

## 6<sup>th</sup> World Media Economics Conference

### Centre d'études sur les médias and Journal of Media Economics

HEC Montréal, Montréal, Canada

May 12-15, 2004

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### **Balancing Business and Public Interests**

Theoretical scenarios on how standardization & copyrights regimes impact the structure, conduct and performance of the market for learning objects

Matthijs Leendertse, University of Amsterdam, The Netherlands

*Information and communication technology has the potential to improve the educational process. To achieve this, it is crucial that digital educational resources are available. This paper is part of a larger PhD project that focuses on the question how governments can stimulate the market to produce high quality and affordable digital educational information. Building on industrial organization, institutional economics and management theory, this paper presents four theoretical scenarios that hypothesize the effects of several distinct configurations of standardization and copyrights regimes on the structure, conduct and performance of the market for learning objects.*

#### **Introduction**

The potential of Information and Communication Technology (ICT) to improve the educational process is widely recognized, especially amongst governmental agencies (see for instance: NGfL & DFEE, 2001; OC&W, 2002; Reding, 2002). As a result, regulatory agencies throughout Europe have taken a leading role in integrating ICT into education. Over the last years, schools throughout the EU have been supplied with computers and connected to data networks. However, less time and resources have been devoted to the development of digital educational material. The form that this material will take is that of learning objects, chunks of content smaller than a complete module or course but large enough to be more or less self-contained and easy to insert into any specific course (Kraan, 2002). Learning objects could thus be defined as digital resources that can be reused in different contexts to support learning (Wiley, 2002).

The private sector plays a vital role in the production of learning objects. Already, commercial companies are increasingly positioning themselves to play a mayor role in an emerging economy in educational information on the internet (Lankes & Sutton, 1999, p. 172). In fact, the sustainability of technology-based education programs might ultimately depend on business' ability to make them profitable (Selwyn, Gorard, & Williams, 2001, p. 272). In order to ensure investment from commercial enterprises for the development of high quality digital educational content, the market for these products must be commercially attractive. Governments that want to stimulate the production of high-quality digital educational content should therefore take commercial interests into account. At the same time,

accessibility of educational resources is a prime focus of educational policy, and commercial viability and accessibility of educational content do not necessarily go hand in hand.

As a result, regulators find themselves balancing between on the one hand facilitating commercial interests to attract investment of private firms for the development of learning objects, and on the other protecting the public interest in terms of availability, quality and affordability of digital educational content. This balancing act is the starting point of a larger research project of that explores how governmental action can encourage the production of high-quality affordable learning objects. In this paper, we focus on how new market structures are being formed and how two distinct basic conditions influence the structure, and through that business strategies and performance of the future market for learning objects. We propose four scenarios that explore the effects of different configurations of basic conditions in terms of standardization and intellectual property rights protection on the performance of the market of learning objects.

## **Theory**

### ***SCP Model***

In order to predict how governmental policy can encourage production of high-quality and affordable learning objects, we first need to determine what attributes influence market performance. Industrial Organization (IO) theory provides an answer to this question. The Structure Conduct Performance (SCP) paradigm that has been developed within IO theory suggests that market performance is a function of both market structure and conduct (Scherer & Ross, 1990). It is argued that different market structures cause different behavior of market actors, resulting in varying market outcomes (performance). Market structure is determined by looking at structural market characteristics such as horizontal or vertical supplier concentration or the degree of product differentiation (Wirth & Bloch, 1995). Market conduct refers to the behavior of firms that are active on a given market. Examples of market conduct are pricing schemes, product and marketing strategies and research and development (Wirth & Bloch, 1995).

### ***Formation of New Market Structures***

Although the basic SCP-model outlined above is useful to study the performance of the future market of learning objects, it does not answer the question how new market structures are being formed. This problem is often encountered within communication research that uses the SCP model. “Attention is fixed, by and large, on identifying the structure of a market or industry under study and relating it to firms’ observed conduct, but little attempt is made to discern how exactly a particular market structure comes into existence” (Wayne Fu, 2003, p. 13). Market structure and conduct are not given facts, but are continuously influenced by a variety of external basic conditions that are often determined by exogenous markets (Scherer & Ross, 1990). Based on the nature of learning objects, we included two main basic conditions into our analysis, namely the level of standardization and the level of protection of intellectual property rights.

In our definition of learning objects, reusability of educational resources is key. Learning objects are complex information products that similar to other digital media products draw upon many of the different layers of the communication system: architectures, services, protocols, data models and interfaces (Anido et al., 2002). In order to ensure reusability of learning objects in different contexts, issues of compatibility of learning objects need to be resolved (Wiley, 2002; Lankes & Sutton, 1999; The Masie Center e-Learning CONSORTIUM, 2002; Weiser, 2003). Establishing industry-wide (technical) standards for learning objects on all layers of the communication system ensures this compatibility.

Furthermore, the ease of illegal usage of digital content as has been witnessed in the music industry raises questions about the protection of intellectual property rights (Alexander, 2002; Dommering, 2000;

Benkler, 2002). The rise of new digital networked technology greatly reduces the costs of making copies while at the same time dramatically increasing the possibility to distribute these copies quickly and easily at low costs (Shapiro & Varian, 1999). The main challenge of copyright regulation is how to strike a balance between protecting the rights of firms that have invested in the production of learning objects, while ensuring socially desirable access to learning objects.

In addition to basic conditions, governments also influence markets using several instruments like subsidies, regulation, price controls and trade rules (Scherer & Ross, 1990). Governments often employ these instruments when the (expected) performance of a market does not meet policy goals.

McQuail (1992) introduced a direct link from market performance to structure and conduct whereby performance indicators are used as feedback for market actors. Based on this feedback, actors can try to change market structure or alter corporate conduct. Since individual firms use different performance criteria than those that are used to assess performance of a media market as a whole, it is not likely that individual companies take care of the feedback from performance on a meso-level to market structure and conduct. Rather, we believe that this feedback process operates via governments and other regulatory mechanisms that deliberately intend to influence market structure and conduct to achieve the desired market performance. As basic conditions also influence structure and conduct, we believe that governmental policy not only targets structure and conduct directly, but can also be directed towards the basic conditions surrounding a specific market. This is especially relevant when governmental agencies want to influence the structure of an emerging market such as the market for learning objects. As market structures and business strategies have yet to emerge, governmental agencies can only alter the basic conditions that shape the future structure of this market. Therefore, it is important for regulatory agencies to understand the implications of different configurations of basic conditions for market performance.

### ***Research Model***

In order to determine the impact of standardization and copyright regulation on performance, we reversed the chronological flow of the SCP-Model. Based on our definition of market performance, we first outline how performance is dependent on business strategies of suppliers of learning objects. Then, we elucidate on how a choice for a specific business strategy is dependent on structural market characteristics. Finally, using institutional economics, we outline how both standardization and protection of intellectual property rights affect market structure.

### ***Performance***

The performance criteria that we analyze in this paper are availability and affordability of learning objects. Availability is defined as the supply of competing high quality learning objects that are interchangeable or substitutable. Affordability is defined as the financial ability of buyers to purchase these learning objects.

### ***Conduct***

Following the SCP model, market performance is directly linked to market conduct. Availability and affordability as market performance criteria correspond to the economic notions of supply (Q) and price (P). As a result, we argue that market performance is dependent on the product-price strategies followed by publishers of learning objects. These two components of corporate conduct are interrelated: the choice for a specific product strategy has consequences for a firm's pricing strategy. Following management theory, there are typically two sources of competitive advantage that companies can strive for in their product – price strategies: low costs and differentiation (Porter, 1998).

By employing a cost leadership strategy, a firm aims to become the low-cost producer in its industry (Porter, 1998). Products sold are typically a standard or non-frills product (Porter, 1998). When a product is not seen as a valid substitute for goods offered on the same product market by competitors, the company

is forced to discount prices well below that of competitors to generate revenues (Porter, 1998). Cost leaders must and therefore aim to achieve parity or proximity in the bases of differentiation relative to its competitors in order to be a superior performer in terms of revenues (Porter, 1998). In order to remain the lowest cost producer of a specific good or service, firms need to continuously invest in becoming more cost-efficient. Innovation is therefore assumed to focus on process improvements (Van Der Wurff & Van Cuilenburg, 2001). In terms of performance, cost leadership strategies have a negative impact on product quality, but a positive influence on affordability of learning objects.

Under a differentiation strategy, competition and marketing is based on product quality / uniqueness. Differentiation is achieved by developing multidimensional products, increasing the rate of technological change in the products, offering high quality products and improving the products image (Scherer, 1970; Robinson, 1998). Personalization of content is probably the most advanced form of product differentiation. Increased relevance due to unique product features enables a differentiator to charge premium prices for their products (Porter, 1998). A differentiator will be an above average performer when its price premium exceeds the costs for being unique (Porter, 1998). Firms that pursue a differentiation strategy will continuously strive to improve their product. Therefore, we assume that these firms will invest primarily in product innovation, which increases product quality (Van Der Wurff & Van Cuilenburg, 2001). However, the premium prices associated with differentiation strategies reduce the affordability of learning objects.

In addition to differentiation strategies, firms can also increase their price setting abilities by locking-in their consumers. Lock-in strategies refer to the actions of suppliers to prevent their clients from turning to alternative suppliers. The most common lock-in strategies are contractual agreements, taking advantage of durable purchases that demand complementary compatible purchases in a later stage, supplying products that demand brand-specific training, developing propriety information and database standards that are not compatible with other databases, becoming the specialized supplier for specific products and offering loyalty services (Shapiro & Varian, 1999, p. 117). Most of these strategies involve increasing the costs for consumers to switch to an alternative supplier. This is especially apparent in markets where suppliers have the exclusive rights to use a particular technology or system. For instance, in a market where two mobile phone companies offer mobile phone services based on TDMA and GSM standards, mobile phone users are forced to purchase a new phone when they want to switch between suppliers. When both suppliers would use GSM technology, these costs would not occur. Because digital media products involve many different layers of the communication system, suppliers can develop proprietary technology for each layer and hence lock-in their consumers. Lock-in enables suppliers to raise prices – and by doing so reduces the affordability of learning objects – without resorting to content innovation. However, as technology is a key area for locking-in buyers of digital media products, long-term lock-in strategies require a high rate of technological change and can hence potentially improve the quality of learning objects.

### *Structure*

Due to the limited nature of this study, we restrict our analysis of market structure to supplier concentration. In our broader study, we also include other structural market variables such as vertical integration and structural product differentiation.

The level of supplier concentration on a market has a great impact on the strategic options available to suppliers, especially with regards to their ability to set prices for their content. In a market with perfect competition “the number of firms selling a homogeneous product commodity is so large, and each individual firm’s share of the market is so small, that no individual firm finds itself able to influence appreciably the commodity’s price by varying the quantity of output it sells” (Scherer & Ross, 1990, p. 16). In return, a reduction of competitors – market concentration – increases a firm’s ability to influence prices. Pure monopolists, oligopolists and monopolistic competitors all have a certain degree of market power: in other words they can influence pricing (Scherer & Ross, 1990). High rates of competition are

not per se beneficial in media markets. Economic logic dictates that when competition is high, prices will rapidly approach marginal costs (Scherer & Ross, 1990). In digital information markets marginal costs are very low and first copy costs are relatively high (Shapiro & Varian, 1999; Van Der Wurff & Van Cuilenburg, 2001). Price competition as a result of low concentration pushes prices below average costs. As a result, firms follow a low-cost strategy in which they try to minimize first copy-costs and hence increasingly offer low quality content at low prices (Van Der Wurff & Van Cuilenburg, 2001). In terms of performance, this price competition is positive for the affordability of learning objects but negative for the quality of the products offered. Firms that want to avoid that negative price spiral and regain control over pricing in the face of high competition can resort to two main strategies; product differentiation and customer lock-in.

### *Basic Conditions*

Both standardization and protection of intellectual property rights affect the level of supplier concentration on the market for learning objects. To understand the impact of these two basic conditions on supplier concentration, we need to consider what attributes cause supplier concentration. In other words, we need to consider why in certain markets the firm emerges as the dominant mode to govern transactions rather than the market. To do so, we borrow from Institutional Economics (IE).

IE argues that institutional behavior to a large extent is determined by what is called ‘transaction costs’: the process and costs associated with each transaction that a firm makes (Picard, 2002, p. 66). Under the neo-classical assumptions of the SCP-model there is no uncertainty on the market, effectively eliminating all transaction costs. If transaction costs are assumed to be zero, the efficient market outcome (performance) will occur no matter what the legal entitlement is (Coase, 1988). “In the absence of transaction costs, it does not matter what the law is, since people can always negotiate without cost to acquire, subdivide, and combine rights whenever this would increase the value of production” (Coase, 1988, p. 15). However, that leaves the question why in the absence of transaction costs there is such a thing as a firm as governance structure for production rather than the market. Coase argues that “the main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism” (Coase, 1988, p. 38). When these transaction costs are higher, it is more likely that firms will emerge as organizing activities within a firm can minimize transaction costs for production (Coase, 1988). Following this reasoning, in a world of no transaction costs there would be perfect competition with many suppliers. A market with high transaction costs on the other hand forces suppliers to organize economic activity within firms and therefore result in a market with increased supplier concentration.

The level of transaction costs is related to the degree of uncertainty in the market (Williamson, 1999). The more uncertainty, the higher transaction costs will be, and the more it is likely that firms organize their economic activities internally. One way of decreasing the degree of uncertainty on a market is by developing industry-wide standards (Funk & Methe, 2001). Since the size of a firm depends foremost on the question whether it will pay to bring an extra exchange transaction under the organizing authority of a firm (Coase, 1988), lower transaction costs as a result of standardization would dampen the economic case for organizing transactions within a firm.

The same goes for the protection of intellectual property rights. Transaction costs are negatively influenced by incomplete contracts (Williamson, 1999, p. 1089). Within the information industry, and hence within the future market for learning objects, contracts generally revolve around intellectual property rights. Effective copyright regimes that allow content originators to both sell their works and retain legal control over reproduction and other uses for a limited time lowers transaction costs (Cheverie, 2002, p. 328). Reversed, problems with the protection of intellectual property rights can lead to the firm as a dominant mode of governance rather than a market (Williamson, 1999). Effective protection of intellectual property rights attracts new parties to the market, hence decreasing supplier concentration.

## Method

To hypothesize the effects of different levels of standardization and protection of intellectual property rights on the structure, conduct and ultimately the performance of the future market for learning objects, we conducted a scenario exercise. The main purpose to develop scenarios is that they should paint distinct different pictures of the future with unique implications for strategic decision-making (Chermack & Van Der Merwe, 2003; Courtney, Kirkland, & Viguerie, 1997). In our case, we wanted to develop scenarios that would explain the effects of standardization and protection of intellectual property rights on performance in terms of availability and affordability of learning objects. These scenarios can help policy makers to assess the (expected) performance of the future market for learning objects under different configurations of basic conditions, and hence can support the policy-making process. Building upon Schoemaker's scenario method that places uncertainties at the core of scenario building (1995), over two axes four scenarios were constructed that depict different configurations of standardization and copyrights regulation.

Due to the limited nature of this paper, we restricted standardization to the software that is used to package learning objects such as Flash, Java or Microsoft Word. For simplicity's sake, we assumed that for the production of learning objects only one packaging software product is required. Initially we decided to use a positive-negative dichotomy; standardization was either absolute or absent. However, this led to an oversimplified picture that ignored the issues that were raised in the literature, most notably those involving open source or even free software initiatives (see for instance: Bonaccorsi & Rossi, 2003; Weiser, 2003; West, 2003). Therefore, we decided to look at the dichotomy proprietary versus free software standards.

Proprietary software is developed and owned by one or several (commercial) organizations. Usage of this software typically requires a software license. Such a license provides the user with the legal rights to use a piece of software on a predefined numbers of computers, usually in return for a license fee (Krogh & Hippel, 2003). Proponents of proprietary standards claim that giving firms the right to exclusively exploit the fruits of their investments facilitates incentives to innovate. Within the realm of proprietary technology, we integrated two other dichotomies into the scenarios. First we distinguished between packaging software developed by exogenous software firms such as Microsoft, and software developed by suppliers of learning objects themselves. Second, we distinguished between a market with just one packaging standard that is owned by a dominant software firm and a market where several publisher-owned standards exist side by side.

In contrast to proprietary standards, for free software the source code and executable component are freely distributed via the internet. Free software prohibits ex post appropriation of the technology: any derivative work must also be distributed as free software and all changes returned to the original author for subsequent redistribution (West, 2003, p. 1265). Proponents of free software also claim that their model increases innovation and enhances the spread of technological knowledge.

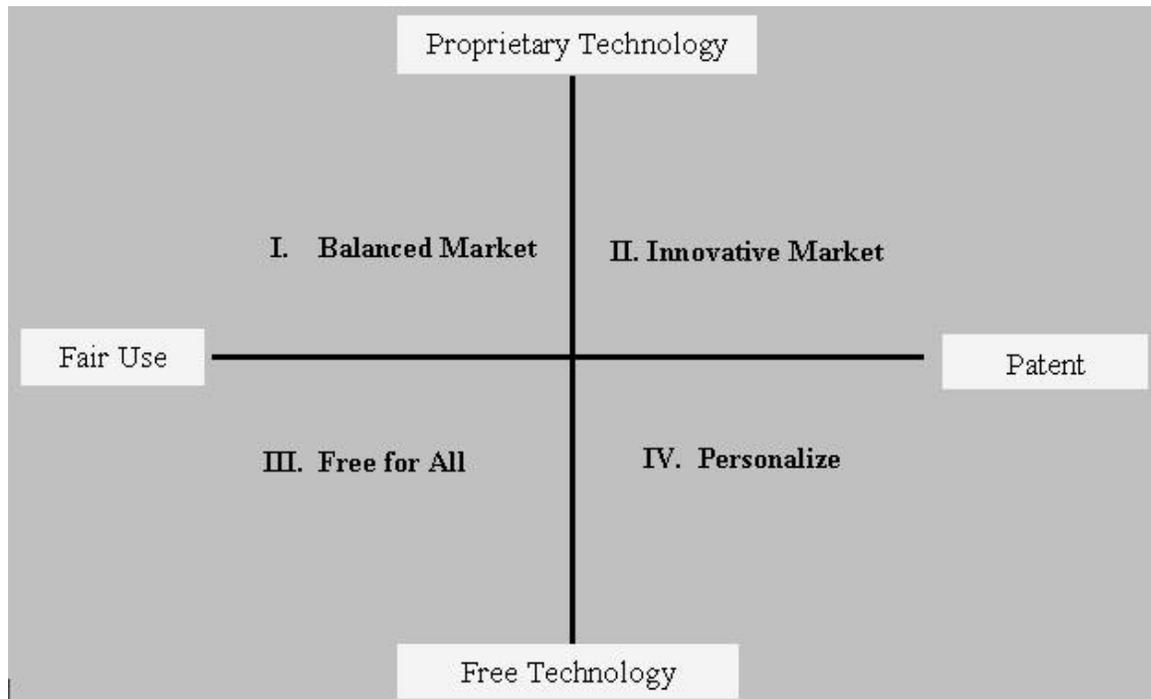
With regards to the protection of intellectual property rights, we found that a complete absence of property rights was not a realistic option in a developed market economy, making a positive-negative opposition undesirable. We did contemplate an axe that placed de facto protection against de jure protection, as legal protection is not a guarantee that digital content is indeed protected. However, this would also imply a positive-negative opposition. Therefore we developed a dichotomy that places consumer's interests (the fair-use model) versus that of suppliers (the patent model). In legal terms, fair-use access implies that under some conditions intellectual property rights must stand aside to allow socially desirable access and use of protected works (Cheverie, 2002, p. 328). Such infringement on copyright typically means that a limited portion of intellectual property can be freely used, a common practice in academic writing. The

patent model on the other hand provides firms with complete control over usage and publication of their material and with the tools to prosecute breaches of their rights.

### Scenarios

The figure below outlines the different scenarios based on the two dichotomies described above:

**Figure 1 ‘Scenario Typology’**



#### **Scenario I: *Balanced Market***

##### *Proprietary Technology – Fair Use Model*

In this scenario, the rights of firms that develop learning objects to exploit their intellectual property are recognized, but can be infringed upon based on the fair-use clause. Because their property rights are not completely safeguarded, a limited number of companies decides to invest in the development of learning objects. Standardization of packaging software for learning objects is achieved because a dominant software company similar to Microsoft controls the software used on the end-equipment. Firms that wish to develop learning objects therefore have no choice but to acquire a software license for this proprietary standard. As the dominant position of the software firm allows it to demand high prices for these software licenses, the number of companies that decide to develop such products is further restricted. The result is moderate competition; a market in which a limited number of companies compete. Moderate competition leads to a dynamic relationship between suppliers of learning objects that seek to minimize the costs of production and offer no-frill standard products (low-cost strategy) and suppliers that seek to create competitive advantage by focusing on product quality / uniqueness (differentiation strategies). Cost leaders gradually copy product innovations of differentiators whereas these in turn gradually adopt process innovations developed by costs leaders (Van Der Wurff & Van Cuilenburg, 2001). This positive cycle leads on the one hand to an increase in the production of high-quality learning objects, the contribution of

the differentiators, whereas the affordability of content is also safeguarded by process innovations that are developed by cost leaders.

### ***Scenario II: Innovative Market***

#### *Proprietary Technology – Patent Model*

Under the basic conditions in this scenario, innovative behavior of publishers of learning objects is rewarded. Developers of learning objects have complete control over usage and publication of their content and are able to prosecute breaches of violation of these rights. As a result, many suppliers invest in the development of learning objects. The subsequent high rate of competition decreases the ability of suppliers to set prices for their products irrespective of competitors. To counterbalance this, firms differentiate their products. The larger publishers not only focus on product quality to retain their price setting abilities but also develop their own proprietary packaging software. This way, these firms can effectively lock-in their customers by for instance taking advantage of durable purchases by their clients that demand complementary compatible purchases in a later stage (Shapiro & Varian, 1999, p. 117). Differentiation and customer lock-in provide these large publishers with the tools to charge premium prices. As they have no access to dominant packaging software standards, smaller suppliers of learning objects ally themselves with larger publishers and sell their products directly to them. The competition between these changing ‘coalitions’ of content providers sparks an ongoing process of product innovation both in terms of technology and content. This focus on product innovation increases the quality of learning objects, but comes at a cost since it enables suppliers to charge premium prices.

### ***Scenario III: Free for all***

#### *Free Technology – Fair Use Model*

Under this scenario, the balance of power has shifted towards buyers of content. Fair use protection provides them with – be it restricted - access to information. In addition, learning objects are packaged using a free software standard. This implies that suppliers of learning objects cannot use packaging incompatibilities to lock in their consumers. Furthermore, as these standards are free to use, uncertainty and financial barriers to market entry are reduced and technological innovations are shared. As a result, many new parties such as (public) broadcasters, newspaper publishers and internet publishers enter the market. Economic logic dictates that when competition is high, prices will rapidly approach marginal costs (Scherer & Ross, 1990). In digital information markets marginal costs are very low and first copy costs are relatively high (Shapiro & Varian, 1999; Van Der Wurff & Van Cuilenburg, 2001). Price competition as a result of low supplier concentration would in theory push prices below average costs. Incumbent publishers of educational material are aware of this problem and offer learning objects for free on the internet to prevent new competitors from investing in the development of educational content. This way, they can preserve their dominant position in the profitable offline educational material market. The high margins these companies enjoy on their offline educational products make up for the costs they incur to make their portfolio digital. Product innovation is dependent on innovation in the portfolio of printed educational material that these few large publishing houses have. Although highly specialized content could still attract paying clients, the lack of copyright protection discourages new entrants from investing in the development of this very expensive material. As a result, learning objects are widely and freely available but innovation is dependent on developments in the printed educational material market.

### ***Scenario IV: Personalize***

#### *Free Technology – Patent Model*

In this scenario, there is a high rate of competition. A free standard for packaging software emerges, reducing uncertainty and lowering market entry barriers. Coupled with patent style protection of intellectual property, a large number of firms decide to invest in the development of learning objects. New suppliers from all sides of the industry such as broadcasters, newspaper publishers and educational institutions flock to the market. As it is not possible to lock-in consumers through technology, firms resort to content differentiation to retain some influence over pricing in the light of strong competition. The

increased costs for producing highly differentiated material are justified by the patent style protection of the product. The high rate of competition pushes companies to develop increasingly unique and differentiated products, culminating into highly personalized interactive information products that offer real-time transactional functionality with databases (Hoch & Leendertse, 2001). In other words, suppliers of learning objects offer unique personalized content to unique users by having content databases interact with user databases. Only a few large publishers are able to develop curriculum-wide personalized information, with a larger number of small publishers following a focus-differentiation strategy that they sell either directly to consumers or to the larger publishing houses that place these into their content portfolio. Personalization increases the quality of information due to increased relevance, but also comes at a financial cost as it allows suppliers to charge premium prices.

## Future Research

To make our scenarios more robust, we will interview experts from industry, government, user groups and academia from several EU15 countries. Based on these interviews, we construct four scenarios that best describe (i) the range of possible developments of relevant standardization efforts and intellectual property rights; and (ii) the main expected implications of these developments for market structure and market behavior.

Following a review of existing studies, we then conduct four case studies to determine how structure and behavior in each scenario influence the performance of markets in terms of availability and affordability of learning objects. These studies focus on later to be defined empirical cases that best represent the four scenarios. For instance, the 'Free for All' scenario resembles MIT's OpenCourseWare program, in which MIT's courses are distributed freely on the internet. With these empirical cases we follow the research design developed in previous research (Van Der Wurff & Van Cuilenburg, 2001; Van Der Wurff, 2002).

Finally, we will conduct a large-scale survey of suppliers and users of learning objects in the Netherlands to assess what scenario best fits current developments in this country. Based on this survey, we will develop policy recommendations for the Dutch authorities.

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