or international organisations like the United Nations, OECD, the World Bank, the International Monetary Fund, Eurostat, etc.

The production of official statistics is typically financed by taxpayers via government budgets. Statistical surveys of this nature typically require scarce expertise for the design work, and expensive data collection operations for the production. However, once the resulting statistical results are available, they will be useful and valuable for a wide range of users in society: policy-makers, public and private analysts and decision-makers, researchers, students, etc, not forgetting the public at large. Nevertheless, no one of these users alone would probably have the resources or incitement to produce the statistics, unless they were collectively financed; collective financing via the government budget is a rational solution in this case.

It should be noted that what has just been said about design and production of official statistics does not necessarily apply to reproduction (printing) and dissemination of the produced statistics. As long as traditional information technology was used (printing etc), each copy produced and disseminated involved a non-negligible extra cost, which seemed fair to recover from the actual user of that copy. Thus statistical publications were typically sold and distributed for a fee, rather than given away for free. Ideally the price of the printed copies should be set to cover the costs of reproduction and distribution, nothing more, since all preceding steps in the process had already been paid for by the taxpayers via the government budget.

Nowadays statistical agencies have many technical modes and channels to choose from for making their statistical outputs available to their customers, and the customers can choose between many alternatives for retrieving and accessing the statistics. Naturally, methods based on modern information technology, like computerised databases made available via the Internet, gain in popularity all the time, since they are flexible, user-friendly, and efficient. Printed publications are still in demand, especially analytically oriented publications, containing much more advanced contents than mere figures and short explanations.

With the new information technology available, the costs for reproduction and dissemination of statistics in electronic form have gone down to almost zero. Nevertheless many statistical agencies continued to charge their customers for the electronic outputs in much the same way as they had always done for the printed publications, forgetting or deliberately hiding the fact that the values of the cost parameters in the electronically based reproduction and dissemination process were quite different from the corresponding parameter values applicable in a traditional printing and distribution process. Some agencies had got used to seeing their marketing and sales departments as revenue-making businesses, and because of bad accounting practices they sometimes even believed that these businesses were making profits, which they almost never did (rather losses), and if they had made profits, that would have been harmful, since it would have meant that the publications had been wrongly priced, and the too high prices would have led to an under-consumption of valuable statistics, and an over-taxation of taxpayers/users of statistics.

By now most national statistical agencies and most international organisations (with some notable exceptions like the OECD) have changed their pricing policies in such a way that electronic information products are made available to everyone free of charge in standardised forms, whereas printed products are still being charged for. When looking at the situation, many agencies discovered that the cost of charging was typically by far the most significant cost in a modern, electronically based dissemination process, which made it ridiculous to charge in the first place. Some agencies may also undertake extra tasks to be paid for by the customer, e.g. making analyses and presentations tailored to special needs, but often such needs are left to be met by private actors on competitive markets.

Having introduced the new pricing policies, statistical agencies have noted an explosion in the use of official statistics, most likely to the benefit of all parties concerned: private businesses, public administrations, researchers, interested citizens – economic as well as social and democratic interests; well informed citizens and politicians should hopefully lead to a better society in all respects and for all concerned.

Those few agencies and organisations which still charge for their electronic information products have a few typical arguments. One of them is that they may lose revenues from printed publications if these become less in demand because of the free availability of electronic products. First of all, this may not be true at all. The increased visibility of official statistics as such, thanks to the free availability of the electronic products, will also increase the exposure of the printed publications to audiences that did not know that these publications existed, and who may sometimes find it useful to buy a printed publication for certain purposes, rather than relying entirely on electronic outputs – traditional printed publications still have certain advantages. Secondly, even if the sales of printed publications went down, the decrease in revenues should be balanced by a corresponding decrease in costs – otherwise the printed publications have been overpriced, in contradiction with the laws of a well functioning market economy.

4.4. Geographic data: coordinates and maps

The area of geographic data and information systems (GIS) is an area where, in some countries, the pricing policies of governments and government agencies have lead to a striking underutilisation of information resources which are strategic for economic growth and private welfare. It has also often led to an inefficient duplication of work, when both private and public actors have found that they cannot afford to use the geographic data provided by the government agency responsible, and instead have to do their own data collection, or use less accurate data from other sources.

4.5. Conclusion from the examples

A very important conclusion from the examples stated above is that producers and customers of intellectual products and information products and services in the information economy are in serious need of new business models, making it possible to form profitable and viable businesses, while at the same time allowing the customers to reap the benefits of the new opportunities offered by modern information technology, without having to pay more than necessary for these benefits.

In the following two sections we shall discuss what a business model is, and what kind of business models could be suitable for actors in the information economy.

5. What is a business model?

The term “business model” has different meanings in the literature – some broader, some more narrow in scope. In a narrow sense, a business model is a model for how to earn money from a business, or, expressed in a slightly more elaborated way, how to design the business so as to generate enough money to make the business sustainable in the long run.

In a broader sense, a business model is a model of the business as a whole, a model of all important aspects of a business, e.g.

- value aspects: vision, goals, strategies, customers, products, etc

- process aspects: how the business is organised in order to produce value for the customers in a profitable way (or within a budget)
- information aspects: what information the processes need, and how basic concepts used in the business are defined and related to each other

Business models that combine different perspectives may be very useful for analyses of businesses and preparation of changes. See [Sundgren, Tolis, and Steneskog 2004].

In order to start a business and, even more importantly, to stay in business, we need to be able to answer questions such as:

1. In which business are we? Which are the important concepts in our business?
2. Who are our customers, and what kind of value do we create for these customers?
3. Which is the vision of our business, and which are our strategies and goals?
4. How can we earn money to make our business viable and profitable?
5. How can we design, organise, and execute our business processes so as to achieve our goals, and create value for our customers?

If we can answer these questions satisfactorily, we may have a feasible **business model**. We may have to iterate between the questions above a number of times, modifying different aspects of the business model, before the whole model is consistent and, hopefully, optimal.

5.1. Which business are we in, and how do we define it?

The answer to this question may not always be obvious. We may benefit from reconsidering which business we actually are in. Let me give two examples.

Example 1. Up to the 1930's there were companies making good business by distributing ice to retailers of meat and other heat-sensitive products. Then came the refrigerators, and the ice distributors went out of business. They regarded themselves as being in the ice business. Had they redefined themselves as being in the distribution business, they might have survived, because they had gained excellence in managing distribution networks in such a way that they could reach many shops in a short time.

Example 2. American Airlines developed early a very good computer-based flight and seat reservation system that was adopted by the travelling industry as a whole. It became a necessity for airlines to appear on the first screen of the American Airlines system. After some time American Airlines earned much more from the information system than from flying airplanes, in which business they actually made losses. Guess what they did.

It is interesting to note that in these examples, and many others, the companies concerned could benefit by taking a broader look at their business, including aspects belonging to the information economy. Both distribution networks and flight reservation systems are information systems. In the first example it was probably a paper-based information system, or only an *ad hoc* system relying on people's experience. In the second example it was certainly a computer-supported information system.

The examples also show that the information economy may not be separate from the traditional economy of (material) goods and services. Information goods and services may very well be an integrated part of a more traditional business. However, even in such cases the business as a whole may benefit a lot from recognising the

information aspect of the business explicitly and in its own right. One may compare with the earlier transition of companies producing and selling physical products (like cars) into companies producing and selling packages of physical products and accompanying services; today you buy a car together with a package of guarantees, insurances, and other services, and both you as a buyer, and the car manufacturer as the seller, consider all parts of the package as important.

In addition to businesses where information is regarded as an important tool or complement to material products and services, there is a growing number of businesses where information is in focus, both as the product and as a tool for producing and communicating the product. In fact such businesses have existed for a long time in the media industry: books, newspapers, radio, TV, music, film, etc. Tragically the media industry has come to associate themselves so much with the material tools and traditional distribution channels that they lost focus on their core business, to provide contents to their customers, and even neglected and opposed the rapidly emerging and very efficient new tools and channels based on modern information technology. Most of the companies in the media industry still do not seem to understand how to adapt in a positive and constructive way to the opportunities offered by the information economy based on modern technology. Instead of exploiting the opportunities, listening to their customers, rationalising their business processes, and pricing their products in accordance with the laws of a free, capitalistic economy, they call for protection and harmful regulations of free competition, prosecute their customers, and give up large shares of their markets to innovative companies outside the traditional media industry, many of which are actually very serious and successful.

When we discuss questions such as "which business we are in", and all the important aspects of this business, as listed above, we need to be careful with definitions of the concepts and terms we are using. We must be sure that we all understand ourselves what we are talking about, and furthermore, we must be sure that we understand each other.

5.2. Who are our customers, and what do they expect from us?

It is absolutely essential in all kinds of businesses to know, who are your customers, how you reach them, and what they really expect from you – not what you think they expect from you. In the information economy you may have to reconsider these questions quite often, because modern technologies offer new opportunities all the time, and your customers will certainly expect you to take advantage of these technologies, improving the information products themselves, improving the communication channels, improving the price/performance ratios, etc. And do you know who your final customers really are? Sometimes it is the customers' customers you should focus on. In some branches intermediaries may disappear or become less important. For example, book readers and potential book readers may not visit bookstores or libraries any longer – they expect to be able to find and download books (and many other types of media products) from the Internet, in a way that is convenient from their perspective, and at a reasonable price.

A good thing with the information economy is that it is very easy to get a lot of useful feedback from the customers, e.g. by studying their behaviour, when they move around on an Internet website, by systematically analysing their purchasing patterns, by explicitly asking them for their comments, by making it easy for them to file complaints, by handling such complaints as a top priority, etc. If the product you provide is an information product, it may be relatively easy to modify it, so you may not have to be so anxious if the first version of the product is not so successful as you

had hoped after investigating the potential market. It is not easy for a potential customer to describe the characteristics of an "ideal" product, and to quantify how eager she would be to actually purchase this product at different prices. But after you have launched an information product via the Internet, you will get feedback very quickly, and then you should be prepared to respond as quickly to the feedback by modifying the product and the services around it, if necessary.

6. Business models for the information economy

Now we shall turn to a more concrete discussion about how to create viable business models for companies in the information economy. According to [Zimmermann 2000], in order to create business models for the digital economy, it is necessary to analyse the context from a company or industry perspective. Zimmermann states four basic questions, which have to be asked:

- Structures: What is the future structure of a certain industry?
- Processes: What will the value creation processes look like ?
- Products: What are the basic customer's needs and the respective product/service elements in order to serve them?
- Infrastructure: Which services are necessary for a specific marketplace serving for a distinct business community?

Here we shall add two issues to be discussed:

- New goal structures – beyond profit maximisation
- New marketing strategies

See also [Selz 1999] and [Timmers 1998], referred to by [Zimmermann 2000].

6.1. New ways of structuring businesses and processes

When analysing the structure of a business and its processes, one may discover that the structures that used to be natural and efficient are no longer obviously best in the information economy, with the new possibilities offered by information and communication technology, especially the Internet. We will look at a couple of examples.

6.1.1. E-commerce

Consider a traditional mail-order business. It has a number of main processes, for example:

- marketing (advertising etc)
- customer-oriented order process (by surface mail and/or telephone)
- the delivery of goods ordered from a warehouse
- warehouse management
- the supplier-oriented order and delivery process
- invoicing and payment collection

The mail-order company may use subcontractor for certain sub-processes, but in general the processes in a traditional mail-order business are rather tightly integrated, and kept under close control by one and the same company, the mail-order business itself.

If a traditional mail-order company transforms itself into e-commerce, it may consider structuring its business in a different way. For example, it may loosen the couplings between the above-mentioned processes a bit, and even outsource or sell some of the processes to independent companies, replacing the tight integration between the processes with a loosely coupled system of processes, managed by different companies interacting in some kind of partnerships with one another.

An e-commerce company may define its core business to be the directly customer-oriented and highly interactive processes of marketing and order-taking. It may focus entirely on these processes and leave the other processes to business partners, intervening in these processes only if a customer experiences some problem with them, for example, if the delivery or payment process fails for some reason. The goods may actually be delivered from different warehouses around the world, the payments may be collected via bank cards, etc. Thanks to the speed, low costs, and ubiquity of information systems, the physical systems of the business (the warehouses etc) may be organised in a more complex way, so as to minimise the costs of storage and transportation. It does not really matter any longer where in the world the customers are and where the e-business interacting with the customer has its physical headquarters – if anywhere.

A discussion of some aspects of this kind of business restructuring can be found in [Gaudeul and Jullien 2007]. When analysing and reconsidering the processes of a business, it may be useful to consider the rich literature on business modelling and business process reengineering, e.g. [Hommes 2004], [Sundgren, Tolis and Steneskog 2004], [Malhotra 1998], [Davenport 1993].

6.1.2. Authoring and publishing

An authoring and publishing business contains some typical processes:

- One or more authors (writers, composers, artists, knowledge workers, etc) create a piece of art or knowledge
- Intermediaries (publishers etc) evaluate, publish, and market the works of the authors, and collect revenues, some of which are given back to the authors

Over time, it seems that the owners of the intermediary processes (publishers, agents, etc) have more and more become the main players in authoring and publishing businesses, whereas the authors have become subcontractors to the intermediaries, rather than the other way around, as would seem to be more natural and fair. After all, without the authors, there would be nothing to publish and sell, whereas the authors could possibly do without the intermediaries. Can they?

With the rapid penetration of the Internet as an inexpensive, efficient, and interactive channel of communication, it has suddenly become possible for authors to find their audiences and customers directly, without intermediaries, and for potential audiences and customers to find the works of the authors in a very efficient and inexpensive way.

There is good reason for both the authors, on their part, and the intermediaries, on theirs, to reconsider their respective businesses. It is no longer evident that the two businesses should be so intimately linked to each other, as they have been in the past, and it is definitely not evident that the authors should be subcontractors of the publishers, rather than the other way around.

The authors may very well find that they can do fine without the traditional intermediaries. Creative as they usually are, they have already found a lot of new,

Internet-based tools to market their products, and meet their audiences and customers. They discover that they produce, or may produce, a whole portfolio of related products, which may very well support each other, and do this in new ways, with the help of the new technology. For example, a musician may see his digital works as advertisements for live concerts, more than the other way around, and a scientific writer may see his books as just one communication form of the knowledge he produces – other forms being lectures, courses, consultancies, etc.

6.2. New goal structures – beyond profit maximisation

The last example above, the scientific writer or researcher, leads us to the next issue that becomes very interesting in the information economy, the issue of the goals and objective of a business. A researcher very seldom expects to make a profit from publishing books and articles. In fact, articles submitted to scientific journals are never paid for; neither is the tedious and highly qualified peer-reviewing that researchers are expected to do as a part of their scientific careers. On the other hand, the publishers of traditional scientific journals will certainly not publish, unless they will make a profit from the publishing, and without blushing they will sell their products to the same authors (possibly through their universities) who have provided them with their articles free of charge. Even if an author of a scientific book will get some royalty, it will usually correspond to a very low hourly compensation for the author's creative work.

Obviously, researchers have other goals than profit maximisation when they document and publish their research results. They need to document their results in order to merit themselves for academic positions, and apart from this, they are usually genuinely interested that as many other researchers as possible should note and appreciate what they have achieved. Thus the researcher attains self-fulfilment and, sometimes, fame and glory.

For the publisher, on the other hand, a researcher's success is only valuable if it leads to profits for the publisher, which is a low priority goal for the researcher. In fact, the researcher may become much faster and much more widely read, acknowledged, quoted, and recognised as a researcher, if she publishes herself through open access journals and open archives, available free of charge via the Internet. We will return to this below.

Thus there are obvious goal conflicts between authors and publishers. In the traditional economy, the authors and the publishers did not have much choice than coexisting in the same business, with tightly integrated processes. In the information economy, and with today's penetration of the Internet, the authors have many alternatives to the traditional dependence on publishers, and the publishers have to review their business in creative ways in order to find new roles for themselves, including new offerings that really add customer value to the products of the authors, and to do this in ways that the authors cannot easily or efficiently do themselves.

6.3. New marketing strategies

It is not a new idea to market a product by giving it away for free. [Anderson 2008] tells how King C. Gillette after trying an endless number of marketing gimmicks without success, finally found a successful strategy for boosting the sales of his innovative safety razor with disposable thin metal blades: "Razors were bundled with everything from Wrigley's gum to packets of coffee, tea, spices, and marshmallows. The freebies helped to sell those products, but the tactic helped Gillette even more. By giving away the razors, which were useless by themselves, he was creating demand

for disposable blades. A few billion blades later, this business model is now the foundation of entire industries: Give away the cell phone, sell the monthly plan; make the videogame console cheap and sell expensive games; install fancy coffeemakers in offices at no charge so you can sell managers expensive coffee sachets."

However, before recent developments in the information economy, practically everything "free" was really just the result of a so-called cross-subsidy: you get one thing free if you buy another, or you get a product free only if you pay for a service.

In the modern information economy a different situation has emerged, creating conditions for new marketing strategies. The new strategies are not based on cross-subsidies — the shifting of costs from one product to another — but on the fact that the costs of products *themselves*, the information products, are falling fast and coming very close to zero.

In an economy where the cost of a product is not negligible, you may give away products, or give heavy discounts on them, only if you sell many more at full price, or use cross-subsidies as described above. In contrast, in the information economy, where the cost of some products are really very close to zero, you only have to sell very few products at a non-zero price, in order to be able to give away most products, maybe 99% of them, for free. The situation is reversed in comparison with the situation in a traditional economy, where you have to sell much more than 1% at a non-zero price.

7. Earning money from information businesses

Many traditional businesses in the media industry have learnt the hard way that it is not so easy to earn money from information products in a world based on modern information technology, at least not in comparison with how it used to be, when not only the creators of successful products (literature, music, etc) could get decently paid for their efforts by royalties generated by the sales of physical products used for distributing their work, but where a large number of other business people and others (for example heirs) somehow associated with their work could make a good living on overhead charges included in the prices of the material products then needed to carry the immaterial work of authors and artists.

The main reason why this old system for compensating and overcompensating some people and companies in the media industry could survive so long, was that the marginal cost of producing extra copies of the material carriers of the immaterial work (like printed books and – to a lesser extent – CD and DVD records) were really so high that a certain overhead percentage could rather easily be added to the price without distorting the market economy mechanisms completely. But when no material carriers are needed, and when the marginal cost for downloading extra copies of the immaterial work are very close to zero, for both the producer and the consumer, the situation becomes completely different. Even the very introduction of any kind of charging mechanism at all, even electronic, introduces a very high percentage increase in the overhead costs. It will often simply cost too much to charge, at least it will cost so much that it severely distorts the normal forces of a market economy – people will abstain from such products, or they will find satisfactory substitutions, e.g. by "borrowing" or sharing electronic copies from each other via BitTorrent or equivalent systems, distributed libraries one could say. After all, borrowing via public libraries used to be legal and free.

There is a need, of course, to develop business models, where authors and performers of useful and demanded information products get paid decently for their work. At the same time it does not seem reasonable that authors and performers (and

their heirs) should earn money when they are not working. A successful football player has to play in order to earn money; he does not obtain royalties for his performances after he has stopped playing or even died.

7.1. Information services as infrastructure services

From an economic point of view it is useful to compare information services with services made available by an infrastructure. Up to now infrastructures have typically been "hard" (like roads, bridges, transmission networks). Knowledge bases and bases of immaterial works made available via the Internet may be regarded as a soft infrastructure, whereas the Internet itself is a hard infrastructure.

In order to maximise the total benefits in society of an existing infrastructure, one should not charge the users of the infrastructure for more than the marginal cost of using the infrastructure, when they use it. Charging them less than the marginal cost of usage would, on the other hand, mean subsidising the usage and should only be done for very clearly defined purposes or reasons. One reason may be that the marginal cost of a single user's use of the infrastructure is so small that the cost of charging the users individually for their marginal use would be much higher than the cost of the usage itself.

The problem then is how the development costs and other costs not directly related to the usage of the infrastructure should be financed. Some possibilities are:

- taxes
- flat fees paid by subscribers to the service at certain time intervals
- payments from buyers of other products and services, who indirectly benefit from others using the infrastructure, e.g. businesses whose offerings become more visible or available to potential customers using the infrastructure

The last alternative above is the alternative that has been so innovatively and successfully exploited by Google, an example that will be more carefully examined below. Already here it can be noted that there are at least three parties involved in the Google business model, who have all gained very significantly from it:

- Google itself (of course), making enormous profits
- The users of the Google search engine (getting good value for no money)
- The advertisers (getting very good value for less money than they pay for alternative marketing channels)

How can all three parties gain? There are two basic reasons:

- Google launched an innovative and very efficient search engine, made it available free of charge, and thus attracted an enormously large audience, without even having to spend any money on marketing its own product
- Google offered advertisers a new and innovative channel that was simply more efficient in terms of value for advertising money than available alternatives; from Google's point of view the channel was so efficient that they could price it very attractively for the advertisers, while providing the search engine free of charge to the general public, and keeping a substantial net profit for themselves

Thus the business model is based on two innovations: a technical one (the search engine) and an economic one (the new advertising channel). Furthermore, the two innovations were linked to each other in a way that was in itself innovative, a systems innovation with enormous synergy effects.

The innovations have been further developed, and the synergy effects have been further exploited by Google, making more and more sophisticated use of automatically generated and collected statistics about user behaviour, which are intelligently used for offering advertisers more and more attractive and efficient advertising services.

7.2. Discoupling financing from usage of infrastructure

Somebody has to pay for everything. This is a simple truth that needs many qualifications, especially in the field of information economy. Different business models, all generating profit for a business owner, may vary significantly as regards, for example

- prices per user and usages (depending on the volume of the usage, which is again strongly affected by the price)
- prices for different products/services, when several products/services are bundled as discussed earlier (note especially the strong and very complex and cleverly designed interdependences that may exist between the bundled products/services, like the Google offerings to advertisers and information searchers, respectively)

An example of the importance of discoupling financing from usage is the introduction of citizen's certificates that many countries are now undertaking. Several business models are possible here, and have been tried in different countries – with various results. For example, in Denmark the government took full central responsibility, both financially and otherwise, with a very fast penetration and acceptance of the certificate as the result, to the benefit of the whole society. In Sweden the government first tried to find a market-based solution through the banks, which did not work very well, and a new government will now try a different approach, with more similarities with the Danish model.

7.3. Bundled businesses

Bundled (or combined) businesses are businesses where you combine two or more offerings to two or more populations of potential customers. Both the offerings and the customer populations may be quite distinct from each other, like they are in the case of Google. Bundled businesses have become very important in the information economy, but they have existed in other forms far back in history. For example, a traditional, printed newspaper typically relies on one offering to potential readers of their editorial contents (news, analyses, etc), and quite a different offering to potential advertisers. For both offerings you have a set of parameters that you may adjust, for example the price. For readers of editorial contents, you may have one price and one service package for subscribers, and another price and other distribution channels for buyers of single copies. The different offerings are linked to each other in ways that are important to understand and exploit to the benefit of the business (and the customers). For example, the more readers a newspaper gets, the more attractive it becomes for potential advertisers, especially if the readers belong to a segment of particular interest for particular advertisers.

Example 1. Some years ago the Swedish entrepreneur Jan Stenbäck shocked the market of daily newspapers by offering a newspaper called Metro free of charge at all

underground entrances in Stockholm. Referring to the model I just described, what he did was just to put one of the price parameters to an extreme, zero. Metro became profitable sooner than expected, and now the concept has been copied by several followers; some have succeeded, some have failed.

Example 2. Ryanair is an example of similar entrepreneurship, based on combined offerings, in another type of business. The main business is (or at least seems to be) flying people between two places at a very low price, often close to zero. Other offerings are the marketing and selling of other products and services, especially products and services associated with travelling.

Example 3. Google is of course the most outstanding example of a bundled business and has already been mentioned above. The offering in focus at the start was the Internet search service based on an innovative search engine and offered to the general public free of charge. This offering was bundled with an offering to advertisers. The success of the search engine was of course a major key to the commercial success of the advertisement offering. But it should be noted that the efficiency of the new advertisement channel (in terms of costs of reaching potential buyers and making them buy) was also very high in comparison with existing channels. This efficiency leap, which makes the new advertisement offering a "win-win" offering for both Google and its advertising customers, is again based on innovative information methodology. Actually it may be claimed to be a "win-win-win" situation, because the users of the search engine did not only find the information they were looking for, but also information (and offerings of advertisers) they did not know existed, and which they rather often find interesting and useful.

Thus there are many synergies involved in the bundled offerings exploited by modern information businesses. If you get these mechanisms explained, they are hopefully not so difficult to understand, at least in principle, but in fact they have confused – and are still confusing – a big majority of business people grown up and trained in more traditional branches of the economy.

It is important to make a distinction between business bundling, as described above, and cross-subsidies as discussed above. Cross-subsidies, especially those which are based on formal or de facto monopolies are regarded as harmful in a market economy; see for example [Irwin 1997].

8. Authors' rights: Open Access and Open Source

As discussed above, authors, in the sense of creators of intellectual products, often have other goals than profit maximisation. Naturally authors have to earn their living like everyone else – but not necessarily as an immediate, short-term effect of their creative work. Sharing the creative work with colleagues, getting their criticism and appreciation, may give the authors satisfaction and self-fulfilment that is not directly exchangeable into money, but nevertheless very important for the authors' sense of meaningfulness and quality of life. In addition, sharing intellectual work with colleagues, critics, and audiences, without disturbances of monetary transactions, may also turn out to be advantageous for career of the author, and thus also profitable in a somewhat longer time perspective.

Here we shall take a look at the legal concept of "authors' rights", a concept that seems to have become somewhat outdated and even counterproductive for authors in the information economy. Then we shall study two interesting and

innovative examples of organising intellectual work in the information economy, two business models (in a broad sense) for intellectual work: open access and open source.

8.1. Authors' rights

Copyright and authors' rights began to be recognised by lawmakers in the 18th century. The purpose was to tackle the inequality in relations between authors and publishers, and the need to secure an income for authors. The solution was to give the author of a creative, intellectual work a monopoly right, initially the right to copy or otherwise reproduce the work, for a limited term.

The concept of authors' rights has two distinct components: economic rights and moral rights. The economic rights are limited in time and may be transferred by the author to others, usually by means of a written contract. The economic rights are intended to allow the author to profit financially from the work. The moral rights are intended to ensure that the author is recognised and identified as the author of the work, and to give the author the right to object to any distortion of the work that would damage the author's reputation. The moral rights are personal and cannot be transferred except by testament.

It is interesting to note that both the economic rights and the moral rights focus on the right of the author as an individual person. The original purpose was to protect creative authors against profit-seeking businessmen and companies (e.g. publishers), who wanted to exploit the economic value of creative intellectual works. This contrasts very much to the situation in today's information society, where it seems to be the businessmen and companies, who are the most outspoken and most militant advocates of authors' rights and, not least, the monopolies associated with such rights, whereas the authors themselves, as well as their organisations, are often more open to new business models to secure their own incomes from their works – rather than the incomes of businesses, which reproduce, market, and disseminate their works. Maybe this will lead to a development, where the authors regain more of the economic power over their own works, and where the authors contract out more specified tasks to publishers, promoters, agents, and other businesses, on conditions that are more similar to those in other parts of the economy.

Many steps in this direction can already be seen. Music creators and artists use new distribution channels that have become available free of charge on the Internet, and from which their customers can download their works free of charge. Incomes for the authors may be generated by advertisements, live concerts, or inexpensive flat rate subscriptions to websites with very large coverage and superior availability.

8.2. Open Access

Another example, from the academic world, is the rapid growth and penetration of open access journals. Open Access (OA) means "free, immediate, permanent, full-text, online access, for any user, web-wide, to digital scientific and scholarly material, primarily research articles published in peer-reviewed journals. OA means that any individual user, anywhere, who has access to the Internet, may link, read, download, store, print-off, use, and data-mine the digital content of that article. An OA article usually has limited copyright and licensing restrictions."

Lund University, one of the oldest and most respected universities in Sweden, has gone so far as to make open access publishing a strongly recommended practice for their researchers. On its website, Lund University states its policy as follows [Lund University 2008]:

"What is Open Access?
The term Open Access stands for a way of publishing, where the researcher gives free online access to his/hers publications. Since 2006, Lund University has a publishing policy in which the board of Lund University recommends researchers to, if possible, give free access to their research publications.

Why make your research available through Open Access?
There are many reasons as to why you should make research publications accessible in Open Access journals. Studies show that a publication with free access is read by more people, and that the published results are more often put into practical use. By giving free access to an article, authors keep the copyright and thereby can make use of their work freely. Even in cases where a work is published through a publisher, it is possible, if the contract allows it, to parallel publish the article (self-archiving). Parallel publishing can normally be done as soon as your publication has been accepted – sometimes even earlier. It has been shown that early publishing gives more citations.

The basic idea with Open Access is that there should be free online access to quality controlled scientific publications. That way it is possible even for departments lacking resources, especially in the third world, to take part of high quality research results, and thus stimulate their own research. Since it is less expensive to publish according to the Open Access model than to traditional publishing methods, funds that today are used for subscriptions to scientific journals could instead benefit research.

How do I give free access to my results?
If there is a high quality journal that is freely accessible within your field of research, then this is the easiest way to make publications freely accessible. Most scientific journals allow parallel publishing. This way the publication is made freely accessible and searchable through common search engines. Lund University's policy for scientific publishing recommends researchers to publish their work in an Open Access journal or, if that is not possible, to keep the right to self-archive the article."

8.3. Open Source

The previous section discussed "open access" in the sense of "open access to scientific journals and scientific papers". Analogously, a short definition of "open source" could be "open access to software source code".

A more elaborate definition of "open source" is provided by the Open Source Initiative (OSI) on their website, [Open Source Initiative 2008a]. The definition is based on the assumption that the distribution of the software is associated with a license, approved in a Licence Review Process, [Open Source Initiative 2008b]. According to the OSI definition of "open source", open-source software and the associated licence must comply with the following criteria:

1. **Free Redistribution.** The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.
2. **Source Code.** The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably,

downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

3. **Derived Works.** The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.
4. **Integrity of The Author's Source Code.** The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.
5. **No Discrimination Against Persons or Groups.** The license must not discriminate against any person or group of persons.
6. **No Discrimination Against Fields of Endeavour.** The license must not restrict anyone from making use of the program in a specific field of endeavour. For example, it may not restrict the program from being used in a business, or from being used for genetic research.
7. **Distribution of License.** The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.
8. **License Must Not Be Specific to a Product.** The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.
9. **License Must Not Restrict Other Software.** The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.
10. **License Must Be Technology-Neutral.** No provision of the license may be predicated on any individual technology or style of interface.

It is decisive for the success of business models based on concepts like “open source” and “open access” that all parties involved, especially the authors and creators of intellectual assets, feel that they gain more than they lose from providing their voluntary contributions free of charge to others. For example, an author providing open access to a scientific paper or a book, must value the following advantages higher than possible monetary revenues from royalties:

- fast publishing
- large audience
- feedback from fellow scientists
- many citations by fellow scientists

In the case of open access to scientific work it seems likely that the benefits listed above are often much more valuable to the author than any lost opportunities for incomes through royalties.

In the case of open source, the situation is not always equally clear. Some software producers, while seeing the advantages of distributing software free of charge, are still reluctant, because they fear that they will morally (if not legally) be held responsible for errors in their own code, or even in further developments of the code made by others. Businesses, on the other hand, may hesitate to use open source software for business-critical applications, because there is nobody to hold responsible for flaws in the code that may have severe consequences for the business.

9. Conclusion

This article has discussed some special features of the information economy, based on information products and services, as compared with the traditional economy, based on farming, industrial production of material goods, and labour-intensive services. The information economy is sometimes claimed to be a completely new economy, governed by other economic laws than the traditional economy. This is not true. However, there are some cost parameters that have changed drastically in the information economy. For example, Internet has lowered the marginal cost for reproduction and distribution of information products to almost zero, and marketing costs have also gone down significantly because of the efficiency of Internet in combination with Internet-based search engines. However, the costs for creation of the original of an information product may still be high. With a unit cost for copies close to zero, it would often distort the demand for information products in a disastrous way, if the creator's development costs for the original were to be allocated to the reproduced copies. New and more creative business models are needed than those that have been practiced for a very long time in the media and publishing industries. Innovative entrepreneurs like the founders of Google are leading the way towards new and more efficient schemes, often based on bundling of several offerings to the same or different customers. If the new business models are well designed, all parties involved will gain, producers as well as consumers of information products and services.

New thinking is also needed in the legislation around copyright and authors' rights. It is important to recall that this legislation was originally intended to ensure decent incomes for creative authors of intellectual works, and to protect them against greedy businessmen, who wanted to exploit the economic potential of their works and make profits for themselves. This is the reason why the authors were given a monopoly over their works, although monopolies are usually damaging to the efficiency of a market economy. In the present situation it seems that the business people exploiting the economic potential of authors' works are benefitting much more from this monopoly than the authors themselves. It is time for the authors to regain the economic power over their works, and decide for themselves if there are better business models for them and their customers than those which have been prevailing up to now.

There is still very little research on new business models and new legislation needed in the information economy. Practitioners and innovators have tried different approaches, and some of the experiments have been extremely successful. Some examples have been given in this chapter. It has also been pointed out, by means of examples from the history, what may happen if businesses are not alert to changes in technology and customer behaviour. There is a need for researchers to study the experiences, both positive and negative, in order to come up with more substantial conclusions and advice. There is a particular need for interdisciplinary research in cooperation between economists, specialists on information systems and information technology, psychologists, sociologists, lawyers, and maybe others as well.

References

Anderson C. 2008. Free! Why $0.00 is the Future of Business. *Wired Magazine* 16.03.

Baumol W.J. 1972. On Taxation and the Control of Externalities. *American Economic Review* 62(3), 307-322.

Clifton, J. A. (1977). Competition and the evolution of the capitalist mode of production, *Cambridge Journal of Economics* vol. 1, no. 2, pp. 137-151.

Davenport T. 1993. *Process Innovation: Reengineering work through information technology*, Harvard Business School Press, Boston.

Dupuit J. 1844. De la mesure de l'utilité des travaux publics. *Annales des ponts et chaussées*, Second series, 8.

Findahl O. 2006. Thieves or customers? File-sharing in the Digital World. In Cunningham P. and Cunningham M. (eds.), *Exploiting the Knowledge Economy: Issues, Applications, Case Studies*, IOS Press, Amsterdam.

Gaudeul A. and Jullien, B. 2005. E-commerce, two-sided markets and info-mediation. In *Internet and Digital Economics* 2007, Cambridge University Press.

Hommes B-J. 2004. *The Evaluation of Business Process Modeling Techniques.* Doctoral thesis. Technische Universiteit Delft.

Irwin T. 1997. *Price Structures, Cross-Subsidies, and Competition in Infrastructure*. The World Bank Group, Note No. 107.

Kotler P. 1967. *Marketing Management: Analysis, Planning, Implementation and Control*. Prentice Hall.

Lee, C-S. 2001. An analytical framework for evaluating e-commerce buiness models and strategies. *Internet Research*, 4(11), 349-359.

Lee F.S. 1998. *Post-Keynesian Price Theory*. Cambridge University Press.

Lund University 2008. *Open Access*. http://www.lub.lu.se/en/researcher/open-access.html.

Malhotra, Y. 1998. Business Process Redesign: An Overview. *IEEE Engineering Management Review*, vol. 26, no. 3.

Marshall L. 2004. The effects of piracy upon the music industry: A case study of bootlegging. *Media, Culture & Society*, 26(2): 163-181.

Mas-Colell A., Whinston M. D., and Green J.R. 1995. *Microeconomic Theory*. New York and Oxford: Oxford University Press.

Open Source Initiative 2008a. *The Open Source Definition*. http://www.opensource.org/docs/osd.

Open Source Initiative 2008b. *The Licence Review Process*. http://www.opensource.org/approval.

Pigou A.C. 1920. *Economics of Welfare*. Macmillan and Co.

Prest A. R. & Turvey, R. 1965. Cost-Benefit Analysis: A Survey. *The Economic Journal*, Vol. 75, No. 300, pp. 683-735.

Samuelson P. A. 1948. *Economics: An Introductory Analysis*. McGraw-Hill; with William D. Nordhaus (since 1985), McGraw-Hill (18th ed., 2004).

Samuelson P. A. 1954. The Pure Theory of Public Expenditure. *Review of Economics and Statistics*, 36(4), 387–389.

Samuelson W. F. 2009. *Managerial Economics*. 6th edition, Wiley.

Selz D. 1999. *Value Webs - Emerging forms of fluid and flexible organizations*. Dissertation, University of St. Gallen.

Sundgren B., Tolis C., and Steneskog G. 2004. *Business Modelling and Solutions*. 4th edition. Stockholm, Sweden: Stockholm School of Economics.

Timmers P. 1998. Business Models for Electronic Markets. *Electronic Markets*, Vol. 8 No. 2, pp. 3-8.

Zimmerman H-D. 2000. Understanding the Digital Economy: Challenges for New Business Models. *AMCIS Proceedings.*