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Summary

Although lacking a commonly accepted definition, technical standards essentially refers to a set of technical specifications that enable compatibility among products. They may arise through formal or standard-setting organizations, or sometimes simply from winning the market itself.

Many of the products for which standards are of importance display network effects. Network effects designate the increasing value of a network with the number of its users (e.g. a telephone network). Markets displaying network effects are prone to end up in standardization where only one or a few technologies remain, inducing "the winner takes it all" standards races or cooperative efforts to divide the profits through formal or informal bodies and organisations (from cross-licensing agreements to formal standard-setting organizations). Network effects can also lead to various kinds of market failures. Arbitrary decisions of early users can tip the market and it may be difficult to reverse the process or change to another (even a better) standard once a standard is set (formally or by the market).

At the core of deciding the network size and the access to it is the question of compatibility. At the core of compatibility is the question of IPRs. While IPRs generally only grant protection of an expression (copyright) or a solution to a problem (patents), they can confer considerably more power when combined with network effects. The owner of the IPRs essential for compatibility in a tipped network market has a quasi-monopoly. Because this counters the prevailing logic of the IP system, some special IP provisions treat matters of interoperability while other changes in legal design are being suggested. The current legal position as well as some of the proposed changes are being examined in the wider context of innovative incentives and drivers of welfare, concluding (in this part) that an IP solution with respect to standards probably suffers from practical and theoretical disadvantages. Many of the problems arising are due to the changing role of copyright especially with respect to computer software (in a broad sense). A re-design of that (a general software *sui generis* protection system) would probably ease many of the software related problems.

The set of problems attached to network effects and IPRs can also raise competition law concerns. While the judiciary is supervising and imposing some changes in standard-setting through agreements (patent-pools, standard-setting organizations), it seems that the main shortcomings are with respect to the very rare cases when measures are needed against a single-firm owning a de facto standard. Here, the new incentives balance test applied by the Commission in *Microsoft* might have merit.

Abbreviations

3G	The third-generation technology in the context of mobile phone standards
ATM	Automated Teller Machine
CD	Compact Disc
CEN	Comité Européen de Normalisation (The European Committee for Standardisation)
CENELEC	Comité Européen de Normalisation Electrotechnique (European Committee for Electrotechnical Standardisation)
CFI	The Court of First Instance
DIVX	Digital Video Express
DRM	Digital Rights Management
DVD	Digital Versatile Disc (or Digital Video Disc)
ECJ	European Court of Justice
ETSI	European Telecommunications Standards Institute
FRAND	Fair, Reasonable, and Non-Discriminatory [Licensing Terms]
GSM	Global System for Mobile Communications (originally from Groupe Spécial Mobile)
IPR(s)	Intellectual Property Right(s)
ISO	International Organization for Standardization
OJ	Official Journal
OS	Operating System
SSO	Standards-Setting Organization
USB	Universal Serial Bus
VCR	Video Cassette Recorder
VHS	Video Home System

1 Introduction

In our everyday life, we come across standards of various kinds more often than we probably realize. Standards have been set in a wide range of areas: from electrical plugs to the breadth of railway tracks to our CD players. Standards in many ways serve as a means to increase convenience and lower costs that otherwise would occur from each producer having its own design with no inter-connection to the others.

Without standardization, it has been said, there would be no "new economy". In areas of great importance to consumers and companies alike – consumer electronics, computer operating systems, digital audio and video formats – standardization is particularly important for mass production and compatibility. IPRs – the prime mover of creative and innovative activity – are nowadays usually a key factor in standardization activities. If the specifications of a technical standard requires the use of IPR protected components (which is usually the case in any reasonably advanced product), the owner of that IPR might be able to foreclose any competition in products compatible with the standard. In such cases, there is a real danger that monopoly-like situations might occur.

As the common wisdom has it that IPRs generally do not lead to monopolies, at least not broad ones, IPR protected technical standards represent something of an anomaly. Does this call for the redesign of IP law, and what kinds of competition law concerns or measures does it give rise to? Is it appropriate at all to intervene? What is the current position in the EC legal framework, and how should one optimally deal with these situations if one wishes to maximize the societal output and efficiency? It essentially comes down to balancing the need for creative incentive to that of industrial competition and these considerations will be an underlying topic of this thesis.

1.1 Purpose and Delimitation

This thesis examines the legal and economic implications of IPR protected technical standards in a European Community context.

The purpose of this thesis is to analyze how access to and protection of IPR covered standards are treated within an EC law context. Recognizing this area as an important intersection of intellectual property law and competition law, special interest will be given to how the incentives for static and dynamic competition are weighed against each other in access/protection questions relating to technical standards. The provisions in relevant legal sources will be analyzed and solutions suggested in doctrine will be tentatively assessed.

Primarily, I will take the EU perspective, but as these problems are on a rather principal level, doctrine of other legal systems will be included to the extent that they can shed more light on the matter.

Concerning the various forms of IPRs, while not excluding any of them as inapplicable to the reasoning in this thesis, the main focus will be on patents and copyright. Questions relating to license fee calculations have also been left out.

1.2 Method and Material

I will initially provide an analytical framework for the economic theories concerning standards and the properties of the markets in which standards play an important role. This will be done through a descriptive survey of the most influential economic theories in the area.

In the next phase, I will use traditional legal method, combining a descriptive and analytical study of the sources of law to attempt to establish the position *de lege lata* on the issue of access to and protection of IPR protected technical standards in the EC.

No specific legislation concerning standards is at hand, and case law directly referring to the issues at hand here is scarce. Other sources of law than the traditional ones have thus been included, notably guidelines, communications and decisions from the Commission, and some case law not dealing with standards primarily, but, in my view, with important implications for the purpose of the thesis.

The *de lege lata* and proposed changes will be evaluated and analyzed in a law and economics perspective. The pro-competitive and anti-competitive factors of upholding or restricting IPRs in standards will be analyzed. “Pros and cons” of some of the major alternative approaches will be established, and a humble recommendation for future handling of cases like this will be given.

1.3 Outline

In Chapter 2, which is essentially a research overview, treats definitions and the principal economical problems that may occur in relation to technical standards. The main economic theories of the area and some empirical examples are given.

Chapter 3 will introduce the IP law dimension. The current IP law position on access to and protection of IPRs in technical standards is discussed, as well as suggestions of changes. This will be done from a perspective of incentives and

Chapter 4 covers the EC competition law approach, outlined along article 81 and article 82. Legal documents and cases that might clarify the current competition law position on access to and protection of IPRs in technical standards are treated and aspects of recent developments in case law are analyzed.

In chapter 5, a brief conclusion will be given.

2 Technical Standards

The natural starting point is to establish the nature of technical standards, and the economic context in which they must be understood. Markets in which standards and standardization are of importance exhibit certain characteristics that differ from traditional branches of industry. This has important implications when examining the legal framework and various policy options concerning IPRs in standards in the following chapters of the thesis. I will exemplify the economic concepts below with empirical examples to which the reader most likely can relate.

2.1 Definitions of Key Concepts

There is no prevailing definition of a **standard**. The word can be used in a wide range of contexts, many of them having absolutely nothing to do with the topic of this thesis. Consequently, standards will have a more restricted meaning in this thesis, suggested by the prefix **technical**. That prefix should be interpreted in a rather broad sense.[1] Minimum standards, quality standards and compatibility standards are some conceivable categories. The main interest of this thesis is compatibility standards, but since they in some cases overlap with the other two and are hard to practically separate at all since they often (but not always) have the same purpose or effect, no razor-sharp distinction will be necessary in this thesis (keeping in mind, though, the emphasis on the compatibility dimension). Gandal uses the following simple definition of a standard: ”a set of technical specifications that enable compatibility among products”.[2] Lea has used a somewhat more detailed definition:

> A ‘technical standard’ is a recording of one or more solutions to one or more problems of matching persons, objects, processes or any combination thereof, and which is intended for common and repeated use in any technical field.[3]

Hereinafter, the word ‘standard’ alone will refer to technical standard along the definitions above.

Somewhat confusingly, the term **standardization** is also used, but with a slightly different meaning. Standardization generally refers to the establishing of *one* specific technical standard out of various competing possibilities, thus either making them uniform or deciding on using one for the whole relevant industry, or for the specific purpose.

A standard is either **closed** or **open**. This is usually a matter of whether a company owns the standard (a proprietary standard) or not (a non-proprietary standard), or at least whether it exercises its proprietary rights or not.[4] Put very simply, standards developed and held by a particular company

[1] Compare Lea & Hall, 2004 p. 69.
[2] Gandal, 2002, p 81.
[3] Quoted in Lea & Hall, 2004, p 71.
[4] Lemley, 2002, p 1893.

are usually closed. Contrary, standards agreed on by national standardization bodies are traditionally open. However, the national (governmental) standardization bodies have decreased in importance in recent decades to informal bodies of industry in the private sector and other non-governmental SSOs.[5]

There are three main ways in which standards arise: 1) through legislation or a formal standardization body, 2) through an informal body of industry, or, lastly, 3) from the market itself. Exactly how these should be labelled and categorized is also a topic of a certain scholarly obscurity. There is a principal difference between standards that are known as **de jure** standards, and those that are **de facto** standards and there is some confusion in the literature as to when the terms apply. *De jure* standards are not necessarily established by legislation, which the term suggests, nor is it always compulsory to adhere to the standard, which the Latin also might suggest. The term, in some contexts, simply refer to standards that are agreed upon through a standard-setting organization. Exactly which organization can render a *de jure* standard status is not clear. [6] *De facto* standards designate those standards which have arisen from the market itself, either through voluntarily agreed developments within informal bodies in the industry, or originating purely from the market eventually adhering to one particular standard. The latter is sometimes also referred to as *corporate technical standards*[7] or *single-firm de facto standards*.

In this thesis, I will use the following definitions, indicating how they have arisen:

1) Formal standardization bodies or legislation (*de jure* standards[8]). Many countries have national standards bodies, such as the US Federal Communications Commission (FCC). Usually, these are *de jure* standards proper: they are empowered by legislative bodies to take decisions which are mandatory to follow. [9] Apart from those, there are also important SSOs without formal legislative power following other divisions than those of the state: they can for example be regional, like the ETSI in Europe. [10] They can also follow industrial lines, like the International Telecommunications Union, which is the oldest standards developing organization in the world. [11] According to research, the work of these organizations within information and communications technology and the consumer electric goods that carry these technologies have had a considerable impact on the standardization regime.[12] Traditionally, *de jure* standards do not involve IPRs.

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[5] Lemley, 2002, p 1897-1900.
[6] Lea & Hall, 2004, p 69.
[7] Lea & Hall, 2004, p 69.
[8] These bodies are subject to article 86 of the EC Treaty and could be subject to Articles 10 in combination with article 81 and 82 of the EC Treaty.
[9] Gandal, 2000, s 3.
[10] Other important European examples are CEN, CENELEC, IEC, ISO, and other national standards bodies recognized under Directive 98/34 of June 22, 1998, on technical standards and regulations, OJ No L 204/37, 21.7.1998.
[11] Gandal, 2000, s 3.
[12] David & Shurmer, 1996, p 797

2) Informal Bodies standards and voluntary industrial agreements (*de facto* standards).[13] Sometimes it is in the apparent interest of industry itself to agree on a common standard, even if no such measure has been taken by a national standard setting body or a standard developing organization. Often, the result of these arrangements is that the standard will be open (at least accessible). Sometimes, the necessary IPRs are pooled together (so-called patent-pools, which also can contain other IPRs than patents), in which case the standard will be closed, probably requiring a licensing agreement from the holders. The CD and DVD standards have been developed in this way.[14] This conduct may also forestall the third one:

3) *Single-firm de facto* standards. [15] It is possible that a standard arises without any formal or informal decision. A product might in its own right set a standard through the properties of the market in which it exists. The tipping of the VCR market in favour of the VHS system over its rivals, mainly Betamax, is such an example. Also, in the computer operating system market, Microsoft's Windows operating system could be considered as such a standard as well.

These distinctions will be good to keep in mind for henceforth, as they have legal implications.

2.2 The Properties of the Market: Network Effects, Compatibility, and Lock-In

Many of the markets in which technical standards are of importance are characterized by so-called network effects. The demand for a good exhibits network effects, if the utility of that good for each consumer is positively related to the number of other consumers using the same good. Thus, it can be described as an economy of scale on the demand side. Over the last three decades, a fairly large body of economic literature has treated the matter. This is certainly due to the fact that network effects characterize many of the industries that have grown rapidly during that time and that have been subject to wide scholarly and public debate, such as various information and communication industries, including consumer electronics and not least products related to the Internet and computer software. [16] A characteristic of all these products is that they are dependant upon technical standards to communicate effectively (directly or indirectly). Standards enable components to work together to produce a better output and makes it possible for several producers to coordinate production (when access to a standard is possible).

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[13] Cases of interest are ***Philips VCR***, chapter 4.1.2.1, ***X-Open Group***, chapter 4.1.2.2; ***APS (Advanced Photographic System)***, chapter 4.1.2.3, ***DVD***, chapter 4.1.2.4, **3G**, chapter 4.1.2.5.

[14] More on these particular examples in the following chapter 2.2.

[15] Cases of interest are: ***IMS Health***, chapter 4.2.2.1;.***Microsoft*** (the parts concerning client-to-server OS, OS to middleware, and server-to-server OS interoperability), section chapter 4.2.2.2.

[16] Liebowitz & Margolis, 1994, p 133.

The main area of academic interest is that strong network effects can alter market outcomes in many important ways compared to goods not exhibiting network effects. Naturally, the reason the value of a good increases with additional users in the first place is that there are large positive outcomes out of network effects. Nevertheless, a characteristic of network effects is also that they tend to lead to various kinds of market failures. The term "network externalities" is often used interchangeably with network effects, although some make a distinction where network externalities implies market failure.[17]

Due to certain characteristics of the market which will be described in this subchapter, competition in markets with network effects will in most cases ultimately end up in a situation where one certain technical standard prevails **(standardization)**, or possibly with a small amount of alternatives since heterogeneity in preferences and taste to some extent can limit standardization. The result is thus quasi-monopoly or oligopoly. [18] Markets may have stronger or weaker tendencies toward standardization. In some cases, a common standard is quickly agreed upon. In other cases, standards wars can be long and costly. I will give examples of both.

2.2.1 Start-Up

A first network market characteristic to introduce is the so-called **start-up problem**. Network effects lead to particular market share dynamics. A critical mass of users is needed early on in order to secure a larger network size. The phenomenon can be graphically described by an S-shaped curve. [19] Once the obstacle of accumulating a critical mass is overcome, the network size can grow rapidly. The consumer is normally far from unaware of these mechanisms. Hence, the consumer's expectations about the future size of a network will be crucial and potentially self-fulfilling. If the typical consumer believes that a certain technology will win the market, then it will strongly increase the likelihood of it turning out that way. The market thus is likely to **"tip"** at some point in the development once a lead has been established.[20] This is also referred to as the "snowball" or "bandwagon" effect. Besides the "purely psychological" bandwagon effect, Katz & Shapiro also point out the importance of a) product information, which is more available for popular brands, and b) the market share, which in itself can serve as a sign of product quality.[21]

Extending the theories, one can add a system networks consisting of "hardware" and complementary "software" products (a "**virtual network**").[22] It introduces important properties. The typical "physical network" is a telephone network, an instant messenger service (e.g. MSN

[17] See for example Liebowitz & Margolis, 1994, p 135, and Matutes & Regibeau, 1988. Occasionally, I have also come across "positive feedback" as an alternative term for network effects.
[18] Gandal 2002 p 81, Katz & Shapiro 1994, p 112.
[19] Cabral, 1990, p 301-303.
[20] Katz & Shapiro, 1994, p 105-106.
[21] Katz & Shapiro 1985, p. 424.
[22] Introduced and developed by Katz & Shapiro, 1985, 1986a, 1986b, 1994.

Messenger or ICQ), email, or a fax network. The value of that physical network displays direct network effects, which positively relate quite simply to the number of users of that network. The "virtual network", with hardware and software, display so-called indirect network effects, which means that the value of a hardware (for example a CD-player) increases with the number of other hardware users, because it positively influences quality and variety of the available software (CDs, in the mentioned example) because of economies of scale in software production. Another example could be computer operating systems ("hardware", in this context) and applications programs ("software").[23]

The start-up problem is perhaps in practice even more evident in virtual networks, which makes the **installed base** of hardware crucial for the further development of the market position.[24] The installed base can constitute an important barrier of entry. [25] This amounts to something of a *Catch 22* situation: if there are not sufficient software applications available, the customer will see less of a point in buying a product. Conversely, if there are few hardware owners, software producers are unlikely to cater for the software market corresponding to particular hardware. [26] Here, corporate strategy is very delicate and **timing** will be an important factor in the success of breaking out of this limbo. [27] Since there is certainly a first mover advantage, premature announcements can be a weapon in attracting customers to a certain standard and discouraging them from switching to another standard, or slow the speed of an already rolling "snowball"[28]. If some potential users wait for a pre-announced product, the installed base of the old technology will be reduced by those who wait.[29]

Furthermore, various kinds of **aggressive pricing regimes** is another option for obtaining or securing a lead in installed base, or even preventing new entries. In contrast to traditional industries, marginal cost pricing may result in immediate market failure due to the start-up problem in network industries. That is why introductory pricing at (or even below)[30] marginal costs may be necessary as a means to achieve large network size. This is done for example game consoles for home video games to penetrate the market and obtain an installed base. [31] Even when a certain party has achieved market lead, it does not automatically mean that the market leader earns unwarranted profits: The quasi-rents (that is, the income earned in excess of post-investment opportunity cost, by a sunk cost investment) may cover the costs incurred in earlier stages in order to accumulate the critical

[23] Lea & Hall 2004 s 73. See also Gandal, 2002, p 80.
[24] Farrell & Saloner, 1986a, pp 940-941, 954..
[25] Farrell & Saloner, 1986a, p 942.
[26] Gandal 2002 p 81.
[27] Gandal, 2002, p 82.
[28] Farrell & Saloner, 1986a, p 954.
[29] Farrell & Saloner, 1986a, p 942.
[30] McGowan & Lemley (1998 p 495) argue that notions of neoclassical antitrust policy such as predation might have to be reconsidered in network markets.
[31] Clements & Ohashi, 2005, p 516, 521.

mass of consumers. It is hard to distinguish this kind of "necessary" introductory pricing from anti-competitive predatory pricing.[32]

2.2.2 Hold-Up

A second form of market failure (after the start-up problem), is the so-called **hold-up problem**. This designates the phenomenon that buyers of hardware are likely to be exploited by future software price increases. [33] Lock-in can be of various kinds: sometimes *contractual*, as with mobile phones, requiring a certain minimum amount of duration. But lock-in can also be due to *investments in training and learning*, such as being familiar with a certain word processor software. *Data conversion* limitation is another problems, as for example a collection of vinyl records are not convertible to CDs. *Search costs* for evaluating alternatives can also be viewed as a form of lock-in. Most of the above are the result of corporate strategy rather than technical or economic necessity but they naturally tend to affect market outcomes in the ways in which they are intended to.

Since network markets are unlikely to have a large variety of systems in the long run, consumer faces the risk of being stranded with a **sunk investment** in an "**orphan technology**".[34] If the network does not grow sufficiently, or is under-utilized, it is bound to be abandoned. The investment made in the network by the consumer is of little or no use. This can make the consumer hesitant in the early stages of the product cycle. This is especially the case in virtual network markets.[35] The positive feedback from complementary software, in combination with the fear for being stuck with orphan technology, will result in a "natural tendency" in virtual network markets towards the eruption of a *single-firm technical standard*.[36]

2.2.3 Compatibility and Economic Welfare

There are benefits in standardization (that all consumers use compatible products) as such.[37] Farrell and Saloner points out three important advantages[38]: a) the interchangeability of complementary products; b) the ease of communications between people, or between people and machines; c) cost savings, since standardization facilitates mass production. This, however, presupposes compatibility.[39] Since a network market is likely to end up in domination of one or a few standards, the question of compatibility becomes the crucial point. Any product component that could

[32] The field of predatory pricing, however interesting and with some implications for this thesis, is dealt with at length in both legal and economic literature and will not be further scrutinized here.
[33] Farrell & Gallini, 1988.
[34] Gandal 2002 p 81.
[35] Gandal 2002 p 81.
[36] Katz & Shapiro, 1994, p 105f.
[37] See for example the study by Swann, 2000.
[38] Farrell & Saloner, 1986a, p 940.
[39] Farrell & Saloner, 1986a, p 940. For more on the questions of the overall economic welfare effects of compatibility with reference to its effects on incentives to innovate, see chapters 3-4.

be made compatible will be a part of the network.[40] If there is complete compatibility, consumers of all the goods share the same network and contribute to the network effects. The other extreme, complete incompatibility, is where the consumers of each standard form separate networks and the network effects are confined to that company's level. This affects the nature of competition of course:

> The more skewed are the returns, the harder firms will fight; and the sharper the available tactics, the more fighting will dissipate profits. Prizes are typically more skewed under inter-technology competition, because the likelihood of tipping gives it an all-or-nothing flavor.[41]

The over all trade-off to compatibility is **product variation** (or differentiation); that several incompatible products each have market shares. With increasing compatibility, a decrease in variation follows. The desirability of achieving compatibility probably differs in various situations. In some cases (arguably the VCR standards war accounted for below), the loss in variation may not be that high a price to pay for compatibility. In other cases though, the loss of variation might actually be worse from a consumer perspective.[42] Some economists suggest that there might be less of a trade-off between variety and standardization if the variety is a matter of "software" rather than "hardware".[43] Where to strike a balance between the two is a question of achieving the optimal product variation.[44] For the purpose of this thesis, it is enough to bear in mind that efficiency in network markets must not necessarily thrive from a large product variation, as often would be the case in traditional markets. Also oligopolistic and monopolistic markets can be innovative.[45]

Two main economic welfare effects must be kept in mind when examining the trade-off between standardization and variety. The first one is that of **suboptimal standardization**. This represents the failure of the market to achieve a desirable standardization.[46] The second economic welfare effect is that an **inferior standard** might be adopted (in a physical or virtual network).[47] Once adopted, the incentives for an individual to change to a better standard are low. The optimal choice for society as a whole is contradicted by private incentives of the individual customers.

Another factor – related to the economic welfare effects above – in understanding various forms of market failure is the so-called **path-dependence**. Two concepts are "excess inertia" (lock-in to inefficient technologies by historical events) and "excess momentum" (a premature inefficient adoption of a new technologies).[48]

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[40] Lea & Hall 2004 s 73.
[41] Besen & Farrell, 1994, p 120.
[42] Katz & Shapiro, 1994, p106.
[43] Langlois, 1999, p 42-43.
[44] Such as Dixit & Stiglitz, 1977; Salop 1979; Farrell & Sal 1986b.
[45] Lévêque, 2005, p 79.
[46] Gandal 2002, p 83.
[47] Gandal 2002, p 83.
[48] Gandal, 2002, p 83. Farrell & Saloner, 1986a, p 942-943, Farrell & Saloner, 1985, Arthur, 1985.

Excess inertia often dependant on the installed based of a competing, normally older, standard. Costumers are often locked-in to a certain system through high switching-costs from one system to another. Even if a customer before the purchase is indifferent to the alternatives in, say software programs of a certain application, once he has made a choice and made investment in learning and file creation and so on, the cost of switching is high, and benefits are unlikely to occur unless a certain critical sum of other users switch as well. The excess inertia effect of this is amplified if the potential users initially reject the product.[49]

The opposite of excess inertia is and **excess momentum**, i.e. the "inefficient adoption of a new technology".[50]

Another very important implication of compatibility is that it alters the very nature of the competition. While a state of incompatibility fosters competition "for the market", compatibility provides for competition "within the market" under conditions more similar to traditional industries.[51] The market will consequently be much likelier to "tip" in favour of one standard under incompatibility, as the profit of sales will be distributed more evenly under compatibility. Thus, compatibility tends to relax competition in the early stages of the product life-cycle, while intensifying it later on, both due to the lessened risk of monopolization.[52]

On the corporate level, there are two major effects from compatibility for the individual companies: a) the market expansion effect, and b) the business gift effect.[53] The market expansion effect refers to the fact that by expanding the network, the value of the products are enhanced due to the network effects (since it will add more users to the network, the value for each participator of that network will be larger). This, in turn, draws more customers to the market. Companies thus have an important mutual interest in expanding the market with respect to the market expansion effect. The other effect, the business gift effect, refers to the fact that firms with a large installed base will lose a quality advantage through compatibility. The implications of these two effects is dependant upon the perspective. Put simply, smaller firms tend to benefit from both effects. Large firms benefit from the market expansion effect, but tend to be harmed by the business gift effect.[54]

Principally, compatibility can be achieved in two ways: either by the adoption of a common standard or by the creation of an adapter, which also makes unilateral compatibility possible.[55] **Backward compatibility** is the possibility to access older technologies with the new one.[56] This is also interacted with installed base: a customer will be more prone to change a software product if he can access files he already has with the new system,

[49] Farrell & Saloner, 1986, p 940-942.
[50] Farrell & Saloner, 1986, p 942.
[51] Besen & Farrell, 1994.
[52] Katz & Shapiro, 1986b.
[53] Chen et al, 2007, p 4.
[54] Chen et al, 2007, p 4.
[55] Katz & Shapiro, 1985, p 434.
[56] Langlois, 1999, p 50; Bresnahan, 2004, p 3.

i.e. if it is compatible. In this way, one does not have to abandon sunk investment already being made in one standard. **One-way compatibility** is also possible, with one system being compatible to the other but not conversely.[57]

Compatibility is at the core of corporate strategy:

> In most markets where network externalities are important, the compatibility of products will be the result of explicit decisions by the firms. When network externalities are large, the choice of whether to make the products compatible will be one of the most important dimensions of market performance.[58]

A wide range of strategies and tactics is at hand for the companies.[59] Because of the market properties, the assessments of these strategies and tactics by competition law enforcers is a much more delicate issue in network industries than in traditional industries.[60]

2.3 Empirical Support

Apart from the growing body of theoretical, there is naturally also empirical support for the phenomena described above.

An often-mentioned example of path dependence from the literature on economic history concerns the very keyboard this thesis is written on. Many have probably wondered why our computer keyboard is designed the way it is. There is no apparent order among the keys. Experiments suggest that it is not even the most efficient one. The DSK[61] apparently holds most of the world's records for speed typing.[62] Apple produced some of its earlier computers with a switch, making it possible to convert the keyboard into the DSK, claiming that it makes you type 20-40% faster.[63] It was not a success. The QWERTY[64] keyboard still has a firm grip of the market.

Why? Economic historian Paul David argues, as for many standards, we must search for the answer to this question with a pretty open outset: "'historical accidents' can neither be ignored, nor neatly quarantined for the purpose of economic analysis; the dynamic process itself takes on an *essentially historical* character".[65]

When the typewriter market began to grow in the 1880s, there were many competitors to QWERTY. With the different keyboards came rather different technical solutions for printing, some even printing on the hidden side of the paper, which in comparison made the QWERTY technology more user friendly. But the technical rationale for QWERTY was soon

[57] Manenti, & Somma, 2002, p 4-5.
[58] Katz & Shapiro, 1985, p 434.
[59] A basic overview is provided by Besen & Farrell, 1994.
[60] Economides & White, 1994.
[61] The Dvorak Simplified Keyboard, designed by August Dvorak.
[62] David, 1985, p 332.
[63] David, 1985, p 332-333, quoting further sources for evidence supporting the superiority of the DSK.
[64] QWERTY are the first letters below the numbers on the upper left hand of the keyboard designed by Christopher Sholes.
[65] David, 1985, p 332.

irrelevant, since all typewriters came to use more or less the same technology. But the installed base of QWERTY keyboards caused "excess inertia".[66]

In his account of the economics of QWERTY, David extracts three features which he finds decisive for QWERTY's rise to the overall dominant keyboard standard. a) Technical interrelatedness, which is the compatibility between keyboard "hardware" and the "software" in form of the typist's memorized skills. b) Economies of scale, especially under increasing returns due to network effects, which can make random factors exert great leverage. c) Quasi-irreversibility: lock-in due to the switching costs, where the costs of the hardware (the typewriters) was decreasing while the cost of software conversion (teaching the typists a new system) were increasing.

David concludes:

> competition in the absence of perfect features markets drove the industry prematurely into standardization *on the wrong system* – where decentralized decision making subsequently has sufficed to hold it. Outcomes of this kind are not so exotic. For such things to happen seems only to possible in the presence of strong technical interrelatedness, scale economies, and irreversibilities due to learning and habituation.[67]

The story about how the QWERTY keyboard standard won the competition with the alternatives is thus an often-cited example of industries being "locked-in" in an inferior standard.[68]

A change to a technically superior standard is normally desirable for society as a whole. The presence of a large installed base can however cause conflicting incentives between the overall social desire for the adoption of the new technology and the incentives that influence the decisions of the individual consumers.[69]

There is a perhaps more severe form of market failure apart from excess inertia and excess momentum. Lacking a better term, I call this phenomenon implosion. Contrary to a "too quick", or "to slow", technology adoption, the market can fail completely and all competing technologies are abandoned. A notable example of this is the sound standard that possibly could have replaced the stereo system.

The stereo system was introduced in the late 1950s, replacing the mono system with two audio channels play back to give a more realistic sound. In the 1970s, the logical next step was introduced. A four-channel audio

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[66] Farrell & Saloner, 1986a, p 942.
[67] David, 1985, p 336.
[68] Note though, that David's empirical foundations has been questioned fiercely by Liebowitz & Margolis (1990), but the basic themes in David's article seem to be accepted in several standard works on technological development (for example Rosenberg, 1994, Chapter 1) and was also defended by Jared Diamon in "The Curse of QWERTY", Discover, April 1997, p 34. Liebowitz & Margolis are the refreshing *enfants terribles* in the field, questioning the theoretical and empirical validity of the mainstream theories: "the a priori case for network externalities is treacherous and the empirical case is yet to be presented, Liebowitz & Margolis, 1994, p 149.
[69] Farrell & Saloner, 1986, p 941.

system with "surround" character - called quadraphonic sound – was developed that would reflect this and create a more "concert-like" experience, since research suggested that up to 80% of the sound in a concert hall comes from the reflection of walls and the ceiling and only 20 % from the front.

Matrix systems, such as SQ and QS, and Discrete systems ("real quad" by its proponents) were introduced, where the former was more backward compatible with vinyl cutters and players, whereas the latter was more technically demanding but arguably had some technical advantages in the core characteristic of quad: the front-rear separation of sound. Both systems were however backward compatible to stereo hardware and software.[70]

In 1971 CBS, the by far largest producer of records in the U.S. at the time, introduced its "SQ" system, rivalled by "QS" of Sansui, both Matrix systems. Discrete systems were introduced by JVC (CD-4), and after some, RCA, another large record company, decided to support the system with software.[71] Since everyone was aware of that consumer expectations would probably decide the outcomes, the battle between the matrix and discrete standards, in the words of Postrel, evolved "into a struggle to present one's own system as the eventual, inevitable winner".[72]

Quadraphonic sound hardware and software still seemed like a success the first years, with sales growing rapidly, but:

> Consumers were confused by the multiplicity of quad systems, and dealers reported that customers were fearful of being stranded with the wrong system. Dealers generally were not terribly enthusiastic about four-channel, believing that it ought not to have been released without a single standard, an extensive software library, and better recording quality. Those retailers that tried hard to sell four-channel equipment complained that customers were confused by bad-mouthing of quad in other stores. Disillusionment was setting in by the end of 1974.[73]

In 1976, the game was more or less over. Despite its support from large actors in the software and hardware market, Quad systems were decreasing, and it never really penetrated the market. Stereo sound systems prevailed and many consumers were stuck with expensive quad hardware for which no software was made.[74]

In analyzing the reasons for this, Postrel uses the models by Farrell & Saloner.[75] Lack of software is pointed out as on of two important factors. In 1975, only 23 out of the 105 most sold records were quads. The other one is the standards confusion, and advertising of different systems with reference to the inferior quality of the other's system might deter costumers from considering to buy from the product category at all.[76]

> A glacial pace of software development and technical deficiencies in the systems led to sluggish demand. The lack of demand then discouraged software development.

[70] Postrel, 1990, p 170-172.
[71] Postrel, 1990 p 172-173.
[72] Postrel, 1990, p 173.
[73] Postrel, 1990, p 174.
[74] Postrel, 1990, p 183.
[75] Farrell & Saloner, 1986.
[76] Postrel, 1990, p 181-83.

> Confusion among the public about the nature, performance, and operating characteristics of quad, and especially about the merits and demerits of matrix versus discrete technology, prevented four-channel from becoming the perceived "next step" after stereo.[77]

Notably, upon the introduction of the CD standard, both these factors were neutralized by industry cooperation.

If there is no compatibility between competing standards, then a standards race is likely, (since the network market is prone to end up in standardization). The prime example of this is the VCR standards war in which Matsushita's VHS format triumphed over Sony's Betamax format – an experience that probably had important influence on the strategies for technological development since then.

Sony launched its Betamax VCR in February 1976 – more than a year earlier than the first VHS was introduced to the US in September 1977.[78] The systems were incompatible. Since Betamax was released first and generally held to have been *at least* technically equivalent[79] to VHS, it may be somewhat surprising that VHS decisively had won the standards war by the mid 1980s with market shares of around 90 %.[80] In 1988, after a decade of standards war, Sony – the originator of Betamax – gave up producing Betamax and started manufacturing VHS systems.

Many reasons have been contemplated for this. One factor which might have been of importance early on, when VCRs were used only to record programs from TV, is the initially longer playing and recording time of VHS compatible tapes.[81] Another decisive blow was probably the choice of the film industry to support the VHS system when it had to decide on which standard to release pre-recorded tapes in the early 1980s. The market finally tipped shortly thereafter. The more favourable licensing terms of the VHS standard was another factor awarded decisive importance of some commentators. This made more hardware producers willing to choose the VHS standards leading to increased competition and reduced prices in hardware. This could explain why VHS quickly could reach equivalent market shares despite Betamax's 18 month head start.

In an econometric analysis,[82] Ohashi established significant indirect network effects when examining the strength of the relationship between each standard's installed base and the consumer demand for each standard. Interestingly, Ohashi's study suggest that if Sony had used its first-mover advantage to build a larger installed base through low pricing, "in the first

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[77] Postrel, 1990, p 183.
[78] Park, 2004, p 938. Some earlier machines were launched by some Japanese companies before the technology was fully developed but the efforts were aborted before the reputation of the product category had taken damage (compare to the account of quadraphonic sound below).
[79] Many sources claim that Betamax was technically superior, some mean they were equivalent; I have come across no claims of technical superiority of the VHS system intrinsically.
[80] Park, 2004, p 939.
[81] Park, 2004, p 938.
[82] Ohashi, 2003.

three years of the VHS introduction, it would have driven VHS out of the market in 1985".[83]

During the VCR standards war, a digital audio format was beginning being developed. The compact disc technology was developed by Philips in 1979, and but it was launched jointly by Philips and Sony in 1983. It was meant to be a pretty straightforward replacement of a well-established analogue vinyl standard. Both Philips and Sony owned important music record (software) producers (Polygram records and CBS respectively) and the technology was licenced on relatively favourable terms. [84] More than 30 firms had signed licensing agreements to use the CD standard technology in 1982 and other firms had withdrawn their competing prototypes within the same product category. This represents something of an antithesis of the drawn-out VCR standards war.

The development of the DVD standard [85] also had important elements of hardware-software cooperation like the CD standard. Sony, Toshiba, and Panasonic, cooperated with major movie studios such as Warner and Columbia.[86] There was some initial disagreement on which consumer electronics firm's standard to adopt. [87] The competing group's (Sony-Philips vs Toshiba-Matsushita) incompatible standards agreed to use a common standard incorporating elements from both of the prior incompatible ones. [88] The project was well underway in the mid 1990s, and all the well-known consumer electronics manufacturers supported the DVD standard.[89] But it was not without competitors; the DIVX standard was being simultaneously developed and pre-announced in 1997 by Circuit City (without neither hardware nor software to display). [90] DIVX was a pay-per-view system which would be one-way compatible, that is all DVD discs could be played on a DIVX standards system, but not conversely.[91] It also had software support from major film studios such as Disney, Paramount, Universal, and Dreamworks.[92] The reason for the preannouncement was obviously that the DVD standard otherwise would get a lead that could be hard to catch up with. The DIVX never really materialized in the way intended and preannounced, but after the preannouncement, DVD sales dropped and *Dranove* and *Gandal* argue that that the preannouncement of the competing DIVX standard temporarily slowed down the adoption of DVD standard.[93]

Network effects does not have to be confined to high-tech markets, or to any particularly form of innovation at all. This is interesting, because with

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[83] Ohashi, 2003, p 450.
[84] Gandal et al, 2000, p 45.
[85] For case law on this, see chapter 4.1.2.4.
[86] Dranove & Gandal, 2003, p 3.
[87] "Sony decision could cause standards war", *Managing Intellectual Property,* April 1995, Vol 48, p 7-8.
[88] McGowan & Lemley, 1998, p 516.
[89] Dranove & Gandal, 2003, p 8.
[90] Dranove & Gandal, 2003, p 3, 9.
[91] Dranove & Gandal, 2003, p 3-4.
[92] Dranove & Gandal, 2003, p 5.
[93] Dranove & Gandal, 2003, p 1, 11, 24.

no innovative step, huge amounts of money are earned on account of market properties, rather than good business skills (they can of course coincide).[94]

Some of the most interesting innovative industries the last decades have been computer hardware and software industries and the Internet. A good example of lock-ins due to switching costs and investments made in learning have been examined by some scholars with reference to interface, OS[95] and "killer application" software, most notably spreadsheet programs.[96]

2.4 Summary

Products for which compatibility is important typically exhibit network effects. Their implications can be somewhat confusing and contradictory: Network effects are largely positive – the value of a network increases with the size and the overall economic welfare increases with the enhanced value for its customers (fax networks, ATMs). Since they are prone to end up in standardization where only one or a few technologies remain, they induce "the winner takes it all" standards races, conducted in various cooperative (standard-setting bodies) or not-so-cooperative ways (standards wars; VHS vs Betamax). But network effects can also lead to various kinds of market failures. Arbitrary decisions of early users can set a snowball in motion that has a decided influence on the standards race. The winner is thus often the first mover or the one with the best initial corporate strategies, rather than the provider of best technical alternative (although they luckily do not rule each other out). Once a standard is established, it may be very difficult to reverse the process or change to another (even a better) standard. Large segments of customers can be locked-in to an inferior standard, hampering technological advancement. Considerable market power is thus awarded to the winner of a standards race, who is liable to have a decisive influence on the nature or competition and technological advance for a long time.

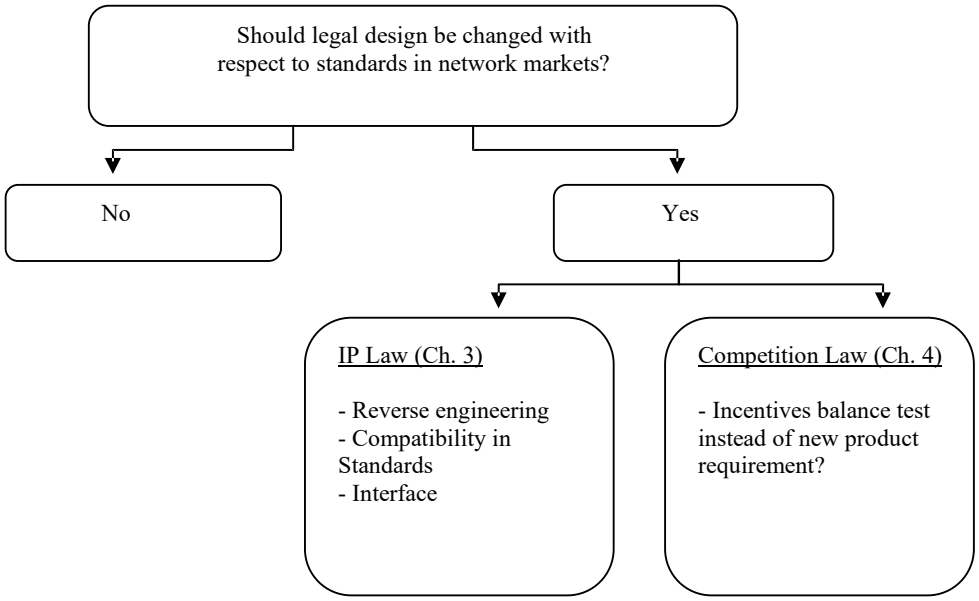
At the core of this is the question of compatibility. Entry barriers are significantly lower when compatibility is an option. To achieve compatibility and avoid many of the draw-backs and in uncertainty of standard wars, SSOs (of various degree) decide on a standard. Sometimes, not only will standardization may not emerge, but the technology category may take damage as such when there is a perceived disorder among various incompatible standards (Quadraphonic sound).

[94] Network effects are not restricted to innovative markets; moderate network effects were reported in yellow pages market in Rysman 2002.
[95] Gandal, Greenstein, & Salant, 1999; Goolsbee & Klenow, 2002.
[96] Brynjolfsson & Kemerer, 1996; Gandal, 1994, 1995.

3 Technical Standards and Intellectual Property

This chapter builds on the foregoing one, but adds an ingredient: intellectual property rights (IPRs). Essentially, while IPRs are pro-innovative and provide incentives for technological progress, they also tend set off other effects in the technical standards context. Legal and economic research suggest that they amplify network effects, reduce possibilities of compatibility, increase switching costs and the likelihood of monopoly-like situations in markets exhibiting network effects and as a consequence confer a market power without correlation to the level of inventiveness of the protected matter. That is why some claim a natural tension between IPRs and standards: While IPRs should afford protection, and prevent or regulate diffusion, standards are usually a means to make technology more accessible.[97] Contrary to this view, some authors claim that this opposition is superficial.[98]

A rough outline of the argument can be graphically described like this:



[97] For example Hart & Buttrick, 1995.
[98] Lea & Hall, 2004.

Still, no matter whether an "internal" IP solution or an "external" or "corrective" competition law measure is contemplated, the effects of this on the over all efficiency must be assessed, and more specifically what harms such measures would cause with respect to the incentives to innovate.

In this chapter, I will scrutinize what legal and economic research has to say about the effects of IPRs in standards and some possible IP law measures against the conundrum described above, already existing in law or suggested in legal/economic doctrine. Related to this, practices in contractual and other non-mandatory ways to ease the draw-backs of IPRs in standards will also be discussed.

3.1 Compatibility and IP Law

Many of the important product categories which exhibit network effects are high tech products entirely dependent on IPR protected components. The acquisition of the know-how necessary for an entry in most of the high tech markets is normally very costly. It is today almost impossible to develop a high tech product, such as an audio, video or software application, without involving one or – more likely – many IPRs. For example, at least 6313 essential patents by more than 70 different owners were notified in the UMTS standard-setting process.[99] (Note that several "non-essential" patents come on top of this figure).

The issue of compatibility[100] is at the heart of the matter, since compatibility decides the scope of a network, the art of the competition in general and the level of barriers of entry in particular. IPRs were deliberately left out of the account of compatibility in chapter 2.2 because the decision of compatibility or incompatibility may be a question of voluntary and unilateral corporate strategy, where both options are possible for the acting parties. If IPRs protect components essential to achieve compatibility, the choices are severely limited. (The options for the actors in several of the examples in the empirical account in section 2.3 were in fact restrained by IPRs).

A basic corollary of the issuing of an IPR is the freedom for the rights holder to choose how and by whom the IPR will be commercialized. Normally this is not controversial, since a monopoly in the economic sense of the word is not awarded the rights holder. Neither do standards (non-proprietary) confer any monopoly powers per se. However, when combined, IPRs in standards in markets with network effects could bring about crucial amplifications of market power, prone to lead to a monopoly in the economic sense of the word. Blocking and exclusion through IPRs in standards is a very real possibility.[101] The IPR holder can maintain a durable market power and make sure no real competition evolves, even if close or equivalent substitutes exist.[102]

[99] Bekkers & West, 2006.
[100] Or interoperability. The terms will be used with the same meaning.
[101] Shapiro, 2001, p 93. Besen & Farrell, 1994.
[102] Lemley & McGowan, 1998, p 523.

Because of this anomaly, which counters the normal logic of IP law, there is a natural case for contemplating whether IPRs should be limited in order to make compatibility possible between competing incompatible products in network markets. Three main strands of argumentation within the field of IP law can serve as helping categorizations, categorized after where the possible need for intervention lies: 1) Reverse engineering; 2) General access for compatibility with proprietary standards; 3) Limited protection of interface. Within the EU IP law framework, there are currently only legal documents concerning reverse engineering.

3.1.1 Reverse Engineering

In the patent law framework, the so-called research exemption enables legal reverse engineering. For copyright, the situation is different. Since copyright normally includes the right to reproduce, adapt, and translate, reverse engineering (or decompiling) to reveal code would be a copyright infringement. The introduction of so-called digital rights management (DRM) systems has added further intensity to the issue of reverse engineering. DRM systems use encryption or other technological means to restrict access to and uses of digital content.[103]

The importance of reverse engineering (and its copyright aspects) with respect to compatibility is to a certain extent acknowledged in the EU IP law framework. In the EU Software Directive,[104] article 6 limits the copyright owner's influence on his IPR, as his consent is not required in order to obtain information necessary to achieve interoperability. [105] The rights of the IPR owner is somewhat relaxed in order to make reverse engineering possible – but under strict conditions. However, compatibility would in most cases require the inclusion of copyright protected material, and the software directive does not mandate that. Further, the exact scope of this compatibility provision in the Software Directive is contested and there is no case law to shed more light on the matter.[106]

Compatibility is also mentioned as desirable in the recitals of the Copyright Directive from 2001:[107]

> In an increasingly networked environment, differences between technological measures could lead to an incompatibility of systems within the Community. Compatibility and interoperability of the different systems should be encouraged. It would be highly desirable to encourage the development of global systems.[108]

No "hard law" obligations follow this recital though. The Copyright Directive has an "anti-circumvention" provision in article 6(2), which –

[103] Weiser, 2003, p 563.
[104] Council Directive 91/250 (1991) on the legal protection of computer programs (the software directive) (OJ L 122/42).
[105] Recital 23 of the Software Directive states that the objective of article 6 is to "to make it possible to connect all components of a computer system, including those of different manufacturers, so that they can work together".
[106] Välimäki & Oksanen, 2006, p 563-564.
[107] Directive 2001/29 on the harmonisation of certain aspects of copyright and related rights in the information society.
[108] Recital 54.

according to recital 50 – should not prevent or inhibit article 6 of the Software Directive. However, the scope of the "circumventing" provisions and the possibilities of achieving interoperability through reverse engineering only, seem to be unclear.

The current legal position with respect to IP law seems to be that research as to how compatibility can be achieved *per se* may not be prevented by a copyright holder, and this, in my view, is probably comparable (and with the same practical effects) as the so-called research exception in patent law. [109] When the line to IPR intrusion and/or circumvention is crossed is not clear – but highly relevant.[110]

3.1.2 General Access for Compatibility With Proprietary Standards

Even if reverse engineering would be allowed without restrictions for both copyright and patents, access to IPR protected material needed to achieve actual compatibility is not provided for in any IP source of law. Reverse engineering does not open up standards as such to competition.[111]

The broadest and most radical solution to this would be to have a general IP exception with respect to technical standards in network markets. [112] This would have some similarities with the concept of trade mark degeneration, according to which a trademark that has become "customary in the current language or in […] established practices of trade" loses protection. [113] This calls for vigilance and carefulness from the part of branders, balancing on a thin line investing in a trade mark while not making the term generic. A standards analogy would be that when an IPR becomes part of a network market standard, it would lose its protection. It has been argued that in most cases, due to network effects, the investment would have been sufficiently recouped at this stage. [114] Others are more wary of the disincentives it could provide, and suggest a provision requiring the IPR owner to issue a compulsory license on FRAND terms.[115]

No current legal IP document is anywhere near this reasoning. However, an approach with some similar traits was contemplated in France with respect to DRM systems when implementing the Copyright Directive into French law. Mandatory compatibility though compulsory licensing on

[109] Consumer protection law perspective might be a another possible factor in assessing DRM systems, see Välimäki & Oksanen, 2006, pp 562-562, 566-567, with reference to the actions of several Nordic consumer protection agencies.
[110] In the draft EU Software Patent Directive (down-voted) there were wordings suggesting that software patent would not be able to prevent research on compatibility. (See Article 6 of Common Position (EC) No 20/2005 from the Council concerning patentability of computer-implemented inventions. OJ C144E/02.
[111] Lemley & McGowan, 1998, p 530.
[112] This point has been argued by Koelman, 2006; similarly by Samuelson, 2006a; See also Weiser, 2003, p. 606-607.
[113] See for example Article 7 of the 1993 Regulation on the Community Trade Mark, Council Regulation No 40/94.
[114] Weiser, 2003, p 606-607.
[115] Koelman, 2006, p 10.

FRAND terms was drafted and put before the legislature, which voted it down. The final wording left room to force information necessary for interoperability on a case-by-case basis.[116] [117]

3.1.3 Limited Protection of Interface

A more limited but more frequently proposed suggestion concerns computer interface. The computerization of large parts of the economy have made the importance of interface aspects hard to overestimate. Farrell & Shapiro (two of the recurring writers within the field) point out why this fact has special implications for the IP system, in connection to network market characteristics:

> First, copyrighted computer software, such as Microsoft Windows, can have far greater economic significance than any single book, musical composition, or movie. Second, copyrights can interact with network effects/interfaces and turn what might initially have been rather "arbitrary" choices (with many alternatives) into "essential" choices (with no good alternatives) once users standardize on a product or interface. The greatest power seems to result when the design choices protected by copyright define an *interface* that lets other software be compatible with the copyrighted software in question. If network effects are strong, a copyright including interface protocols can thus confer a good deal of market power.[118]

However, no IP law provisions regulate (or restrict) IP in interface as a special phenomenon distinguishable from other IPRs. Restrictions or limitations have been suggested in doctrine though.[119]

3.2 Static and Dynamic Efficiency

To require the opening up of a proprietary standard is naturally a severe limitation of an IPR, and – in line with the justifications of IP law as such – could only come in question when the overall benefits outweighs the costs. The best place to begin an assessment of various design options in IP law is probably to take a step back and briefly enter from the angle from which the phenomenon of IP becomes interesting for this thesis in the first place: the question of how to promote overall efficiency and welfare. There are two important "main strands" as to how this is best achieved: the static and the dynamic approach.

Static efficiency is achieved through companies competing within an existing technology. It concerns "price and quality" competition. In a policy promoting static efficiency, incentives are provided for companies to refine their production methods, cut costs, and in the long run the idea is that the

[116] Välimäki & Oksanen, 2006, p 564-565; Koelman, 2006, p 13.
[117] When considering compulsory licensing as a possible remedy, one should note that for patents, it is excluded for the first three years according to the Paris Convention. As for copyright, the Berne Convention stipulate a limited number of "free uses" and states that other exceptions should only be permitted when they do not prejudice the legitimate interests of the author Art. 9(2). Other requirements are provided for in the TRIPS agreement, art 31.
[118] Farrell & Shapiro, 2004, p 8.
[119] Farrell & Shapiro, 2004; Lemley & McGowan, 1998, p 531-537.

price of a product using a particular technology should be closing in on the cost per unit of production. This makes static efficiency attractive in an immediate way from a consumer point of view. Some of the most influential competition (anti-trust) schools of the last century have been promoting static efficiency as a means to promote (consumer) welfare.[120]

Dynamic efficiency is achieved through promoting innovation and technological change. Economic theory in the latest decades has increasingly acknowledged the gains from dynamic efficiency – also for consumers, even though the incentives employed to promote innovation usually lead to higher prices (at least initially).[121] Dynamic efficiency theorists of this new wave who want to sport some historical knowledge are in the habit of kicking off with the writings of Joseph Schumpeter. He was one of the first economists to write on the subject of innovation and competition. The resurrection of Schumpeter has lead to the re-introduction of the concept of "creative destruction", which he argued represented the core of capitalist competition.[122] In an often-quoted passage, he argues that:

> […] in capitalist reality as distinguished from its textbook picture, it is not that kind of competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization […] – competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.[123]

The threat of competition in the new commodity is a sword hanging even over a monopolist, forcing him to react to even a mere threat at an early stage, making even potential competition a strong incentive to innovate (likely in a pro-consumer direction). The profits of the existing companies (and with them likely the companies themselves) will be creatively destroyed by a "wave" of new entrepreneurial entrants, for the good of society as a whole.

There is of course an intrinsic tension between the static and dynamic approaches. In promoting static efficiency, competitors should be encouraged to quickly adopt any technological progress another competitor has made and start the price-quality race towards marginal cost. This, however, is naturally a deterrent to innovation (which, of course, is why IP law was drafted).

The conundrum is finding at what point the short-term draw-backs of dynamic efficiency promotion is recouped well enough by the benefits

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[120] The Chicago School of Anti-Trust (influential from late 1970s, mainly in the U.S.) taught that the only legitimate goal of the antitrust laws was to promote consumer welfare. Thus, judgments influenced of this school of competition law thinking tended to define legality or illegality by the *effects* on the consumers (*not* categories of behaviours and actions, such as predatory pricing). See Piraino 2007, p 346-347; Langlois, 1999, p 1-15.

[121] That IPRs leads to an initial price increase and choice reduction is widely acknowledged; see for example Landes & Posner, 1989, p 333.

[122] Schumpeter, 1942, p 59-165; the quote on p 84. An anecdotal point is that Schumpeter believed that this creative destruction along with other similar traits of capitalism would eventually lead to socialism (which was something the conservative Schumpeter was certainly not wishing for).

[123] Schumpeter, 1942, p 84.

arising out of the technically more advanced (but costlier) products that follow. Naturally, IP law has to be drafted without reversing the incentives, as too strong protection (broad, long, without exceptions) might discourage innovation (for other firms) rather than promote it – at the very least in certain markets and industries. The interests of the inventor have to be balanced against the interests of competitors and consumers.

Consequently, there are some built-in limitations or qualifications. Copyright only protects a certain expression, not the underlying idea. [124] A patent protects an idea, if it meets the criteria of novelty, non-obviousness and inventive step and is disclosed. Both these leave lots of room for similar expressions and ideas in the same field or toward the same end. No monopoly situation normally arises through the existence or exercise of an IPR, because of these possibilities of creating solutions that circumvent the protected matter.

3.3 Breadth, Leangth and Inviolability of the Protection

How does intrusions in proprietary standards affect the incentives structure in the IPR system at large? The "question behind the question" in section 3.1 is then whether IPRs in standards can actually be more costly than beneficial over all, and if it might reduce, or reverse, incentives to innovate and thus frustrate rather than promote technical advance. The compatibility standards aspect is part of the long-standing disagreement on the whole IPR system between the proponents of strong IPRs, and the sceptics pointing at other factors as being equally or more important than IPRs in promoting innovation. Some sceptics even suggest that strong IPRs in this area can be anti-innovative, arguing that potential innovations are blocked by the IPRs of foregoing generation of inventions. Since this is of interest when contemplating the possible merits of making IP restrictions with respect to standards, I will give an account of how the proponents of such an intervention reason.

The sceptics of the IPR system are emphasizing the cumulative environment, stressing that very few inventions are standing only on their own merit and owe much of its success to other inventions. Inventors inspire each other, exchange information and occasionally copy each other's results. Often, essentially similar technologies are developed simultaneously, with complementary qualities towards the same major

[124] A number of further "fair use" doctrines further makes copyright less rigid; of importance is the US "merger doctrine", which holds "that if there is only one or a very small number of ways to express an idea, copyright protection will generally be unavailable to that way or those few ways in order to avoid protecting the idea. […] While most merger cases involve works that are uncopyrightable when first created, […] some cases have held that an initially copyrightable work may be disqualified for copyright protection over time", Samuelson, 2006a, p 16.

purpose and existing inventions are frequently used as the outset for research on improvements.[125] Scotchmer puts it like this:

> Most economic literature on patenting and patent races has looked at innovations in isolation, without focusing on the externalities or spillovers that early innovators confer on later innovators. But the cumulative nature of research poses problems for the optimal design of patent law that are not addressed by that perspective. The challenge is to reward early innovators, but to reward later innovators adequately for their improvements and new products as well.[126]

When many similar (possibly also simultaneous and complementary) patents are accumulated, as the case is for many standards, an overview can be hard to reach, infringement charges may be hanging swords over many patents. Merges & Nelson have studied several cases of the impact of strong IPRs on follow-on innovation and argue that innovation has been obstructed in a number of cumulative innovation markets due to strong IPRs.[127] The way in which patent policy is being shaped has also changed, with a large number of patenting being issued in the information technology sector.[128] Shapiro has referred to it as a "patent thicket": "a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology".[129] A key issue is the patent breadth or patent scope. In industries where a very high number of patents are being applied for and issued, the danger of infringing one or more patents might be a deterrent for companies contemplating the introduction of a product.[130]

The "open source" phenomenon is of interest here, providing empirical experience contradicting the prevailing "incentives school" traditionally justifying IPRs. Open source is not only embraced by enthusiastic youngsters for ideological (or at least idealistic) reasons; some important actors formerly relying on proprietary standards have chosen to switch to open source strategies on pragmatic grounds. An interesting example is IBM, which was once a very fierce proponent of strong IPRs. [131] While IBM still develops and licenses proprietary software, it also contributes significantly to open source projects with both substantial investment (100 million $ a year) as well as donation of proprietary technology from its IPR portfolio to open source projects such as the OS Linux. [132] Samuelson argues a number of reasons for this: First of all, the lessons of company history

[125] Encaoua & Hollander, 2002, p 74.
[126] Scotchmer, 1991, p 30.
[127] Merges & Nelson, 1990 and 1994.
[128] Farrell & Shapiro, 2004, p 15.
[129] Shapiro, 2001, p 1-2.
[130] Shapiro, 2001, p 8. Business insiders have also raised similar concerns especially with reference to patentability of business methods which easily can be very broad and general. See for example Amazon.com's CEO quoted in Encaoua & Hollander, 2002, p 73 and Shapiro 2001 p 2.
[131] In 1984, IBM was subject to a competition law investigation by the Commission with similarities to the currently pending *Microsoft* case. For reasons of brevity, that case is left out of this thesis, see press release IP/84/291 and [1984]3 CMLR 255.
[132] Samuelson, 2006b, p 21.

might have caused a anti-Microsoft strategy.[133] Another factor for IBM's embrace of open source might be that it is less expensive than proprietary software, also in the sense that the cost of developing and improving the system can be shared among a large number of contributors (and, as in the case of Linux, that the costly start-up was already done when IBM started to support it). Today, apart from IBM, Nokia, Intel and Hitachi are also contributing to the development of Linux.[134]

However, open source applications are extremely unlikely to drive proprietary standards (OS) out of the market anytime soon, and the phenomenon is limited to specific technology areas (computer software and OS). In the following subchapter, I will examine the ways in which the draw-backs of the "patent thicket" have been handled through contractual arrangements.

3.4 Cross-Licensing, Patent-Pools and SSOs

This section considers various contractual remedies to the problems caused by network effects and "patent thickets". Licensing is the typical way in which IPR diffusion (and hence access) takes place. With proper licensing system, both innovation (through IPRs) and diffusion (through licensing) could be achieved without legal intervention. The patterns in which licensing takes place seem to vary from industry to industry.[135] IPRs are usually "bargaining chips" in the licensing and/or standard-setting process, with which companies can obtain cross-licenses or other rewards from having its own technology included. Often, a firm without patents to offer has less chances of getting access to the standard. [136] The transaction costs of each party doing this on its own bilaterally with every single stakeholder company would of course be immense. There are two (although related) kinds of transaction costs that are of importance here: The first one is the hold-up problem (the expensive and potentially obstructive hold-up problems of the "patent thickets" problems discussed in the foregoing chapter). The second is the complements problem: a certain solution might require the coordination of a large number of patents (most commonly sorted out through a patent-pool).[137]

[133] In the 1980s, IBM's PCs came with a licensed OS from Microsoft. The IBM computers were challenged by other companies (Dell, Compaq etc) also with the Microsoft OS licensed and thus interoperable with software written originally for the IBM PC. When IBM tried to launch its own OS/2 (at first in cooperation with Microsoft) it failed largely because it was not compatible with Microsoft's OS in the end (Microsoft abandoned the OS/2 project after the success of its Windows 3.0 OS). IBM abandoned its OS, but by investing in Linux, IBM is able to be independent of Microsoft's licensing terms and policy on disclosure (or non-disclosure) of interface information. See Samuelson, 2006b, p 22-24.
[134] Samuelson, 2006b, p 24.
[135] Farrell & Shapiro, 2004, p 20.
[136] Bekkers, 2004, p 2.
[137] Shapiro, 2001, p 8.

Standard-setting organizations, cross-licensing arrangements and patent-pools are ways to reduce both these kinds of transaction costs and further facilitate the kind of access to standards that constitute the ground for the "IPR sceptics'" calls for legal intervention. It can also affect market outcomes: if members of a cooperative effort (be it through an SSO, cross-licensing or patent pool) together have a reasonable market share, their combined effort can be likely to tip the market in their favour.[138]

SSOs take a number of measures to clear the field, particularly two points are of major interest: One is that the participating companies frequently are required to disclose what IPRs they possess that might come in question for inclusion in the standard. The other is that they sometimes have to agree before to license any essential IPRs on "fair, reasonable and non-discriminatory" (FRAND) terms.[139] Naturally, there is no agreement as to what that is.[140]

It is in the business interest of an IPR holder to have its subject matter included in a standard, as that would typically generate far greater revenues if included in a widespread standard. If a standard is adopted which is later on found to infringe a certain companies IPR, then that firm suddenly has decisive market power (especially if there are considerable sunk costs and network effects and lock-in has made switching costs high). This has sometimes been referred to as the "patent ambush" problem (also "hidden IPRs").[141]

Two main problems are that first of all, it might not always be possible to have a complete overview of a company's complete IPR portfolio. Secondly, there are a number of good reasons for not disclosing pending patent applications.

Do companies involved in standard-setting procedures have a legal duty to disclose information to the other members of the standard-setting organization about their patent or patent applications? The question is more of competition law relevance, but the situation there seems only clear in parts. In telecommunications, the Access Directive mandates national authorities to order access to key technologies needed for interoperability. [142] But since this only regulates a certain branch of industry, no general legal

[138] McGowan & Lemley, 1998, p 516.
[139] Farrell & Shapiro, 2004, 29-30.
[140] That must not mean that agreement is always hard to reach: One success story from this point of view (low licensing) is the case of the USB promoted by Intel, where the participants agreed to give access to their patents free-of-charge or on a low-royalty basis. The licensing terms of the USB includes an obligation not to assert essential patents against other manufacturers of USB-compliant devices and the standard was kept accessible also to Apple computers (and others), see Farrell & Shapiro, 2004, p 31. They also note that the reasons for this need naturally not be altruistic; for example, Intel has a strong position on the complementary microprocessor market.
[141] Related to this are so called "submarine patents", taking a very long time (years, decades…) to go through the patent system. Shapiro, 2001, p 3.
[142] Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, OJ L 108/7, art, 4-5, 8, and 12.

conclusion, which increases the importance of contractual obligations in the wake of IP law.[143]

3.5 Analysis

3.5.1 Is the Incentives Structure of the IP Framwork Altered in a Network Market?

It seems well-founded that network effects to a certain extent alters market outcomes in important branches of industry. This can certainly provide an extra reward, on top of the reward typically offered by the IP system (or, conversely, a reward even without IPR protection). Seen from a perspective of the foundations of IP law (the promotion of creativity and innovation), one has to conclude that in network markets, a substantial amount of the reward a holder of an IPR protected standard obtains has little to do with the inventiveness of his IPR protected matter but rather arises from properties of the market itself. This could very well alter the point at which innovative incentive balanced against industrial competition.

I think it is fair to say that the nature of the IP system has changed in recent decades in important areas and aspects – especially the changing role of copyright. Copyright has always been important for film and literature publishing. Patents have been the IP royal road for sectors in rapid technological advancement. In the so-called information economy, copyright has somehow come to be an important driver of technological development than it arguably was in the "traditional" economy. This has implications which the design of copyright law probably was not meant to have (the lifetime-plus-seventy-years protections period is of course ridiculous for software products).

There are also practical problems of changing nature: Unlike the "traditional" industries, the low cost entry in forms of price of imitation in for example software and music is also a threat against which the copyright protection obviously is not always able to protect. Many of the "modern" industries in which copyright is an issue, the possibilities to copy a product at low cost are virtually unlimited. This has changed the way in which copyright can be enforced. It has of course been of great concern and worry to the film and music industry and has lead to so-called digital rights management systems (DRM), which in various ways tries to complete the legal protection with technological barriers to unauthorized copying.

These DRM systems – with their plethora of technological restrictions as to use and interoperability – have made the question of compatibility all the more important, from the view of the consumer as well as the competitor or potential entrant. The increasing number of IPRs being required to compile a high tech product can create similar concerns.

In my view, the problems above are to large extent caused by the inadequateness of copyright in many of the sectors (interface, OS, software)

[143] Shapiro, 2001, p 22.

where they have come to play an important role. Attempts have been made to redress this with a *sui generis* protection system (e.g. "software patent"), but they have so far been futile. Hopefully that will change. A more "patent-like" approach would probably solve many of these problems. With consideration to the typical lifetime of a digital product and the signs of a different incentives structure than in traditional markets, this "patent-like" *sui generis* system would probably need to have shorter protection period than ordinary patents.

3.5.2 Should IP Limitations be Introduced for Standards?

This chapter up until now might have hinted towards a position supporting serious intrusions in the IP framework. Although the theoretical case of all the three categorizations of IP limitations above have clear merits and are well-founded enough to contemplate seriously, I see clear practical problems which calls for conservatism when contemplating any change.

This goes especially the more far-reaching one (general IP exemption for standards), against which I raise two more precise concerns. The first objection has to do with classification and identification. Again, even if the case for loosening IP in standards might be reasonable enough, there can be no general certainty as to when this theoretical case occurs and in what particular markets and products. It seems very hard do decisively distinguish network effect markets from other "traditional" and "normal" markets and different generations of products and production of middleware might also rapidly increase this uncertainty. Perhaps more importantly, network effects are in general a positive effect adding value, not at all necessarily an unwanted market failure. One also has to take into account *who* is to make the judgment. Whether the patenting authorities or the courts, the judgement will be based on more or less arbitrary assessments and risk being both unfair and unsound. If the wrong decisions are taken in this, the incentives structure can be *severely* damaged.

My second major objection emanates from the perhaps confusing semantics prevailing in the field. O*ne* standard and might be the vehicle through which *standardization* of a certain product category takes place. It is only when the standard is the prevailing solution in the market (the industry standard) that an IPR limitation has any merit (and, for the sake of clarity, that is also the position held by the proponents of that particular approach). However, it would be very hard to generally determine at what point and by what criteria *a* standard becomes *the* standard.

As for reverse engineering, the circumvention ban in the copyright directive seems to counter the "inventing-around" paths that otherwise could be taken . Legal and commercially meaningful reverse engineering would be a case in the unclear gorge between the provisions banning "circumvention" (art 6 Copyright Directive) and an IPR infringement case. There are likely severe limits in making a product compatible through reverse engineering only without involving IPR.

That problem as well as the interface concerns are a part of the major problem mentioned above; that copyright is not drafted for those kinds of products. With respect to interface, they often contain easy one-word notions that might be very hard to duplicate. Interface has already been tried in the US in analogy with the "fair use" doctrines.[144] It would be conceivable to limit copyright with respect to such interface commands. Especially since there is empirical support (although more has to be accumulated here to merit a firm conclusion) that incentives for proprietary technologies might be lower in the software industry.

The main problem here is not limited to standards though, but a part of the tension arising out of the generally changed role of copyright. If a software patent (including interface and OS) with a relatively short protection time were introduced, some of the pains of standards would be relieved (and the merits of this solution would not be limited to a standards context).

In conclusion, a general IP exemption would be far too broad. Before repairing, a realistic assessment of the actual practical (not theoretical and/or hypothetical) problems would be in place. In my view, the contractual arrangements in patent-pools and SSOs normally goes a long way. [145] There is of course a residual post of market dead-lock situations where an IP intrusion might have to be mandated (especially with respect to single-firm de facto standards with vertical integration). These would probably be few – but important – examples and a specific market anomaly rather than a general IP problem, which would be better dealt with through competition law intervention.

[144] For example in Lotus Development Corp. v. Borland International, 49 F.3d 807 (1st Cir. 1995).

[145] Perhaps tighter limits arrangements can solve some of the problems in SSOs. Are really over 6000 patents *essential* for the UMTS standard?

4 Technical Standards and EC Competition Law

The issue of standards and compatibility can obviously raise competition law concerns. So far, most of the interference in standard-setting have been through competition law and that order seems likely to continue. [146] When interacting with IP law, competition law measures can have wide implications for the overall incentives structure and very likely the overall output. Encaoua & Hollander have pointed out three channels through which competition law is prone to affect economic welfare: 1) intensity of the race to innovate, 2) competition in the product market 3) competition in the licensing market.[147]

In this chapter, I will examine how standards are treated in the EC competition law framework. The outline will follow the two main provisions of EC competition law.

4.1 Article 81

Article 81 prohibits agreements between undertakings that may affect trade between EC Member States and that have as their object or effect the prevention, restriction, or distortion of competition within the common market. The restriction must be appreciable. Such restrictions are automatically void according to Article 81(2). Article 81 is of special interest for technical standards developed through SSOs, patent-polls and cross-licensing.

Agreements as those above may however be lawful if they meet the criteria of Article 81(3): a) the agreement fosters technical or economic progress b) it is indispensable to achieve such progress c) it benefits consumers, and d) do not completely exclude competition.

4.1.1 Communication and Guidelines

Since the competition law provisions in the EC Treaty are somewhat vague and without an obvious and precise interpretation, the Commission has issued a number of guiding documents.

The Commission published a Communication in 1992, "Intellectual Property Rights and Standardization",[148] treating the public benefits of using industry standards and the public benefits arising out of promoting IPRs. A set of "best practice" guidelines were given, with the following main points: A) No standard should include an IPR, which the rights holder is not prepared to license. B) Standards should be available for use on FRAND

[146] Lueder, 2005.
[147] Encaoua & Hollander, 2002, p 65.
[148] COM (92) 445 final.

licensing terms from the IPR owners. C) A SSO and the IPR holder should each use best efforts to identify relevant IPRs applicable to any standards.

The general "Guidelines on Horizontal Cooperation Agreements" of 2001 has a section concerning agreements on standards.[149]

In line with the appreciably criterion in article 81, standards that cover only a negligible part of the relevant market are normally not restricting competition. Outside the scope of Article 81 are, according to the guidelines, also those agreements where participation is unrestricted and transparent and which are either without any obligation to comply, or – if an obligation to comply in fact exists – are part of a wider agreement to ensure compatibility of products.[150] Contrary examples of standards agreements that almost always are unlawful with respect to Article 81 are those "that use a standard as a means amongst other parts of a broader restrictive agreement aimed at excluding actual or potential competitors".[151] Then there are agreements that might be unlawful under certain circumstances. Such agreements could be those that "grant the parties joint control over production and/or innovation, thereby restricting their ability to compete on product characteristics, while affecting third parties like suppliers or purchasers".[152] These must be assessed taken into account "the nature of the standard and its likely effect on the markets concerned, on the one hand, and the scope of possible restrictions that go beyond the primary objective of standardization, as defined above, on the other." [153] The Guidelines further state that "[s]tandardization agreements may restrict competition where they prevent the parties from either developing alternative standards or commercialising products that do not comply with the standard"[154] and especially mentions that barriers of entry will be of importance in the judgement.[155]

According to the Guidelines, standardization agreements can have effect on three markets: 1) The product market to which the standard relates; 2) The service market for standard setting; and 3) the market for testing and certification.[156]

A standards agreement may of course also benefit from the exception provided for in **Article 81(3)**. The Guidelines deal with the conditions that have to be met for the applicability of the exemption.

Concerning the economic benefits (that concerns two of the conditions of Article 81(3)), the principally positive approach of the EC Commission to agreements "that promote economic interpenetration" or "encourage the development of new markets and improved supply conditions" are reiterated in the guidelines. This can only be achieved given that the standards are

[149] Guidelines on Horizontal Agreements, para 159-178.
[150] Guidelines on Horizontal Agreements, para 163-164.
[151] Guidelines on Horizontal Agreements, para 165.
[152] Guidelines on Horizontal Agreements, para 166.
[153] Guidelines on Horizontal Agreements, para 166.
[154] Guidelines on Horizontal Agreements, para 167.
[155] Guidelines on Horizontal Agreements, para 168.
[156] Guidelines on Horizontal Agreements, para 161.

available for those who wish to accede and that they are transparent.[157] When assessing the effects of standardization on innovation, the assessment should be assessed on a case-by-case basis depending on the lifetime of the products in question and what stage the market development is (fast growing, growing, stagnant). If a new standard may "trigger unduly rapid obsolescence of existing products", the parties may have to provide "evidence that the collective standardization is efficiency-enhancing for the consumer".[158]

With reference to the indispensability criterion, the guidelines state that standardization agreements should be separated from related topics, such as R&D and commercialization. All competitors affected by the standard should be able to participate in the discussions, and "[i]n any event, it must be justifiable why one standard is chosen over another."[159] "It should be very clearly demonstrated why it is indispensable to the emergence of the economic benefits that an agreement to disseminate a standard in an industry where only one competitor offers an alternative should oblige the parties to the agreement to boycott the alternative" [160] (the agreement must not eliminate competition on the market.)[161]

4.1.2 Cases

4.1.2.1 Philips VCR

The VCR market went through crucial developments in the 1970s (see above section 2.3). Questions relating to the VCR standard came before the European Commission in 1977 in the Philips VCR case.[162]

At issue was a "basic agreement" on "uniform application of technical standards for the VCR system" and a "supplementary letter" to that agreement.[163] The main agreement was a cross-licensing agreement between Philips and five other German undertakings, all important consumer electronics firms with interest in the VCR market. In order to assure compatibility, the agreement provided for the exclusive use of one technical standard. The parties granted each other royalty-free, non-exclusive and non-transferable licences to their patents affecting the compatibility, and other VCR manufacturers would be free to join the agreement. [164] No

[157] Guidelines on Horizontal Agreements, para 169.
[158] Guidelines on Horizontal Agreements, para 170.
[159] Guidelines on Horizontal Agreements, para 171-172.
[160] Guidelines on Horizontal Agreements, para 173.
[161] There are also block exemptions. "Standards on entirely new products may raise issues similar to those raised for R & D agreements." (Guidelines on Horizontal Agreements, para 161.) Thus, the R&D Regulation may be relevant for standards as well (Regulation 2659/2000 of November 29, 2000, OJ No L 304/7).
[162] Commission Decision of 20 December 1977 relating to a proceeding under Article 81 of the EEC Treaty, OJ No L 47, 18/1/1978, p.42-47. Hereinafter referred to as "*Philips VCR*".
[163] *Philips VCR*, para 8.
[164] *Philips VCR*, para 12-13. The supplementary letter, signed at the same time, contained obligations to make sure that branches of the companies outside Germany also honoured the agreement and those undertakings would in that case also benefit from the cross-

changes to this agreement were allowed without the consent of all the parties.[165]

At the time, only Philips and Sony had developed full marketable VCR systems.[166] They licensed their systems to various licensees independently and the systems were incompatible.[167] In the preamble of the basic agreement, it was emphasized that the parties to the agreement have chosen to use Philips VCR standard and it stipulates the adoption of the whole Philips system by the other parties.[168]

Philips' market share was according to the Commission "pre-eminent", considerably larger than Sony's, and the two competing standards providers' together accounted for more than 70% of the sales in the common market.[169]

The Commission held that the agreement constituted an infringement of article 81(1). Two main factors were highlighted: the clauses concerning exclusion of other standards, and the licensing terms themselves. The parties to the agreement were "obliged to manufacture and distribute only cassettes and recorders conforming to the VCR system licensed by Philips" and neither allowed to use another system at the same time, nor switch system, as long as the agreement continued. [170] The provision of the licensing agreement concerning termination was of special concern to the Commission, with respect to Philips' market power as the leading licensor at the time. The terminating party would have its licenses to the other parties' patents cancelled, while the licenses on the terminating party's own patents would continue to run royalty-free.[171]

The affect on trade between member states was also held to be mainly due to the fact that it concerned a new product, which had not yet reached all of its potential customers. Tying these undertakings to Philips VCR system would influence the sales organisation and affect the trade between member states.[172]

The Commission also explored the possible benefit of the exception in article 81(3). It affirmed that an agreement of this kind could have large benefits for the consumers in terms of compatibility and that licensing agreements of this kind normally contribute to technical progress. However, the Commission argued that "no significant improvement in production or distribution was achieved since compliance with the VCR standards led to the exclusion of other, perhaps better, systems." [173] The Commission stated that the exclusionary provisions, the ban on sales of other systems and the

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licensing arrangement as long as they licensed their patents to the other parties of the agreement on the same terms.

[165] *Philips VCR*, para 11.
[166] *Philips VCR*, para 5.
[167] *Philips VCR*, para 7.
[168] *Philips VCR*, para 9.
[169] *Philips VCR*, para 6.
[170] *Philips VCR*, para 23.
[171] *Philips VCR*, para 24-25.
[172] *Philips VCR*, para 26.
[173] *Philips VCR*, para 29.

obligation to adhere to that standard only, were not indispensable to the attainment of compatibility.[174]

4.1.2.2 X/Open Group

An OS (Unix) possible to use for a "mix and match" of several hardware and software suppliers was developed by AT&T in the 1970s. The principal objective of the X/Open Group, a group of nine large European information technology companies, was to take advantage of the portability (the ability to move the system from hardware to hardware with littler or no modification) of Unix to establish a standard interface to increase the volume of applications available on the members computer systems. Group decisions were to be taken through simple majority and group admission was subject to majority vote among the members and to industry requirements (information technology companies).[175]

The Commission[176] pointed out that there was no obligation for the members of the group to design their computers in accordance with the version of Unix in question. [177] The membership criteria and requirement of majority decision was however of greater concern, but the Commission exempted the membership restrictions according to article 81(3). The overall balance tipped in favour of an exemption due to "the Group's professed aim of making available as widely and quickly as possible the results of the cooperation" and that restriction of membership was necessary for practical and logistical reasons.[178]

4.1.2.3 APS

In the 1990s, a joint attempt to introduce a new industry standard for cameras, films, and photo-finishing equipment was made. This is known as Advanced Photographic System (APS). Canon, Kodak, Minolta, Nikon, and later also Fuji, took part of the development. These are all major actors in the global photography market, and the inclusion of all of them was motivated with the difficulties in developing the standard.[179] The Commission was notified of the cooperation in July 1993, and cleared it in April 1998, after requiring some changes in the arrangements[180]

An important concern to the Commission seems to have been third party access. In order for this to be commercially viable, a certain allowance in time for competitors was required by the Commission. The notifying parties agreed to change their agreements by "granting licences to third parties two years before the date of the introduction of the APS and well before the end of its development".[181]

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[174] *Philips VCR*, para 31.
[175] Commission decision of 15 December 1986 in case IV/31.458 X/Open Group, OJ No L 35, 6.2.1986, p. 36. Hereinafter referred to as "*X/Open Group*", para 11-12, 34.
[176] Commission decision of 15 December 1986 in case IV/31.458 X/Open Group, OJ No L 35, 6.2.1986, p. 36. Hereinafter referred to as "*X/Open Group*".
[177] *X/Open Group*, para 30.
[178] *X/Open Group*, para 45.
[179] Press release IP/98/353 of 15 April 1998.
[180] Press release IP/98/353 of 15 April 1998.
[181] Press release IP/98/353 of 15 April 1998.

In addition, "the Commission also arranged for licensees to receive technical know-how and help on a considerably larger scale than initially envisaged."[182]

After complying with these changes, the notified agreements met the Commission's requirements to ensure full competition: "securing a transparent and fair licensing system and technical assistance between the parties and potential licensees".[183]

4.1.2.4 DVD

The digitalization of the audio standard had proven a success with the CD almost completely making the analogue vinyl standard obsolete. A digitalization of the video system was a natural technological step. With the experiences from the VCR standards war and the rather successful cooperation on the development of the CD standard, it was at first not clear whether there would be another standards war or another cooperative effort between the large consumer electronics firms.[184] A couple of different standards were developed simultaneously. Notably, Sony and Philips jointly developed a standard which was compatible with the CD standard with a one sided disc much resembling the CD (Sony and Philips, being the main developers and licensors of the CD standard, owned the essential patents for that standard[185]). Toshiba had developed another system, among other things with a two-sided disc, while also using many of the applications of the CD standard (thus, in any case, being dependant on licensing from Sony and Philips).[186] The dispute was solved through a compromise in which elements of both technologies were included.[187]

A set of agreements on a patent pool, which Toshiba administered, were submitted to the Commission in May 1999.[188] The parties to the agreements were, apart from Toshiba, Hitachi, Matsushita, Mitsubishi, and Time Warner.[189] (Thus other important DVD technology players were not participating, notably Philips, Sony, Pioneer, and Thomson, which Commission later pointed out[190]). Toshiba pledged to grant a license "to any firm wishing to implement the DVD specifications" and also something of a "most favoured license term".[191] The Commission cleared the agreements in October 2000 and issued a comfort letter. The patent pool "would help promote technical and economic progress by allowing quick and efficient

[182] Press release IP/98/353 of 15 April 1998.
[183] Press release IP/98/353 of 15 April 1998. Later the same year, the MGEG-2 standard licensing arrangement was cleared by the Commission with similar motivation, see Press release IP/98/1155 of 18 December 1998.
[184] "Sony decision could cause standards war", *Managing Intellectual Property,* April 1995, Vol 48, p 7.
[185] Id. p 8.
[186] Id., p 7-8.
[187] McGowan & Lemley, 1998, p 516.
[188] Case No IV/C-3/37.506, OJ 1999/C 242/04 p 5.
[189] Id.
[190] Press release IP/00/1135 of 9 October 2000.
[191] "all of the licensees under the scheme will be informed if any other party is granted more favourable royalty terms, so that their licences may be amended to reflect those terms", OJ 1999/C 242/04 p 6.

introduction of the DVD technology" and it did not contain unnecessary or excessive restrictions on competition.[192]

4.1.2.5 3G

In July 2000, a group of companies ("The 3G Patent Platform Partnership", including several major telecommunications companies) submitted a set of agreements concerning essential 3G patents. The agreements contained "procedures to identify whether a patent is essential, to streamline the licensing of those who are deemed essential and to reduce the overall licence fees to be paid for the entire portfolio of essential patents".[193]

Two more specific circumstances lead to the approval of the Commission. The first circumstance was that the inter-technology competition was maintained. The 3G technology is defined in the so-called IMT-2000 standard, which comprises five different technologies with different essential patents, but which all can be used to produce 3G equipment. The Commission pointed out that since "a patent that is essential for using a particular technology may still compete with a patent that is essential for using another technology if the two technologies compete. Therefore, in assessing licensing agreements for 3G equipment the Commission must ensure that competition between those essential patents that compete is maintained."[194] In order to achieve this, the parties agreed to establish separate sets of arrangements for each technology, instead of combining all essential patents in one single platform.

Some statements of general concern were given:

> clearance under antitrust rules requires that each licensing agreement is limited to essential patents only, that the agreements do not foreclose competition in related or downstream markets, licensing should be carried out under nondiscriminatory terms and competitively sensitive information is not exchanged. Furthermore, 3G manufacturers should not be forced to pay for patents rights other than those that they really need. Finally, the licensing arrangements should not discourage further R&D and innovation in the mobile communications sector.[195]

The second circumstance to be stressed was that many of the major 3G essential patent holders (Ericsson, Nokia, Motorola, and Qualcomm were mentioned) were not parties to the arrangements in question. Since a significant number of essential patents remained outside of the notified arrangement, the Commission concluded that it appears unlikely that the approval of the notified arrangement would restrict "the competitive offer of 3G mobile technologies and 3G services to consumers".[196]

The Commission, however, seem to have stressed the *in casu* character of its comfort letter: "the scope of this letter is limited to the notified agreements and does not extend to any other industry initiatives or decisions of 3G standard setting bodies and industry working groups" and that "any

[192] Press release IP/00/1135 of 9 October 2000.
[193] Press release IP/02/1651 of 12 November 2002.
[194] Press release IP/02/1651 of 12 November 2002.
[195] Press release IP/02/1651 of 12 November 2002.
[196] Press release IP/02/1651 of 12 November 2002.

significant change in the factual or legal situation would require re-assessment of the arrangements under the competition rules".[197]

4.1.3 Analysis

Some very careful tentative observations can be made from the cases above. As seen, case law referring to standardization and compatibility within the article 81 framework is scarce. [198] Given the importance of the subject and the plethora of views expressed in legal and economic doctrine, the basis for deducing legal conclusions as to the current legal position is remarkably frail.

4.1.3.1 Openness, Access, and Licensing

Since article 81 refers to cooperative arrangements, rather procedural aspects concerning participation in the setting-process are an important aspect (this would mainly concern patent-pools and SSOs). The Guidelines emphasize the "transparent"[199] and "non-discriminatory"[200] manner in which standards should be set. In *X/Open Group*, the Commission found a restriction of membership justifiable and beneficial for competition. This seems to have been motivated by the participants' desire to make the results of the standardization process available "as widely and quickly as possible"[201] and that there were no obligations to implement the standard or to refrain from implementing other standards (contrary obligations were found restrictive of competition in *Philips VCR*).

4.1.3.2 Product Variety and the Risk of Adopting an Inferior Standard

The benefits of achieving a quick introduction among a broad spectrum of participators may be losing the possible benefits of a standards race; competition for the market. This is of course to a large extent a technical question. It is also acknowledged from the Commission itself that it does not have the technical expertise to decide which technology would be the best in any given situation.[202]

In the early *Philips VCR* decision, the concerns of lessened product variety was a main concern. That concern, although present in the 2001 Guidelines, has been to some extent set back in an approach more friendly towards technological co-operations and patent-pools which lead to "quick adoption" (*DVD*) and "quick and efficient introduction" (*MPEG-2*) and less anxious about its possible effects on product variety. The *Philips VCR* case explicitly referred to risk of "exclusion of other, perhaps better, systems". This concern has not been explicitly referred to in the other cases above, although they involve broad horizontal cooperation which would typically

[197] Press release IP/02/1651 of 12 November 2002.
[198] For reasons of brevity, some cases not adding anything essentially new were left out of this section.
[199] Guidelines on Horizontal Agreements, para 196.
[200] Guidelines on Horizontal Agreements, para 174.
[201] *X/Open Group*, para 42.
[202] Brenning, 2002, p 2.

raise concerns as to innovation race intensity. Perhaps the restrictive obligations of the parties to the agreement in *Philips VCR* not to do any business with competing standards again was the decisive factor. The participation in a standard-setting process usually presupposes an interest of adhering to the standard, so normally such restrictive provisions would be unnecessary.[203] The leading market position of Philips was another emphasized factor.[204]

In theory, complementary patents should not be a problem, but rivalling ones are. However, this seems to be upheld with some dubiousness, since the DVD standard certainly involved the merger of two competing technologies. In the 3G on the other hand, the Commission seem to have wanted to be supportive of the 3G industry but at the same time deal with concerns regarding maintaining competition among competing technologies. An all-industry patent-pool supporting a standard like the APS, with every major actor on the market participating, would logically raise even more concerns. It should be said that promoting product market competition also could have effects in itself on the incentives to innovate. If the product competition is sharp, the failure of a market leader to innovate can quickly lead to the loss of that position.

A possible explanation of this can be divided into two: The first one has to do with the changing nature of technology and/or the way in which patent portfolio management is done. The second concerns the considerable advantages with standardization in many cases, both generally economically and with respect to the EC objective of market integration. The 3G telecommunications standard might be a good example of where the quick and uniform adoption of a technology is of important for EC market integration.

4.2 Article 82

Article 82 of the EC Treaty deals with abuse of a dominant position. If dominance is found in a certain relevant market, certain restrictions on the freedom of contract for that undertaking may be imposed with reference to Article 82. Two of the four restrictions of Article 82 are more important for the purpose of access to IPRs.

-) limiting production, markets or technical development to the prejudice of consumers (the consumer perspective).

-) applying dissimilar conditions to equivalent transactions with other trading parties thereby placing them at a competitive disadvantage (the competitor perspective).

Arguably, the consumer perspective has gained ground in recent years.[205]

The typical case of relevance for standards would be when a single standards provider (a single-firm de facto standard) has won the market to

[203] Guidelines on Horizontal Agreements, para 171-173)
[204] *Philips VCR*, para 29.
[205] Korah, 2006, p 135.

the extent that the possible suppliers of complementary goods are totally dependant that provider.[206]

There are no exemptions to Article 82, as those for Article 81. And – naturally – the fact that an agreement is cleared through an exemption (block exemption or "regular" exemption) does not automatically prevent it from amounting to abuse of a dominant position.[207]

4.2.1 Communication and Guidelines

In the 1992 Communication "Intellectual Property Rights and Standardization"[208], the Commission pointed out the right of an IPR owner to freely grant or refuse licenses along his own assessments:

> […] Article [82] cannot permit the expropriation of rights for the purposes of using the technology as the basis of a standard where no other circumstances establish abuse of a dominant position, and taking into account particularly whether there are other viable technologies available.
>
> The problem should therefore be addressed before the technology on which to base the standard in question had been definitively selected. If the standard in question had been adopted, and made mandatory by a Community instrument, refusal to license the technology necessary to use the standard would, a fortiori, create problems.[209]

In a discussion paper on the review of Article 82, DG Competition forwarded the following:

> A special case arises when an undertaking refuses to supply information in a way that allows it to extend its dominance from one market to another. This is the case for information necessary for interoperability between one market and another. Although there is no general obligation even for dominant companies to ensure interoperability, leveraging market power from one market to another by refusing interoperability information may be an abuse of a dominant position.
>
> Even if such information may be considered a trade secret it may not be appropriate to apply to such refusals to supply information the same high standards for intervention as those [in the refusal to license cases up until now.][210]

In the Guidelines on Horizontal Agreements, it is acknowledged that the adoption of a standard by a group of companies that are jointly dominant is likely to lead to the creation of a de facto industry standard. In that case, the standards are to be non-discriminatory and "as open as possible" and thus possible for third parties to access on fair, reasonable and non-discriminatory terms, since "competition would be eliminated if third parties are foreclosed from access to [a de facto] standard".[211]

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[206] However, standards from SSOs or Informal bodies can also apply here. In the words of Brenning (2002 p 4): "If a standard becomes successful, the holder of a patent which is essential to meet the standard, might either be considered jointly dominant with the other essential patent holders or dominant by itself as a result of its essential patent."
[207] Korah, 2006, p 134.
[208] COM (92) 445 final.
[209] COM (92) 445 final, para. 5.1.11.
[210] "DG Competition discussion paper on the application of Article 82 of the Treaty to exclusionary abuses", para 241-242.
[211] Guidelines on Horizontal Agreements, para 174-175.

4.2.2 Cases

Case law on abuse of a dominant position with respect to standards is also scarce, but some cases with relevance have reached further up in the judiciary. At least with respect to the notion of refusal to license there is a "line" of case law concerning when a refusal to allow a third party to use IP (even with no prior usage), which is of interest for IPRs in standards.

Volvo v. Veng[212] was the first ECJ case to deal with a possible compulsory license of an IPR under article 82. The Court established that the refusal to license an IPR was not abusive since the contested item for the licensing refusal "constitutes the very subject matter of that exclusive right"[213]. However, the Court did not categorically close the door for unlawfulness with respect to Article 82.[214]

In *Magill*,[215] the ECJ did impose a compulsory license of an IPR. Three TV broadcasters in the UK and Ireland were required to provide Magill with the copyrighted material it had requested for the publishing of a weekly TV guide. The ECJ reiterated the outset that a "refusal to grant a license, even if it is the act of an undertaking holding a dominant position, cannot in itself constitute abuse of a dominant position."[216] However, the "exercise of an exclusive right by the proprietor may, in exceptional circumstances, involve abusive conduct."[217]

The Court formulated three criteria, which have come to be described as the "exceptional circumstances test": First, the information was indispensable for the production of a new product (a TV guide covering all the TV channels in this case) for which there was a clear and unsatisfied consumer demand.[218] Second, by refusing to provide essential information, the TV broadcasters were likely to exclude all competition in market for TV program magazines.[219] Third, there was no objective justification for such a refusal.[220]

4.2.2.1 IMS Health

Although not concerning technical standards as such, the problem in the IMS Health case have many similar traits and raises interesting questions for the treatment of a prevailing industry standard.

IMS Health had developed a sales data method based on a division of Germany into either 1,860 or 2,847 segments ("bricks"). The "brick structure" enabled sales data to be reported on the basis of small geographic areas, designed according to several criteria such as postal code, population

[212] Case 238/87, [1988] E.C.R. 621. Hereinafter referred to as "*Volvo Veng*".
[213] *Volvo Veng*, para 8.
[214] *Volvo Veng*, para 9.
[215] Joined Cases C-241/91 P & C-242/91 P, [1995] E.C.R. I-743. Hereinafter referred to as "*Magill*".
[216] *Magill*, Para 49-50.
[217] *Magill*, para 50.
[218] *Magill*, para 53-54.
[219] *Magill*, para 56.
[220] *Magill*, para 55.

density, number of pharmacies and doctors. The development of the brick system had been done in cooperation with client pharmaceutical enterprises. NDC Health was trying to compete with IMS, but discovered that customers were very reluctant to use other structures than the established IMS brick structure.[221]

IMS Health took action for copyright infringement against NDC, who were trying to introduce essentially the same structure. NDC for their part claimed that IMS Health's refusal to license the copyrighted brick structure was an abuse of its dominant position, making it impossible for new entries to the market. The brick structure constituted a de facto "industry standard" according to the Commission, which ordered IMS to license the copyrighted material.[222]

The case made some procedural twists and turns, which are of no particular interest here, before eventually reaching the ECJ for a preliminary ruling.[223] The Court confirmed the criteria of Magill and established them as cumulative.[224] The new product requirement was supposed to test whether the refusal to license "prevents the development of the secondary market to the detriment of consumers"[225], which is not the case if the undertaking requesting the license merely intends to duplicate the goods or services of the IPR holder.[226] As for the criterion of "excluding of all competition", it is essential to identify two separate (downstream and upstream – also potential or hypothetical) and interconnected markets.[227] The ECJ left for the national court to decide whether the refusal to license the brick structure in this case was justifiable or not.

The ECJ also stated that in the assessment of a possible abuse of dominance, the involvement of customers in developing the brick structure as well as the actual possibility of constructing an alternative structure should be taken into account.

4.2.2.2 Microsoft

The lengthy *Microsoft*[228] decision by the Commission regarded whether Microsoft had unlawfully withheld information (probably covered by IP protection) necessary for the sake of full achieving interoperability between the Windows OS and non-Microsoft work group server OS. (Other issues of the case concerned tying practices of a media player into the OS.) Although

[221] *IMS Health*, para 3-7.
[222] *IMS Health*, para 6, 12, and IMS Health v. Commission, T-184/01 R, [2001] ECR II-3193. The compulsory license was however suspended by the CFI and ECJ.
[223] Case C-418/01, Case C-418/01, [2004]. Hereinafter referred to as "*IMS Health*".
[224] *IMS Health*, para 38.
[225] *IMS Health*, para 48.
[226] *IMS Health*, para 49.
[227] *IMS Health*, para 44-45.
[228] Commission Decision of 24 March 2004 in case Case COMP/C-3/37.792 Microsoft. Hereinafter referred to as "*Microsoft*".

it is not explicitly a refusal to license case, [229] it probably fair to say that it has very similar implications.[230]

Microsoft's operating system (Windows) had a market share of at least 90% of the operating systems for client PCs.[231] This, according to the Commission, "approaches a position of complete monopoly" [232] and would have to considered a *de facto* industry standard.[233] The main claim of the Commission was that Microsoft had used its overwhelmingly dominant position in OSs for client PCs to influence the adjacent market of OSs for servers, by withholding information necessary in order to design work server programs fully interoperable with Windows and thus compete in the work group server OS market.[234] Microsoft's market shares for OSs for servers were around 60 % according to the commission.[235]

The Commission comments on earlier case law on refusals to licence. [236] The "exceptional circumstances test" of *Magill* was not explicitly used by the Commission, although the criteria from *Bronner* was referred to and claimed to be met by in the decision. [237] The Commission suggested that it must "analyse the entirety of the circumstances surrounding a specific instance of a refusal to supply and must take its decision based on the results of such a comprehensive examination." [238] The fact that the interoperability information might be IP protected does not constitute an objective justification in according to the Commission.[239] Instead, the Commission bases its assessment on an incentives balance test.[240]

The issue of network effects were included in many aspects of the decision.[241] Both direct network effects[242] and indirect network effects[243] were treated, the latter also being called the "applications barrier to entry".[244] Also the relative easiness to find skilled personnel was taken into account as a network effect in learning by the commission.[245] The Commission emphasized network effects, entry barriers and switching costs

[229] At para 568-572 the Commission tries to distinguish the *Microsoft* case from a refusal to license case.
[230] *Microsoft*, para 546: "it cannot be excluded that ordering Microsoft to disclose such specifications and allow such use of them by third parties restricts the exercise of Microsoft's intellectual property rights."
[231] *Microsoft*, para 430-435. Various calculations are given, all being over 90 %.
[232] *Microsoft*, para 435.
[233] Korah, 2006, p 154.
[234] *Microsoft*, para 533, 779-781, 1064-1065.
[235] *Microsoft*, para 491-493, 499.
[236] *Microsoft*, para 548-559.
[237] *Microsoft*, para 554. The Bronner criteria lack the "new product" requirement of *Magill* and *IMS Health*, and the new product requirement is not crucial in the Commission's reasoning in *Microsoft*, although it is claimed that Microsoft's refusal to disclose information limits technical development (*Microsoft*, para 700-701).
[238] *Microsoft*, para 558.
[239] *Microsoft*, para 709-712.
[240] *Microsoft*, para 712.
[241] For example, *Microsoft*, para 420-422.
[242] *Microsoft*, para 438.
[243] *Microsoft*, para 449.
[244] *Microsoft*, para 459.
[245] *Microsoft*, para 517-522.

in the argument leading to the conclusion that the withholding of information amounted to an abuse of a dominant position within the meaning of article 82. Microsoft's incentives to innovate were not considered to be severely lessened.[246] The remedy imposed on Microsoft was to disclose all necessary interface information to facilitate the non-Microsoft workgroup server OSs to be fully interoperable with Windows PC and Microsoft workgroup servers.[247] When necessary for achieving that, Microsoft was entitled to "reasonable remuneration".[248]

4.2.3 Analysis

While cases within the article 81 framework have tended to confer great importance to matters of accessibility (openness) to procedures (patent-pools and SSOs) in setting and using standards, the legal intervention in standards matters with respect to article 82 has seems to cause considerably more anxiety in the judiciary. There are good reasons for that, not only with respect to general incentives concerns, but also in network markets. As pointed out on several occasions, dominance is easily reached in network markets if a lead is established. Nothing is wrong or abusive about this in itself, rather, as stated before, there are advantages emanating from the oligopolistic or even monopolistic structure of the market. The creative destruction" usually solves the deadlocks. Economic history has plenty of examples to given of monopolies that long seemed unshakable suddenly disappearing and markets completely changing character. The question is if and to what extent that process ever needs a midwife. With reference to the analysis in chapter 3, the very few cases which might merit an intervention are probably cases of possible abuse of a dominant position; "exceptional circumstances", to use the parlance of the ECJ. With respect to this, a few observations are of interest, since in my view, contrary to the case of article 81, the prevailing interpretation of article 82 might not provide the tools necessary.

The first concerns the "new product" criterion. One interesting difference between *IMS Health* and *Microsoft* is the treatment of that particular criterion (the Commission's decision was published a month before *IMS Health*). How "new" must a product be in order to be considered legally new? If the new product has to be a completely new category of product, this has very different implications compared to the case where it is enough with a non-duplicate similar (perhaps better) version. In any event, a stringent new product requirement would not change the quasi-monopoly situation that an IPR protected standard might lead to.

Hence, in a standards context, there is probably a merit in making an incentives balance test, as the Commission did in *Microsoft* (neither agreeing nor disagreeing on its material decision), instead of a new product requirement. Of course, a disadvantage of abandoning an approach with more strict criteria would be the general clause character of an incentives

[246] *Microsoft*, para 729.
[247] Press release IP/04/382.
[248] Press release IP/04/382.

test, increasing insecurity and paving way for unrestrained assessments and reasoning. The positive flip side would be that, when done prudently, this is exactly what might be needed in order to take proper case-to-case specific consideration to the shifting incentives structures in different branches of industry.

Again, I reiterate that I do not necessarily recommend an extended refusal to license doctrine. Extending compulsory licensing regimes might also change the ways in which IPRs are managed, with trade-secrets playing a more important role, thus not contributing with the publication that comes with the granting of a patent.

Any remedy involving compulsory licensing has a major obstacle to come cross: The difficulties in establishing exactly what remuneration should be considered fair and reasonable seem to be endless. In economic theory, there is no consensus. The Courts certainly have limited economical and technological expertise in the field and are under time constraints that make them hard to rely upon to make good decisions. It is not very realistic to hope for this Gordian knot to be untied anytime soon. Until then, it is probably safe to use it restrictively. However, since article 82 only comes in question when dominance has been reached, it would – in most cases – be safe to assume that the company in the dominant position has had time to cash in a substantial reward for winning the market (and any remuneration would logically be larger than zero).

5 Conclusion

It is somewhat paradoxical that the development and success of highly advanced technological products that the IP system is drafted to encourage also might result in tension for (and criticism of) that very IP system itself.

The set of problems explored in this thesis has kaleidoscopic qualities; if one parameter is changed, a new topography of problems often emerges – with some old problems relocated to new places and some entirely new problems arising. To grasp it all, one would have to be a Renaissance man fully familiar with the technical, economic, and legal aspects of every contemplated action, or omission. I think there is a point to be made out of this, as this hesitance most likely strikes not only a student wrestling his way through a thesis, but also at least to some extent the legislators contemplating legal design and the judiciary later applying it (although the legislators are not necessarily under the same time constraints as students and judges). The point I want to make is a call for conservatism, not due to impulses of escapism when faced with a difficult nut to crack, but rather due to a concern emanating from the scientific context from which the difficulties arise:

IP law and competition law are both highly economical in their *raison d´être* and in the effects of their design. That makes them particularly susceptible to new scientific trends in the field of economics. Although normally triggered by an empirical observation, new reasoning initially tends to be more theoretical than empirical, and even the theoretical models are usually fiercely challenged. The area of economics also undergoes processes of creative destruction not unlike those that some of its practitioners study. In the light of this, and since no one claims that these issues are on the brink of bringing our societies to bankruptcy (a hasty panic measure would be more likely to have that effect), a certain amount of conservatism or is probably a prudent idea (a wait-and-see approach, if you like).

The starting point of my analysis in this question is that standards and IPRs both are ways to make society as a whole able to reap the fruits of innovation: IPRs by inducing them to occur and standards for making them able to undergo large-scale production and proliferation and facilitating the benefits of large networks. The theoretical tensions are probably sharper than the practical ones. However, I believe that technical standards do require special legal attention. The double-edged qualities of network markets – the benefits of large networks on one side and the benefits *and* perils of monopolistic competition on the other – make any policy a difficult judgement call. Recapitulating the main points in my analyses made with respect to IP and competition law approaches, my conclusion can be summed up into two main ideas:

- Many of the problems which are empirically well founded originate from the changing role of copyright; a change of the IP framework with respect to software with a shorter period of protection would likely solve

many of those problems. This has been in the air for some time, but legal documents have been subject to birth pains.

- The residual problems are better dealt with in a specific competition law context than through general IP rules. Since the protection due to network effects can bring rewards that are substantially higher than their inventiveness likely would have merited alone, an ex post intervention would be necessary to withhold the proportionality between inventiveness and protection, with deference to what kind of IPR and in what line of business the situation occurs in.

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