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Software interoperability information disclosure and competition law

Qiang Yu Email: q.yu@law.leidenuniv.nl. This study was finished at the Max Planck Institute for Intellectual Property and Competition Law. The author thanks Prof.D. Daniel Sokol for comments, while he is responsible for all opinions expressed and any shortcomings.

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*235 I. Introduction

Software interoperability information connects platform software, applications, and users. The disclosure of software interoperability information is the topic of heated debates, as its disclosure and the discontinuation of disclosure are not merely an intellectual property (IP) law issue but also a matter of competition law. Interoperability information disclosure matters greatly in setting standards or obtaining market dominance in the software market. After a certain technology has been set as a public standard, no other competing technologies are allowed to compete with the public standard. Correspondingly, the public standard has a duty to offer interoperability information to all interested market players. The public disclosure of technical standards is recognised to have many benefits:

"When standards are open and freely available, it becomes possible for anyone to develop an interoperable implementation. Proponents of open standards focus on these benefits without qualifications or caveats ... Many advocates of open standards assume an open standard will lead to a vibrant, competitive market that removes vendor lock-in."¹

Because of such benefits, in certain markets, for instance information and communication technologies sector, it has been affirmed by industrial regulation provision.²

In contrast to public standards, the acceptance of private standards by most market players is not required by industrial or government regulation: they gain market dominance through competition in innovation. Of course, these players have no duty to disclose information to competitors. However, after some firm's product becomes the de facto standard of a market, corresponding interoperability information disclosure enters the interface of IP law and competition law. From the IP law perspective, it is the IP holder's right to dispose the interoperability information, and there is no duty to disclose because the product is not a public standard. Anyway, the lack of disclosure is bound to limit follow-on innovation. From a competition law perspective, refusal to disclose is likely to limit secondary market competition. This situation is evident in the software market, and relevant legal practices have already emerged. As a result, the prevailing treatment of the refusal to disclose interoperability information is to grant a duty of disclosure to enable follow-on innovation and secondary market competition.

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By scrutinising the alleged benefits of compulsory disclosure of software interoperability information and the competition mechanism in the software market, this study perceived that the compulsory disclosure of software interoperability information benefits follow-on innovation and competition is theoretically untenable and, on the contrary, that such disclosure harms innovation in practice.

To illustrate the opinion of this article, section II of the article examines the background of compulsory disclosure, which is compulsory licensing, which lies at the centre of IP law and competition law. Further, this section presents the current status of compulsory disclosure in the software market. Section III analyses why the argument for the benefits of the compulsory disclosure of software interoperability information is theoretically unconvincing and practically harmful. Further, this section notes that reverse engineering acts as a substitute method for compulsory disclosure. Finally, this section describes situations in which the refusal to disclose software interoperability information constitutes an abuse of market dominance and therefore becomes subject to compulsory disclosure. At the end of the article, the author notes that software interoperability information generally should not be subject to compulsory disclosure but that attention should be paid to the use of discontinued disclosure as a means to monopolise a market.

II. Legal background and policy on software interoperability information disclosure

Software interoperability information is one component of software. In the case of platform software, it is a technical and competitive advantage in enlarging the platform software's originating network. However, the *236 current prevailing policy from both copyright law and competition law is prone to impose a duty to disclose software interoperability information. This policy is controversial in promoting technological innovation and competition. In order to understand this conflicting situation, we must know the background of the compulsory disclosure policy below.

A. Competition rules on compulsory accessing intellectual property law protected work

1. Intellectual property rights and refusal to license

IP rights are one type of property right, granting a right holder the right to dispose of the protected work exclusively. IP rights have existed from the beginning of humanity. In earlier times, most IP rights were not related to commercial use; like a painting or specially designed tool, they were all invented for non-commercial uses. This type of usage is one type of IP right, the right to use and enforce. In modern times, as commercial strategies and law have developed, whether a legal duty can be imposed on an IP right holder to use and enforce an IP right has become controversial. In *Continental Paper Bag v Eastern Paper Bag*,³ *Continental Paper Bag* and *Eastern Paper Bag* conflicted in a "self-opening bag" patent, which had never been put into effect or use by *Eastern Paper Bag*.⁴ The decision formulates that while

"competitors were excluded from the use of the new patent ... such exclusion may be said to have been of the very essence of the right conferred by the patent, as it is the privilege of any owner of property to use or not use it, without question of motive".⁵

In this case, the court confirmed that an IP right holder has no legal obligation to use and enforce its right. Non-use and refusal to license were subsequently confirmed by the US Patent Act.⁶

Following the above progress, IP right holders' right to license their right was examined by the US courts. These courts have reached a common view: except for public interests,⁷ IP right holders generally are not required to license their work by either IP law or antitrust law. This common view appears in many cases. In *Hartford-Empire Co v United States*,⁸ the court held:

"A patent owner is not in a position of a quasi trustee for public or under any obligation to see that the pub-

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lic acquires free right to use the invention, and he has no obligation either to use it or to grant its use to others but if he discloses the invention in his application so that it will come into public domain at end of 17-year period of exclusive right, he has fulfilled the only obligation imposed by statute"⁹;

in *SCM Corp v Xerox Corp*,¹⁰ the court held similar position

"where a patent has been lawfully acquired, subsequent conduct permissible under the patent laws cannot trigger any liability under the antitrust laws."¹¹

European courts hold parallel opinions in legislation. Guidance on the Commission's enforcement priorities in applying art.82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings¹² provides that:

"When setting its enforcement priorities, the Commission starts from the position that, generally speaking, any undertaking, whether dominant or not, should have the right to choose its trading partners and to dispose freely of its property."¹³

Moreover, the principle that there is no obligation to license, even when the competition law issue is hence raised, has been confirmed by case law. In *Intergraph Corp v Intel Corp*,¹⁴ the court held "it is also correct that the antitrust laws do not negate the patentee's right to exclude others from patent property."¹⁵ This case has precedent in IP products related antitrust cases.¹⁶ IP product distribution is a major concern in competition law analysis is because they are under monopoly supply,^{*237} which creates an inherent monopoly power. Furthermore, they are distributed via licensing, there is freedom to choose whether, when, and with whom to license.¹⁷ This freedom therefore likely leads to restraints on distribution, market elimination, and other competition law targets. However, according to scholarly analysis, IP right holders' freedom in market operation is the reward for their capital and innovation investment; if this freedom is not guaranteed, no one will invest in the development of new technology and new products, which are mutual goals of IP law and competition law.¹⁸ This IP right was demonstrated in *re Independent Service Organizations Antitrust Litigation*.¹⁹ In the case, an independent service organisation (ISO) brought suit, claiming that the copier manufacturer's refusal to sell its patented parts and copyrighted manuals and to license copyrighted software violated antitrust laws. The United States District Court for the District of Kansas cited Federal Trade Commission Antitrust Guidelines for the Licensing of Intellectual Property 4 (1995) and the case *Glass Equipment Development Inc v Besten Inc*.²⁰ to demonstrate its position on the compulsory licensing, stated that:

"In the absence of any indication of illegal tying, fraud in the Patent and Trademark Office, or sham litigation, the patent holder may enforce the statutory right to exclude others from making, using, or selling the claimed invention free from liability under the antitrust laws. We therefore will not inquire into his subjective motivation for exerting his statutory rights, even though his refusal to sell or license his patented invention may have an anticompetitive effect, so long as that anticompetitive effect is not illegally extended beyond the statutory patent grant."²¹

The above US policy is not alone: similar policies have also been approved in the European Union, and it is particularly manifest in case law. In *AB Volvo v Erik Veng*²² the court held

"that an obligation imposed upon the proprietor of a protected design to grant to third parties, even in return for a reasonable royalty, a licence for the supply of products incorporating the design would lead to the proprietor thereof being deprived of the substance of his exclusive right, and that a refusal to grant such a licence cannot in itself constitute an abuse of a dominant position."²³

2. Competition basis for compulsory access to intellectual property, essential facility doctrine and beyond

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Although IP law grants exclusive control, this right is not without exception. In addition to reasons related to public interest, competition forms the basis of further reasons for compulsory accessing IP goods.

a. Essential facility doctrine

The essential facility doctrine is designed for the purpose of competition to allow competitors access to certain facilities to compete in a relevant market. This doctrine, in fact, is a compulsory dealing obligation imposed on facility owners by competition law. Because if without the compulsory dealing obligation, the facility owner can charge anti-competitive prices or refuse to deal to maximise profits. In the early application of this doctrine, some scholars made criticisms on its wide application scope, "the law (essential facility doctrine) evolves ... now in the expansionary second phase, which needs to be brought back to antitrust policy".²⁴ As a result, in order to avoid the doctrine's certain harm to development in certain industries, the application scope of the doctrine was restricted to a limited area. According to Professor Hovenkamp's observation, the essential facility doctrine is most applied in the following areas:

"(1) natural monopolies or joint venture arrangements subject to significant economies of scale; (2) structures, plants or other valuable assets that were created as part of a regulatory regime, whether or not they are properly natural monopolies; or (3) structures that are owned by the government and whose creation or maintenance is subsidized".²⁵

The application scope is only one general consideration in applying the essential facility doctrine. There are practical problems that must be stressed, for instance, in what circumstances the essential facility doctrine should be applied.*²³⁸

Through a revolution of the application of the essential facility doctrine since the 1970s,²⁶ although some complementary problems are still under debate, four elements became the main focus when applying the doctrine. These four elements developed from a number of cases (Terminal Railroad Association,²⁷ Otter Tail,²⁸ Aspen Skiing)²⁹ and finally matured in *MCI Communications Corp v American Tel & Tel Co*. In the decision, court described four elements as requirements in applying the essential facility doctrine:

"(1) control of the essential facility by a monopolist; (2) a competitor's inability practically or reasonably to duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of providing the facility to competitors".³⁰

The first element stresses the prerequisite that the essential facility be under a monopoly control. This element confirms two points: first, the control of the essential facility is limited to a single entity. This stipulation avoids disputes regarding when an essential facility is controlled jointly or collectively. Joint or collective control situations consist of concerted practices, applying essential facility doctrine to such practice is not appropriate because concerted practices are ruled by the competition law that governs concerted practices, such as s.1 of the Sherman Act. The second element defines the status of an essential facility, that is, the facility has no substitutes. This element is controversial because there are different understandings regarding whether a facility can be practically duplicated. These differences can be observed in different decisions. In US courts, cases applying the essential facility doctrine mainly occurred in naturally monopolised markets, as observed by Professor Hovenkamp. Nonetheless, in Europe, the essential facility doctrine is applied beyond natural monopoly markets. Markets concerning airlines, information goods, and even services are subject to the application of the essential facility doctrine,³¹ although competing or substituting suppliers are likely to emerge in these markets.

The third element raises two unclear points. The first point is whether the denial of access also applies to conditional denial. Conditional denial happens when a facility controller sets conditions for accessing the facility. It normally relates to limiting the competitiveness of the subscriber of the facility. As a result, condi-

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tional denial must also be considered under the essential facility doctrine, but it may involve more complicated remedies, such as judicial or pricing supervision.³²The second point is the scope of the competitor. In industrial economic backgrounds, many firms are involved in two or more markets, under which situation, cost and competition relationships engage two- or multi-sided market theory. In the two- or multi-sided market, the scope of competitors is broader than that within a single market, and the competition relationship is more complicated as a result.

Although there are debates on the application scope of the essential facility doctrine, one point is certain: the doctrine does apply to naturally monopolised markets. However, there is uncertainty concerning whether it applies to product markets protected by IP law. Under current competition law practice and IP policy, it is hard to make an assertion on whether the essential facility doctrine applies to these markets.

According to the essential facility doctrine scrutiny method, IP law-protected work markets resemble markets under a natural monopoly. According to IP law, an IP right is controlled exclusively by its owner, no one is allowed to access the IP rights unless there is a licence agreement, which in effect is the same situation as the monopoly control of an essential facility. However, products protected by IP rights differ in two points from natural monopoly goods.

The first point is that naturally monopolised facilities have no substitutes, whereas most IP rights have competing and substitutive goods.³³This contrasting character is based on the different industrial character of the IP good market and naturally monopolised market. Emerging innovative goods compete with existing innovation goods, and as a consequence, innovation and competition are both promoted. Substitutive or competitive IP goods therefore are encouraged to emerge by both market competition and industrial development. Typical goods in such situations include mobile phone operating system software, office software, and web browser software. While naturally monopolised facilities are not encouraged to produce substitutive ones, as

"most of the things found by courts to be essential facilities have fallen into one of three classifications: (1) nature monopolies or joint venture arrangements subject to significant economies of scale; (2) structures, plants or other valuable productive assets that were created as part of a regulatory regime,"²³⁹ whether or not they are properly natural monopolies; or (3) structures that are owned by the government and whose creation or maintenance is subsidized".³⁴

A facility with such characters is either un-duplicable or not economically rational in establishing competing ones. With the established industrial character difference of the two kinds of markets, applying essential facility doctrine in the IP based market is apparently not in line with competition and industrial policy.

The second point is that even when an IP right holder refuses access, it is possible to engage in reverse engineering to obtain the rejected product for either fair use or competitive purposes, while there is no similar possibility to naturally monopolised facility. Reverse engineering an IP law protected work has been accepted by law as a fair use and inherent right.³⁵In the United States, reverse engineering is reasoned to be a legal practice under case law. In 1992, two cases were decided with the theme of the legal status of reverse engineering. In *Atari Games Corp v Nintendo of America*,³⁶ United States Court of Appeals, Federal Circuit held that "Reverse engineering, untainted by the purloined copy of the 10NES program and necessary to understand 10NES, is a fair use."³⁷This legal status was further held in *Sega Enterprises Ltd v Accolade*³⁸

"we conclude that, when the person seeking the understanding has a legitimate reason for doing so and when no other means of access to the unprotected elements exists, such disassembly is as a matter of law a fair use of the copyrighted work."³⁹

In contrast to the US approach, reverse engineering was confirmed by legislation in the EU Common Market

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as not infringing on copyright. The Directive on the legal protection of computer programs⁴⁰ provides that:

"The authorisation of the right holder shall not be required where reproduction of the code and translation of its form within the meaning of points (a) and (b) of Article 4(1) are indispensable to obtain the information necessary to achieve the interoperability of an independently created computer program with other programs"⁴¹

These cases and legislation confirmed that reverse engineering is a legal practice that is not an infringement of copyright law, but the acceptability of producing a competing product through reverse engineering was not determined at this period.

As the innovation based market evolves, the problem of whether producing a competing product through reverse engineering should be allowed is essentially important, "because this is the most common and most economically significant reason to reverse-engineer in this industrial context."⁴² The legal status of producing a competing product through reverse engineering under competition law is clearly defined by case law in both the United States and the European Union. The US case *Sega Enterprises Ltd v Accolade* is an appeal case,⁴³ in the Northern District of California decision, reverse engineering with the aim of creating competing products was decided not to be legal⁴⁴:

"The copying at issue here was undertaken by Accolade for financial gain and was aimed at the creation of a competitive product which will adversely impact the value of the copyrighted work. Such commercial use is presumptively not 'fair use'."⁴⁵

"Fair use, when properly applied, is limited to copying by others which does not materially impair the marketability of the work which is copied."⁴⁶

"While Accolade's game cartridges compete directly with those of Sega Enterprises, Ltd, which has likely lost sales as a result of Accolade's copying."⁴⁷

However, after the decision was overruled by appeal court, reverse engineering for competitive purposes became legal practice in US courts. The EU case is *SAS Institute Inc v World Programming Ltd*,⁴⁸ it is similar to the *Sega* decision,⁴⁹ in which SAS Institute Inc (SAS) licenses a software system allowing customers to de-pose files. The system contains a platform and many*²⁴⁰ applications, but the platform and applications are integrated.⁵⁰ World Programming Ltd (WPL) reverse-engineered the platform part of SAS's software to compete with it.⁵¹ In the case, SAS sued WPL for copyright infringement, and the British court asked the European Court to interpret art. 1(2) of Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs. The Grand Chamber interpreted: the provision

"must be interpreted as meaning that neither the functionality of a computer program nor the programming language and the format of data files used in a computer program in order to exploit certain of its functions constitute a form of expression of that program and, as such, are not protected by copyright in computer programs for the purposes of that directive."⁵²

This case affirms that reverse engineering is legitimate, even when aimed at creating competing products.

The evolution of the legal status of reverse engineering indicates that reverse engineering works as a function of generating substitutive or competing goods in market competition. This character contradicts the criterion for applying the essential facility doctrine that the essential facility must be un-duplicable. The contradiction suggests that in theory, the essential facility doctrine does not apply to IP goods.⁵³ Despite this apparent inapplicability, in the IP markets, the essential facility doctrine is being applied differently in the EU and US market.

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In the United States, the application of the essential facility doctrine is cautious:

"Courts are properly extremely reluctant to find liability on the basis of a company's unilateral refusal to deal, even if that company is a monopolist. That reluctance is even stronger when a refusal to license intellectual property rights is at stake, because the ability to exclude others from using the right is at the heart of IP policy."⁵⁴

Part of the reason for this caution in the United States is that the application scope of the doctrine is narrow, and it is designed for special markets, such as utilities, transportation facilities, or other physical assets. Another part of the reason is that the essential facility doctrine ultimately requires compulsory access, which is a great threat to property rights that deters investment in the relevant market. As a complementary effect, it is particularly vulnerable to the adverse effects of compulsory licensing because the IP goods market is an innovation-only market compared to traditional markets.

Although there is established theory and practice suggesting that the essential facility doctrine is not appropriate for application to IP goods, the doctrine is nonetheless widely applied in Europe, certainly in IP markets. As mentioned previously, in the European Union, the essential facility doctrine has been applied in nearly all markets, which was first developed and applied in the traditional markets, then it is applied in the IP markets. The Margill decision⁵⁵ sets the basic foundation:

"The appellants' refusal to provide basic information by relying on national copyright provisions thus prevented the appearance of a new product, a comprehensive weekly guide to television programmes, which the appellants did not offer and for which there was a potential consumer demand. Such refusal constitutes an abuse under heading (b) of the second paragraph of Article 86 of the Treaty."⁵⁶

The general policy of applying the essential facility doctrine formed in IMS and was finally extended to IP markets despite the criticism that it received.⁵⁷ In *IMS Health GmbH v NDC Health GmbH*,⁵⁸ the court held that "as is clear from that case-law (the Margill decision), exercise of an exclusive right by the owner may, in exceptional circumstances, involve abusive conduct."⁵⁹ Three constitutional exceptional circumstances were then described: 1. preventing the emergence of a new product; 2. the refusal is not justified by objective considerations; 3. the likelihood of excluding all competition on a secondary market.⁶⁰

b. IP being used for market monopolisation

As analysed above, the application of the essential facility doctrine in compulsory accessing IP goods in practice is*²⁴¹ in dispute, but this fact does not limit the liability in competition law for compulsory accessing IP goods. Apart from the essential facility doctrine, when an IP good is abused for monopolising a market or maintaining market dominance, competition duty to license acts as another way of accessing IP goods.

Under the issue of compulsory licensing, there is often concern regarding whether the IP right will be harmed because the exclusive control of IP content lies at the heart of IP policy. However, viewing this issue from a competition perspective, there is also concern regarding whether market competition is protected, as the right to refuse to license can also eliminate competitors, which is one of the main concerns of competition law. Thus, a dilemma arises when granting mandatory licensing. According to case law on this dilemma, whether to grant compulsory licensing depends on different types of licensing relationships.

The first type of licensing relationship occurs in competition cases and explains the inherent right to refuse to license to competitors; this type of licensing generally follows the opinion in the *Data General* decision (DG).⁶¹ The decision demonstrates the principle that the IP owner's valid IP right cannot be imposed duty to enter into new licensing so as to improve competition. In the case, DG is a computer manufacturer. In the market for the service of computers manufactured by DG, DG and Grumman are competitors, and their mar-

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ket shares are 90 per cent and 3 per cent, respectively. DG developed a sophisticated computer programme to diagnose problems in DG's MV computers. Grumman used the computer programme to compete with DG in the service market, though DG did not license the software to Grumman previously. DG sued Grumman for copyright infringement. Grumman counter-claimed, first, that DG had licensed the diagnostic software to it and then discontinued and, secondly, that DG's discontinuation was aimed at excluding Grumman from the service market.⁶² For the first counter-claim, Judge Motz concluded that the Settlement Agreement did not require DG to license any proprietary information to CSSC⁶³ or its customers, nor did the Settlement Agreement prevent DG from prohibiting CSSC from copying and using proprietary information in the custody of DG service customers. For the second counter-claim, the court concluded that it found no merit in Grumman's contention that DG acted in an exclusionary fashion in discontinuing its liberal policies allowing TPM (third party maintainers) access to diagnostic software. Finally, the court concluded that no reasonable jury could find that DG's restrictions on third party maintainers' access to other service tools amounted to exclusionary conduct.⁶⁴

The second type of licensing relationship occurs within an existing license relationship. Case law demonstrates that when limiting an existing licence (mainly terminating it) serves as a facility to monopolise a market, such a practice may be liable for compulsory licensing under competition law. The legal source can be traced back to *Aspen Skiing Co v Aspen Highlands Skiing Corp*⁶⁵ and *Miller Insituform Inc v Insituform of North America Inc*.⁶⁶ *Aspen* is a refusal case related not to licensing but to a facility. *Aspen Skiing Company* is the owner of three out of four of the main facilities serving skiers who visited the resort. It discontinued its participation in a jointly offered interchangeable six-day "all-Aspen" lift ticket. *Aspen Skiing Company's* discontinuation would not only harm convenience for skiers, but it would also cause *Aspen Highlands Skiing Corp* to be eliminated from the market without the continuation strongly demanded by *Aspen Highlands Skiing Corp*. The court held that *Aspen Skiing Company*

"had no valid business reason for discontinuing its participation in a jointly-offered interchangeable six-day 'all-Aspen' lift ticket, which provided convenience to skiers who visited the resort; thus, refusal of owner of the three areas to cooperate with its smaller competitor violated section 2 of the Sherman Act prohibiting monopolization or attempts to monopolize."⁶⁷

A parallel analysis appeared in *Miller* but in the IP context,⁶⁸ defendant *Insituform of North America (INA)* was accused of unlawfully attempting to monopolise the relevant market by revoking plaintiffs' licences to sell and install a patented process for the rehabilitation of pipelines. The court believed that the termination did not violate Sherman Act and held that

"the holder of a patent retains the power to exclude others from manufacturing, using, and selling his inventions without running afoul of the antitrust laws. Here, by terminating the sublicense agreement with the appellant, appellee merely exercised his power to exclude others from using the *Insituform* process, as was his right under 35 U.S.C. § 154 (US patent law)."⁶⁹

The decision contradicts *Aspen* because the court found no antitrust harm:^{*242}

"We agree. There is no adverse effect on competition since, as a patent monopolist, *INA*, from the start, had exclusive right to manufacture, use, and sell his invention."⁷⁰

However, the reason for the lack of antitrust harm is that *INA* had no vertically integrated firm in the market in which the licensee operates, and therefore, *INA* had no competitive relationship. If *INA* also competed in the licensee's market, the final judgment would be different.

The principle that the discontinuation of licensing may be liable for compulsory licensing, after being developed in *Aspen* and *Miller*, was finally formed in *Image Technical Services Inc v Eastman Kodak Co*⁷¹ and

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was followed by *US v Microsoft Corp.*⁷² In *Image Technical*, Eastman Kodak produced and offered services for the Kodak photocopier and micrographic parts. Apart from Eastman Kodak, there were 11 competitors (ISOs) in the service market. As the ISOs grew more competitive, Kodak began restricting access to its photocopier and micrographic parts. In 1985, Kodak stopped selling copier parts to ISOs, and in 1986, Kodak halted the sales of micrographic parts to ISOs. Additionally, Kodak secured agreements from their contracted original-equipment manufacturers not to sell parts to ISOs. These parts restrictions limited the ISOs' ability to compete in the service market for Kodak machines because such competition requires that the service providers have ready access to all parts. In 1987, the ISOs filed this action against Kodak, seeking damages and injunctive relief for violations of the Sherman Act. The ISOs claimed that Kodak "monopolised or attempted to monopolise the sale of service for Kodak machines in violation of § 2 of the Sherman Act".⁷³ The court held that Kodak has no justified business reason for its eliminative practices and finally found that "Kodak used its monopoly on parts, including patented and copyrighted products, to monopolize the service market."⁷⁴ These principles formed in the decision were applied in *US v Microsoft Corp.*,⁷⁵ and both decisions cited *Aspen*. In the *Microsoft* decision,⁷⁶ Microsoft was granted compulsory disclosure duty for its discontinuation of disclosure of the interoperability information of its platform software Windows, which was aimed at eliminating competing market players in the application market (detailed in Pt III).

One potential complementary effect of the compulsory disclosure remedy is that the licensor's licensing practices are largely restricted by existing licensing contracts. This effect has been analysed by some scholars:

"Intellectual property licenses are generally quite complex, and they often involve technologies and markets that change rapidly. Locking companies into existing business relationships seems particularly inappropriate in fast-changing markets. Intellectual property licenses are often exclusive, in whole or in part; locking in relationships in such a context may prevent competition by other potential licensees down the road. Further, as a general matter antitrust law wants to encourage the licensing of intellectual property, since the alternative may be monopoly or at least more centralized control over production. Forcing companies to continue an existing license relationship may have the perverse effect of discouraging them from licensing their intellectual property rights in the first place. In short, we think it would be a mistake to depart from the presumptions that protect unilateral refusals to license merely because the parties had had a relationship in the past."⁷⁷

However, this concern is unnecessary, as evidenced by previous case law; competition liability was granted only when the proposed licensing created an anti-competitive effect and made no contribution to IP rights. Compulsory disclosure is only an ex post remedy: its function is to ensure that competition and innovation are not lessened by inefficient practices. Compulsory disclosure as a competition remedy is different from IP policy making, which should be based on emphasising and foreseeing the benefits and possible adverse effects ex ante. A discontinuation of disclosure of software interoperability information can harm competition, innovation, and consumer welfare immediately, but the efficiency elements or results require time to observe. Moreover, the dynamic character of the market is vague, and there is thus no standard for assessing the harm to the dynamic of a market. As a result, the concern about affecting software suppliers' incentive to disclose is not necessary.

B. Compulsory disclosure software interoperability information

Software interoperability information is one type of IP. It is developed with the same method as other parts of a software platform, and they are internally and functionally connected. According to copyright policy and competition policy, software interoperability information is treated differently from other parts of software. However, the treatment of software interoperability information is not inherently different; the current policy is the result of a policy evolution that occurred in the 1990s.***243**

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1. Software interoperability information disclosure before 1990s

Software interoperability information disclosure was different before the 1990s, largely because software is an innovation product and the software market was emerging. Software emerged in 1955,⁷⁸ and until 1976, it was treated as a type of literary work and was therefore protected by copyright law.⁷⁹

Soon after the legal status of software was established in the United States, software interoperability appeared in litigation as a defence, although it has not been fully accepted. In *Apple Computer v Franklin*,⁸⁰ defendant Franklin designed "Apple compatible" software. "Franklin's copying of Apple's operating system computer programs in an effort to achieve such compatibility precipitated this suit".⁸¹ The court held:

"Franklin may wish to achieve total compatibility with independently developed application programs written for the Apple II, but that is a commercial and competitive objective which does not enter into the somewhat metaphysical issue of whether particular ideas and expressions have merged."⁸²

This case reflects that the competition's opinion had not been included in the judge's consideration, and it was treated precisely as copyright infringement at this stage.

In the same period, the emulation of software interoperability information was decided to be illegal. In *Whelan Associates, Inc. v Jaslow Dental Laboratory, Inc*⁸³: the Court of Appeals' Circuit Judge, Becker, held that: "copyright protection of computer programs could extend beyond programs' literal code to their structure, sequence, and organization".⁸⁴

During the US progression on software interoperability information disclosure, the European Union's relevant policy making was under discussion, and the attitude toward reverse engineering and the scope of protecting software interfaces was not established. The manifest position from EU legislators appeared to be that they objected to reverse engineering and believed copyright protection should extend beyond the expression part of software. In 1989, the Commission issued a proposal for a Directive.⁸⁵ The proposal implied that under some circumstances, a program's interface specifications could not lawfully be used by persons other than the program's developer. Furthermore, it incorporated an expansive prohibition on reproduction without an exception that would allow for reverse analysis.⁸⁶

2. Current status of software interoperability information disclosure

In the 1990s, the policy on software interoperability information disclosure changed. After the European Union legislatively confirmed that copyright protection did not extend to the conceptual portion of software interoperability information and legalised the reverse engineering of software interoperability information, the United States adopted the same policy through a number of cases. Finally, both the European Union and the United States approved the compulsory disclosure of software interoperability information.

In 1991, the European Union enacted a Software Directive,⁸⁷ which emphasises that the ideas in software interoperability information are not protected by copyright:

"Protection in accordance with this Directive shall apply to the expression in any form of a computer program. Ideas and principles which underlie any element of a computer program, including those which underlie its interfaces, are not protected by copyright under this Directive."⁸⁸ The directive also affirms that reverse engineering the interoperability information of software with the aim of achieving interoperability is legal:

"Article 6 Decompilation: The authorisation of the right holder shall not be required where reproduction of the code and translation of its form within the meaning of points (a) and (b) of Article 4(1) are indispensable to

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obtain the information necessary to achieve the interoperability of an independently created computer program with other programs, provided that the following conditions are met: a. those acts are performed by the licensee or by another person having a right to use a copy of a program, or on their behalf by a person authorised to do so; b. the information necessary to achieve interoperability has not previously been readily available to the persons referred to in point (a); and*244 (c) those acts are confined to the parts of the original program which are necessary in order to achieve interoperability."⁸⁹

The literature reveals that the drafting of the Directive was based on both copyright and competition consideration, and it is aimed at promoting interoperability; interoperability is believed to stimulate competition and innovation, which are mutual aims of copyright law and competition law. Furthermore, this directive offers theoretical foundations for the compulsory disclosure of software interoperability information. The reasoning is as follows: software interoperability information can be unprivileged for reasons of competition and innovation, and compulsory disclosure can achieve the same result; thus, compulsory disclosure is reasonable and should be approved by law.

Under European understanding and practice, compulsory disclosure has prevailed, both in competition law agencies and courts.⁹⁰ After *IMS and Margill*, in 2007, the Court of First Instance (Grand Chamber) approved the fine and the duty to disclose interoperability information imposed against Microsoft by the Commission in 2004 for its refusal to disclose interoperability information.⁹¹ The relevant reasons are as follows: (1) the indispensable nature of the interoperability information; (2) the elimination of competition; (3) the new product; and (4) the absence of objective justification.⁹² Following this decision in 2007, the Belgian Competition Council adopted similar reasoning in imposing compulsory disclosure. In *CRM/Portina*,⁹³ the Belgian Competition Council ordered an ICT company to disclose proprietary information over its electronic network. The reasoning of the order was:

"Portima's refusal to disclose technical specifications hindered or even prevented the compatibility of mastering softwares other than BRIO with AS/2. This refusal is preventing the emergence of a new similar product for which there is a potential demand by the insurance brokers ... rival mastering softwares were being technically foreclosed from the market and competition on a secondary market was eliminated ..."⁹⁴

The evolution of the legal rule in the United States is different from the development in the European Union. After the European Union's Software Directive, the US courts responded quickly. Together with the criticism of the strong protection appearing in cases before the 1990s, in 1992, two cases confirmed that copyright protection does not extend to the interface and approved reverse engineering as being legal. In *Computer Associates Intern., Inc. v Altai, Inc.*,⁹⁵ the District Court held that: "rewritten compatibility component in computer program was not substantially similar to copyrighted component and, therefore, did not infringe it".⁹⁶ In *Sega Enterprises Ltd. v Accolade, Inc.*,⁹⁷

"On manufacturer's motion for preliminary injunction, the District Court, Caulfield, J., held that: ... manufacturer was entitled to preliminarily enjoin competitor from developing, manufacturing, shipping, distributing or selling any video game programs that were compatible on manufacturer's game consoles."⁹⁸

However, in contrast to the situation in the EU market, case law reasoning did not give a legal foundation for the compulsory disclosure of software interoperability information in the United States. This difference appeared in the *Microsoft* decision⁹⁹:

"To the extent that Microsoft still asserts a copyright defense, relying upon federal copyright law as a justification for its various restrictions on original equipment manufacturers (hereinafter OEMs), that defense neither explains nor operates to immunize Microsoft's conduct under the Sherman Act."¹⁰⁰

Apparently, under the US court treatment, the refusal to disclose software interoperability information is

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identified as an attempted monopolisation practice, not as an essential facility abuse.*245

Although after the policy reverse, the refusal to disclose software interoperability information received unfavourable treatment, a number of scholars hold even more radical opinions.¹⁰¹ Some scholars believe that software interoperability information should be open to the public, regardless of the difference between public and private standards,¹⁰² which is far from appropriate. Under a public standard, no other standards are interested in replacing it, and all customers must use this standard. This situation has two consequences: first, no one will invest in and innovate on standards other than the public standard, and therefore, the public standard is under no pressure to be replaced by a new standard. Secondly, the public standard should disclose its interoperability information to all interested parties; in other words, the interoperability information of a public standard should also be public.

In contrast, private dominant standards are de facto standards, formed by consumer choice, and this type of market dominance is different to the dominance of a public standard. First, any new standard is allowed to compete against and potentially replace the de facto standard, and thus, there is competition pressure for the de facto standard, as consumers have other choices. Secondly, because of the first point, the de facto standard has no obligation to publicise its interoperability information, particularly to competitors. If there is compulsory disclosure, it is disadvantageous to market competition and innovation, in the meanwhile it also potentially give competitors a free ride (detailed in part III).

The comparison of public and private standards suggests that private standard information should not be subject to compulsory disclosure because of the need to maintain innovation incentives and market competition.

III. Software interoperability information disclosure and market competition

The current non-favour policy facilitates easy access to interoperability information, which is aimed at stimulating investment in downstream market software development and competition between these software applications, ultimately enable consumers to gain access to more software products, also perhaps at lower prices. However, according to the competition in the software market, this policy is biased: its benefits are at the expense of upstream or platform software innovation and competition, and it hurts the consumer in the long run.

A. Compulsory disclosure software interoperability information and its effect in software market competition

The biased copyright policy not only harms innovation in the upstream market, it also distorts competition in the same market. This aftermath reflects that the function of interoperability information has not been fully understood by legislators, and there also appears to be no clear comprehension of software market competition.

The current prevailing understanding of interoperability information is that it is a facility or technical matter aimed at creating a bottleneck to control downstream market competition.¹⁰³ However, this perspective fails to stand up to scrutiny. The most evident*246 proof is that many firms voluntarily disclose their interoperability information.¹⁰⁴ This voluntary disclosure promotes innovation and competition in the secondary markets. This phenomenon is a very popular market operation in network product market competition.

The software market presents an eminent character of network competition. Interoperability information is a competition facility and an advantage in enlarging network in relevant market. The current interoperability information non-favour policy is alleged to achieve two goals, namely, promoting the number and quality of downstream software products, which stimulates innovation investment, and benefitting consumers by allowing them to access more high-quality software products. However, these alleged achievements are based

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on the sacrifice of the platform software (or primary software), which is a critical consideration. Platform software also has innovation pressure in platform software market competition, and the incentives for innovation in this market should also be maintained. The compulsory disclosure of interoperability information is harmful to this motivation. Interoperability information is developed and provided by the platform software developer to support application software, it is an indispensable part of a platform software. Under the market mechanism, the developer is allowed to recover its investment and profits. Interoperability information, as a property of the platform software owner, also contributes to cost recovery and profits. It is indispensable for maintaining the incentive to continue to invest and innovate. However current policy places software interoperability information in an unfavourable situation, therefore it reduces the source of profits for the platform software owner, and as a complementary result of the injured platform software and platform software market, competition and innovation in the application software market will also be badly undermined.

Software interoperability information as a competitive advantage also benefits market participants from avoiding free riding harm. Through market competition, one product acquires the highest amount of consumers, and an increasing number of consumers are then attracted by this large network. At the same time, if the main network product has secondary markets, enlarging the secondary markets contributes indirectly to enlarging the primary network. Though interoperability is so useful a competitive advantage in the primary market in attracting secondary market consumers, the current non-favour policy against interoperability information directly forbids the possession of this competitive advantage. It not only prevents the primary network from obtaining consumers from secondary markets but also gives a free ride to either primary market competitors or secondary market competitors. This free ride function does not apply to additional services or product promotion but instead to the competitor's competitive advantage—interoperability information. Interoperability information requires financial investment to develop, maintain, and upgrade, and these expenses are all paid by the primary software supplier. Compulsory disclosure allows competitors a free ride on this information because the primary market competitors can use the interoperability information to attract consumers from the primary network, which is vital for the primary network. These consequences demonstrate that the current non-favour policy ultimately harms the primary market competitor and benefits the secondary competitors, which is far from the purpose of competition law—protecting competition, not specific competitors.

In addition to the function of interoperability information in network market competition, the competitive structure of the network market should also be examined. As analysed previously, the competitive relationship in a single-product market is different from the competitive relationship in other market structures. The software market is a market with various different structures, single-product markets, two-sided markets, and multi-sided markets, which pose different competitive characters and thus deserve separate competitive considerations. The software products related to interoperability problems are typically engaged in the primary and secondary markets. This vertically related two-market structure poses a unique character under competition analysis.

As proven by case law, all compulsory disclosure of interoperability information has occurred in vertically integrated primary and secondary markets. These decisions are all against dominant software firms, whereas no non-dominant firm is obligated to disclose its interoperability information. Under compulsory disclosure, this situation is unfair for the dominant platform software supplier in competition with the non-dominant firms because competitors of the dominant firm do not invest in innovating with the interoperability information: they only use it freely or even compete with the dominant firm that offers it. This is only one kind of market structure, besides this one, there are another two: some software firms only compete in the platform software market, whereas other firms own platform software but compete only in the downstream markets. These different situations pose different competitive environments that offer good reasons for examining the compulsory licensing policy.

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For the first situation, where a market player only participates in the platform market, it has no interest in concealing their interoperability information. On the contrary, the route to maximise profit is to voluntarily disclose the interoperability information because this disclosure is the best way to enlarge its network; therefore, there will be no compulsory disclosure problem. For the second situation, market players who own a platform but only compete in the downstream market, interoperability information is vital for them to compete in the downstream market. In this situation, the interoperability information is a competitive advantage for the platform software. Compulsory disclosure allows the competitors to share this advantage and save on investment in developing application platforms. In the end, both of the two markets will be destroyed.

The last situation is more complicated because the competitors compete in two vertically-related markets. Participants in both markets face competitors from both the application and platform markets. The compulsory disclosure of interoperability information, as analysed previously, helps both the application market rivals and platform market rivals. For the extreme situation in which there are firms competing with the dominant firm in both the upstream and downstream markets, they can directly benefit from this policy and obtain a competitive advantage. With such a danger, the software firms' incentive to compete and innovate is dampened considerably.

B. Consumer welfare affected

In case law, courts treat consumer welfare as an important factor in considering the compulsory disclosure of interoperability information. This consideration is because consumer welfare will ultimately be affected under most exclusive practices, whereas in the case of licensing software, in addition to the long-run welfare effect, a short-run welfare effect is manifest. In the Microsoft EU case,¹⁰⁵ consumer welfare is one of the major concerns under court analysis:

"There is no doubt that consumers place great significance on the fact that computer programs are interoperable with the quasi-monopolistic products represented by Windows client PC operating systems"¹⁰⁶;

"The Commission observes that in Microsoft's argument cannot be accepted, as that criterion must be assessed against the aim of preserving an effective competitive structure that benefits consumers."¹⁰⁷

It is true that consumers may benefit from this policy in the short term and within certain scope, which enables them to have more access to software products. As introduced previously, compulsory disclosure policy therefore has a vast audience. After a compulsory disclosure, competing application software may appear, which offers consumers either more choice or a lower price. Moreover, because the interoperability information can also be used on rival platform software, consumers can also switch to different platform software without spending more money. This type of cost saving by switching is also desired by consumers.

However, although the policy that supports the compulsory disclosure of software interoperability information is based on the consideration of promoting consumer welfare, and it is enforced with good intention, the alleged consumer welfare actually harms them in the long run and within a broader scope. Because compulsory disclosure interoperability information harms upstream market players so as to benefit downstream market players, consumers only have more choice in the application software. This benefit, on the other hand, will disable them from having more choices in the platform market. After the platform market is destroyed, the application market will in turn be harmed. Finally the important aim, consumer welfare, will be worse off under the competition and innovation chilling policy.

As analysed previously, consumers play a unique role in market dominance and interoperability, which is important in a network market. The consumer's choices form a network and also raise the switching cost. The cost generated by switching is because consumers choose to switch; it is not associated with the platform software supplier, and it does not relate to a bottleneck effect on follow-on innovation and competition.

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Software interoperability information is one such type of cost, but at the same time it is also an indispensable competition advantage and facility. Compulsory disabling of this advantage harms the platform product suppliers, destroys platform software market competition, and ultimately harms the consumer by preventing the development of advanced platform software. As a factual witness, the software market is a hi-tech market, and competition in innovation in this market should be dynamic—so should be the dominant product. However, it is apparently not dynamic in the platform software market, such as the computer operating system market. Microsoft as a platform software supplier has been a dominant firm for more than a decade.¹⁰⁸ Although the market is apparently not dynamic, and it may not be directly related to compulsory disclosure interoperability information, Microsoft's investment in developing interoperability information, applications, and intergrading products was sunk under the compulsory disclosure policy. Furthermore, after the computer operating system*²⁴⁸ software market competition is distorted, no more new operating system software-based application software will be developed.

C. Reverse engineering of interoperability information and competition

As previously analysed, based on the copyright and competition points, legal policy maintained the interoperability information in a non-favourable status so as to promote downstream market competition, innovation, and consumer welfare. However, the policy does not produce the designed effects; on the contrary, the non-favour legal policy results in unforeseen harm to innovation and competition. Thus, it is necessary to analyse whether there is a better or alternative policy. After compulsory disclosure is abandoned, competitors can no longer develop competing products easily or get a free ride, and competition in innovation in the primary market will be promoted. At the same time, the prevailing consideration may be that non-competing follow-on innovation will be hindered. However, this concern is unnecessary because there are two ways to promote non-competing follow-on innovation. The first way is through a disclosure licence. As a result of network effects, no platform software will reject disclosure to non-competing firms that develop programs that help enlarge the platform user group. Follow-on innovation therefore will not be restrained through such licences. The second way is reverse engineering, through which follow-on innovation will also not be affected. Besides, competition against the platform software and related application software will be promoted.

Reverse engineering serves an important function in the copyrighted product market competition, particularly for competition within a network-featured market. The software market is such a market. Its product—software—is an innovative work and is subject to copyright protection. If its interoperability information is not subject to compulsory disclosure, competitor free riding will be avoided. At the same time, competition in the downstream market will be lessened, and consumer choice will be limited. Reverse engineering acts to counter these potential negative effects. Under a de facto standard network, downstream competitors can only compete by reverse engineering the interoperability information. In this situation, where the interoperability information acts as a downstream market entry barrier, reverse engineering is a legitimate way of overcoming this barrier. Reverse engineering's function of accessing interoperability information can replace compulsory disclosure as a suitable and practical mechanism to stimulate downstream innovation, competition, and consumer welfare. Under compulsory disclosure, upstream market innovation, competition, and long-term consumer welfare are destroyed, whereas exempting interoperability information from compulsory disclosure may reduce the downstream market competition and affect consumer welfare. Reverse engineering parts or all of a copyrighted software product as a mitigation is generally allowed by copyright law. In fact, according to existing research, it is also unlikely to give rise to competition problems.¹⁰⁹ The point presented here is that it offers a legitimate way for competitors to enter the downstream market, and that it also benefits consumers; although reverse engineering may cost investment in the reverse engineering of interoperability information, which acts as the cost for market entry. It is a moderate way to balance competition and copyright, whereas compulsory disclosure is too radical.

D. Refusals to disclose software interoperability information as abuse of market dominance that subject to

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compulsory disclosure

Compared to the essential facility approach for imposing a compulsory licence, which has considerable uncertainty, discontinuing the disclosure of software interoperability information possesses due competitive reasons to warrant compulsory disclosure, although it must be examined under certain circumstances. Refusals to continue to disclose software interoperability information typically occurs in a concentrated market because if the market is not concentrated, market players will have more than one choice, and there will thus be no refusal-originated competition problems. In addition, in such a market, due to network competition, there must be a dominant software supplier that is the de facto supplier of the relevant market. Refusals to continue to disclose software interoperability information are likely to constitute market dominance abuse. However, because software product is protected by copyright law's exclusive control, and there is uncertainty regarding whether software interoperability information should be subject to compulsory disclosure, it costs effort to identify a discontinuation as dominance abuse.

1. Market condition

It is useful to note that this study only considers the unilateral refusal of disclosure. To constitute such a refusal, the prerequisite is to obtain a dominant market position. In the software market, the dominant market position is a de facto industrial standard. The most famous example is the Microsoft Windows software platform, which is a dominant computer operating system. Its dominance and relevant large market share were defined in advance in all dominance abuse decisions involving it. In the Microsoft EU case¹¹⁰:*249

"the Commission finds that Microsoft has had a dominant position on the client PC operating systems market since at least 1996 and also on the work group server operating systems market since 2002. As regards the client PC operating systems market, the Commission relies essentially on the following factors to arrive at that conclusion:- Microsoft's market shares are over 90%".¹¹¹

This far exceeds the minimum EU requirement for market dominance (40%).¹¹² In the *Microsoft US* case,¹¹³ the US requirement for identifying market dominance is much higher:

"Fact that software company with 95% share of relevant personal computer (PC) operating system (OS) market ... Microsoft possesses a dominant, persistent, and increasing share of the worldwide market for Intel-compatible PC operating systems. Every year for the last decade, Microsoft's share of the market for Intel-compatible PC operating systems has stood above ninety percent."¹¹⁴

2. Refusals to disclose software interoperability information as an abuse of market dominance

Although all refusals as abuse occurred in the above market background, even should a market fulfil the above structure, a refusal to disclose software interoperability information should not be prejudicially considered as an abuse because copyright is the right at issue, which grants an exclusive right of controlling the intellectual property, and competition law is helpless in this respect. The expression part of software interoperability information is one such type of intellectual property. In market operation, the disclosure of interoperability is flexible: some software suppliers only compete in the platform market, and they voluntarily disclose the interoperability information to all firms interested in developing applications. Some firms restrict interoperability information to themselves to completely control the application market. Other firms disclose interoperability information to both themselves and rivals.

Regardless of how flexible the market strategy is, when a software copyright holder wishes to recover investment and gain profit from the market, it must obey the market rules and thus obey the law that governs markets—competition law. Software interoperability information is one type of intellectual property, and its disclosure should also obey competition law. Competition law generally protects innovation (and the motive

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to innovate) and consumer welfare and forbids the abuse of market power. If there is a dominant firm, competition law should intervene when interoperability is used to limit competition.

Despite software interoperability information is indispensable for connecting platform and applications and users, in market operation, it can easily be abused as a bottleneck to limit competition. A number of such cases have already appeared in the EU and US markets. The most typical cases are the Microsoft case series, in which Microsoft exclusively discontinued offering its software interoperability information to its application market competitors. In the Microsoft EU case,¹¹⁵ Microsoft was accused of withdrawing its interoperability information to exclude its competitor in the application market:

"Microsoft's refusal constitutes a disruption of previous levels of supply, since the analogous information for previous versions of Microsoft's products had been made available to Sun and to the industry at large, indirectly through a licence to AT&T".¹¹⁶

Microsoft brought this case to the Court of First Instance (Grand Chamber). The court held that

"in the light of Article 82 EC, in order to enable developers of work group server operating systems competing with the dominant developer to remain viably on the market. Should it be established that the existing degree of interoperability does not enable those developers to remain viably on the market, it follows that the maintenance of effective competition on that market is being hindered."¹¹⁷

The court further noted that the judgment is made in exceptional circumstances because the decision finally granted a compulsory disclosure of interoperability information.¹¹⁸ In the Microsoft US case,¹¹⁹ Microsoft was accused of having engaged in a strategy of discontinuing the offer of interoperability information to its application market competitor, which is parallel to the abuse Microsoft practiced in the European Union. The *250 interoperability information Microsoft withheld is a scripting tool that Netscape needed to make its browser compatible with certain dial-up internet service providers (hereinafter ISPs), which had been licensed freely to Netscape and other ISPs.¹²⁰

Comparatively, all of the above cases have one common feature, that is, all of the interoperability information owners had disclosed the interoperability information to the public previously. Under competition analysis, in the situation in which the interoperability information has not been disclosed previously, the interoperability information owner owns the right to refuse to disclose. This is because from a competitive perspective, no application market has been formed, and thus, the competition rules are exempted. Where the interoperability information has previously been disclosed, it still owns the right to refuse new disclosure request; however, once the supplier decides to discontinue disclosure, if the supplier discontinues only against rivals, the exclusion of rivals from this market will be a violation of competition law. As a complementary result of market elimination, consumer welfare is directly affected by a discontinuation, because consumers will then face lessened application product and higher price. Thus, competition law intervention is required to protect consumer welfare and the established market competition from being lessened or destroyed.

3. Remedy and application

Although discontinuing the disclosure of software interoperability information subject to compulsory disclosure is proven to be an appropriate remedy, the remedy must still be applied properly, as there are different standards or bases for identifying whether a discontinuation of disclosure subjects to compulsory disclosure. There is also a problem with the application scope.

There exist two different bases of identifying whether a discontinuation of disclosure software interoperability information subject to compulsory disclosure: the US basis and the EU basis.

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Under the US framework of governing market power abuse, discontinuing the disclosure of software interoperability information is treated under §2 of the Sherman Act. It constitutes either an illegal maintenance of monopoly power or an attempt to monopolise a secondary market. In the MicrosoftUS case,¹²¹ in order to exclude the Netscape web browser software, Microsoft exercised various means, one of relevant strategies being as follows:

"Microsoft licensed Internet Explorer and the Internet Explorer Access Kit to hundreds of Internet access providers (hereinafter IAPs) for no charge. Then, Microsoft extended valuable promotional treatment to the ten most important IAPs in exchange for their commitment to promote and distribute Internet Explorer and to exile Navigator from the desktop."¹²²

This means is used to enhance market control via the Internet Explorer Access Kit, which is the embedded interoperability software. The use of the discontinuation of disclosure of interoperability information is the strategic use of discontinuation—the delayed disclosure:

"Microsoft similarly withheld a scripting tool that Netscape needed to make its browser compatible with certain dial-up internet service providers (hereinafter ISPs). Microsoft had licensed the tool freely to ISPs that wanted it, and in fact had cooperated with Netscape in drafting a license agreement that, by mid-July 1996, needed only to be signed by an authorized Microsoft executive to go into effect."¹²³

After the halted process, however, Microsoft continued the licence.¹²⁴ The delay is an important step in raising Microsoft's market share in the web browser market, which could not happen without Microsoft's dominant power.

Though Microsoft eventually disclosed the interoperability information, its consequence is the same as a discontinuation to disclose, which is why Microsoft's actions were still identified as abuse. As a result, the final judgment is organised as follows: "Microsoft shall disclose to ISVs, IHVs, and OEMs in a Timely Manner, in whatever ...all ...that Microsoft employs to enable".¹²⁵

The US approach is accompanied with negative effects. As analysed above, in the MicrosoftUS case, Microsoft was ordered to "disclose to ISVs, IHVs, and OEMs in a Timely Manner, in whatever ...all ...that Microsoft employs to enable".¹²⁶ This decision opened an overbroad scope for compulsory disclosure, not focusing on case specifics and existing relationships, which may harm software supplier and dampen the incentive to disclose interoperability information. Enlarging the scope of the compulsory disclosure of software interoperability information contradicts both IP law and competition law. From the IP law perspective, right holders are generally exempted from the imposition of new licensing agreements, but this overbroad scope has broken the exemption, which is harmful to IP holders. From the competition law perspective, competition law regulation is only a remedy designed to be adopted when competition²⁵¹ is injured or to protect existing competition from being lessened. As this decision ordered the disclosure of software interoperability information to all players, regardless of whether the firms were affected or not, this competition law obligation made private standard equivalent to public standard. It is a misapplication of competition law. The poor obedience by Microsoft both in the United States¹²⁷ and European Union¹²⁸ is a response to this misapplication and it reflects the fact that compulsory disclosure of software interoperability information orders must be made in a case-specific manner.

The EU basis of identifying a discontinuation of disclosure of software interoperability information as an abuse is different from the US basis. Under the EU system of applying art.102 TFEU, a discontinuation of the disclosure of software interoperability information is identified as an abuse of dominant market power and subject to compulsory disclosure. The identification has four bases: (1) the indispensable nature of the interoperability information¹²⁹; (2) elimination of competition¹³⁰; (3) the new product¹³¹; and (4) the absence

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of objective justification.¹³²This basis evolved from several previous cases, namely *Volvo*,¹³³ *Magill*,¹³⁴ and *IMS Health*.¹³⁵These four bases together form a typical argument in accordance with the reasoning in deciding whether to apply the essential facility doctrine. In other words, discontinuing the disclosure of software interoperability information is identified as rejecting access to an essential facility in the European Union.

The *Microsoft* EU case is also problematic. In this case, the essential facility doctrine is applied to software interoperability information, which poses a potential danger because the software interoperability information is only one part of a piece of software, it has no substantial difference from other parts, it is merely artificially made different from other parts. If the interoperability information part of a piece of software is subject to the essential facility doctrine, other parts of a software may also be logically subject to the essential facility doctrine. This legal rule application is opposite to the general understandings that, first, IP rights are generally not subject to compulsory licensing. Secondly, only public standard IP rights are subject to a disclosure duty; private standard rights are not. This application policy may harm IP holders and their incentive to innovate.

Based on the above analysis, a general standard or some basic elements should be outlined, with which a specific discontinuation of disclosure of software interoperability information as an abuse of market power can be identified, at the same time as an IP right and the incentive to innovate are also sufficiently concerned.

In addition to the premise of finding dominance, the first element of identifying an abuse in the interoperability information disclosure should be that the software interoperability information has been previously disclosed to engaged firms. This prerequisite should be affirmed because the expression part of software interoperability information is a kind of IP, whereas the right holders of IP works have an exclusive right to license or refuse to license. Also, previously undisclosed interoperability information is not subject to compulsory disclosure. This principle will be beneficial to EU case law analysis. For instance, in *Virgin Mega v Apple Computer France*¹³⁶:

"the French complainant, Virgin Mega, sought to obtain a license to use Apple's proprietary information,¹³⁷ which would have permitted Virgin's downloads to run on iPod. The FCA (French competition authority) was then asked to assess*²⁵² whether this met the requirements of an abuse of a dominant position under French and EU competition law."¹³⁸

The FCA spent many paragraphs defining relevant markets and identifying the indispensability of Apple's DRM¹³⁹ and finally concluded that Apple's practice is not abuse. It did not notice that *Virgin Mega's* request for access regards an IP rights-protected work that was not previously licensed to it. This point is sufficient to make a prima facie judgment that Apple's action is not abuse. In addition, because Apple has the freedom to duplicate its IP rights works, and there is no further evidence of a competitive market generated by Apple's previous licensing, such a refusal generates no anti-competitive effects.

The second element is that the discontinuation of disclosure of software interoperability information establishes the possibility of eliminating competitors. This element is emphasised by both the US and EU competition law enforcers. The slight difference is that the EU approach does not focus primarily on market elimination but considers follow-on innovation, competition, and consumer welfare. However, these factors are homogeneous effects of market elimination. And in fact, the European Union and United States are in agreement on this element. Further, compulsory disclosure, as a competition law remedy, focuses on ex post effects. Market elimination as the most important indication should naturally be considered as a sign for competition remedy intervention.

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The third element is closely related to the second element, which is that the discontinuation of disclosure of the software interoperability information has no efficiency outcome that can offset the anti-competitive effects of discontinuation. This element has the function of offering a third element and a defence for the three elements. Because there exist practices that appear to restrict competition, but they also generate efficient outcomes, like saving costs, generating advanced products, which can offset its anti-competitive effects to different extents. The software market is featured as an innovation-based market; it is dynamic in competition and innovation. Compulsory disclosure is a very powerful competition law remedy, it can change market structure immediately, which is a threat to a dynamic market. To the extreme situation, if it is applied without considering and balancing its negative and positive effects on both competition and innovation, a whole market can be destroyed. The third element protects justified competition and innovation in this market and thus helps avoid possible harm to the copyright holder.

IV. Conclusion

At the interface of IP rights and competition law, imposing a compulsory licensing duty always requires the consideration of many factors. Two factors are always the most important: competition in innovation and competition order. However, it is not easy to make an ideal decision on imposing a compulsory licensing duty, because IP rights and competition must be balanced in innovation-only markets.

According to legal practices in the EU and US software markets, the compulsory disclosure of software interoperability information has not received good obedience in either of these two regions. There are two reasons for this phenomenon. First, some compulsory disclosures suffer from biased aims: they either focus on one product market but neglect that the fact many products are vertically and horizontally related; or they focus only on short-term benefits, but impose a compulsory disclosure duty which ultimately harms long-term benefits. Secondly, some compulsory disclosures were imposed with an over-broad scope, which harms IP rights and competition, ultimately making it difficult for firms to obey.

Nonetheless, in the software market, compulsory disclosure against unilateral licensing should generally be avoided. It should only be adopted when the relevant market can be monopolised. Furthermore, should a duty be granted, the duty should be imposed within a scope of not exceeding existing contracts.

Qiang Yu

Research fellow

Europa Institute of Leiden University Law School

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 3. Continental Paper Bag Co v Eastern Paper Bag Co 210 U.S. 405, 28 S.Ct. 748 U.S. (1908).
 4. Continental Paper Bag Co 210 U.S. 405, 28 S.Ct. 748 U.S. (1908) at 406–414.
 5. Continental Paper Bag Co 210 U.S. 405, 28 S.Ct. 748 U.S. (1908) at 429–430.
 6. 35 USC s.271(a) — Infringement of patent.
 7. Under certain circumstance intellectual property will suffer compulsory licensing out of public interest

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reasons. This principle appears in legislations for instance US legislation: Clear Air Act and Atomic Energy Act), case law (City of Milwaukee v Activated Sludge Inc 69 F.2d 577 (7th Cir. 1934)) and even international trade treaties (TRIPS). Relevant legal analysis please see: Kurt M. Saunders, "Patent Nonuse and the Role of Public Interest as a Deterrent to Technology Suppression" (2002) 15 Harv. J. L. & Tech.; Ruth E. Freeburg, "No Safe Harbor and No Experimental Use: Is it Time for Compulsory Licensing of Biotech Tools?" (2005) 53 Buff. L. Rev.; Cole M. Fauver, "Compulsory Patent Licensing in the United States: An Idea Whose Time Has Come" (1988) 8 Nw. J. Int'l L. & Bus.; Aditi Bagchi, "Compulsory Licensing and the Duty of Good Faith in TRIPS" (2003) 55 Stan. L. Rev.

8. Hartford-Empire Co v United States 323 U.S. 386.

9. Hartford-Empire 323 U.S. 386 at 432–433. Citing: United States v American Bell Telephone Co 167 U.S. 224, 249, 17 S.Ct. 809, 814, 42 L.Ed. 144; Continental Paper Bag Co 210 U.S. 405, 424, 429, 430, 28 S.Ct. 748, 753, 755, 756, 52 L.Ed. 1122.

10. SCM Corp v Xerox Corp. 645 F.2d 1195 C.A.Conn. 1981 (March 12, 1981).

11. SCM Corp 645 F.2d 1195 C.A.Conn. 1981 (March 12, 1981) at 1206.

12. *Guidance on the Commission's enforcement priorities in applying article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:045:0007:0020:EN:PDF> [Accessed March 6, 2014].

13. *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:045:0007:0020:EN:PDF> [Accessed March 6, 2014], p.75.

14. Intergraph Corp v Intel Corp 195 F.3d 1346 C.A.Fed. (Ala.) (1999).

15. Intergraph Corp 195 F.3d 1346 C.A.Fed. (Ala.) (1999) at 1362.

16. US v Microsoft Corp 87 F.Supp.2d 30 D.D.C. (2000); Golan v Pingel Enterprise Inc. 310 F.3d 1360 C.A.Fed. (Cal.) (2002); Maris Distributing Co v Anheuser-Busch Inc. 302 F.3d 1207 C.A.11 (Fla.) (2002); In re Remeron Antitrust Litigation 335 F.Supp.2d 522 D.N.J. (2004); Daisy Mountain Fire Dist v Microsoft Corp. 547 F.Supp.2d 475 D.Md. (2008); SolidFX LLC v Jeppesen Sanderson Inc. 935 F.Supp.2d 1069 D.Colo. (2013).

17. Donald S. Chisum, *Patents* (Matthew Bender, 1978), para.19.04[3], at 19.120; Richard Holzmann, "Infringement of the United States Patent Right: A Guide for Executives and Attorneys" (August 30, 1995), p.150; James B. Kobak, "Intellectual Property Misuse: Licensing and Litigation" (Aba Professional Education June 2000), p.37; Antitrust Guidelines for the Licensing of Intellectual Property Issued by the US Department of Justice and the Federal Trade Commission April 6, 1995, at 2.3, "Procompetitive benefits of licensing".

18. The author writes this description based on Mazer v Stein 347 U.S. 201, 74 S.Ct. 460 U.S. (1954). Literature please see: Marshall A. Leaffer, *Understanding Copyright Law, 2nd edn.* (Matthew Bender, 1995), pp.3–4; David H. Kramer, "Who Can Use Yesterday's News?: Video Monitoring and the Fair Use Doctrine" (1993) 81 Geo.L.J. 2345, 2352.

19. In re Independent Service Organizations Antitrust Litigation 203 F.3d (Fed.Cir. 2000)

20. Glass Equipment Development Inc v Besten Inc 174 F.3d 1337 C.A.Fed. (W.Va.) (1999). Glass Equipment Development Inc, a patent owner who brings suit to enforce the statutory right to exclude others from making, using, or selling the claimed invention is exempt from the antitrust laws, even though such a suit may have an anti-competitive effect, unless the infringement defendant proves one of two conditions.

21. In re Independent Service Organizations Antitrust Litigation 203 F.3d 1326–1329 (Fed.Cir. 2000)

22. AB Volvo v Erik Veng (UK) Ltd (238/87) [1988] E.C.R. 6211, October 5, 1988.

23. AB Volvo [1988] E.C.R. 6211 at Summary 1 and judgment [8].

24. Phillip Areeda, "Essential Facilities: An Epithet in Need of Limiting Principles" (1990) 58 Antitrust L.J. 841. Other criticism please see Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its*

(Cite as:)

Practice, 4th edn (West Academic Publishing, 2011), pp.336–340.

25. Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice, 4th edn (West Academic Publishing, 2011), p.337*(citation omitted).
26. Hecht v Pro-Football Inc 570 F.2d 982, 992 (D.C. Cir. 1977); Venture Technology Inc v National Fuel Gas Co 1980–81 Trade Cas.(CCH) 63,780, at 78,167 (W.D.N.Y. 1981); Fishman v Wirtz, 1981–2 Trade Cas.(CCH) 1 64,378(ND Ill. 1981); United States v Realty Multi-List Inc 629 F.2d 1351 (5th Cir. 1980); Byars v Bluff City News Co 609 F.2d 843, 859–64 (6th Cir. 1979); General Motors Corp (Crash Parts) 3 Trade Reg.Rep. (CCH) 21,931 (FTC 1982).
27. United States v Terminal R.R. Ass'n 224 U.S. 383, 32 S.Ct. 507, 56 L.Ed. 810 (1912).
28. Otter Tail Power Co v United States 410 U.S. 366, 93 S.Ct. 1022, 35 L.Ed.2d 359 (1973).
29. Aspen Skiing Co v Aspen Highlands Skiing Corp 472 U.S. 585, 105 S.Ct. 2847, 86 L.Ed.2d 467 (1985), Aspen Highlands Skiing Corp v Aspen Skiing Co 738 F.2d 1509, 1521 (10th Cir.1984), aff'd on other grounds.
30. MCI Communications Corp v American Tel & Tel Co, 708 F.2d at 1132–33 (7th Cir.), cert denied, 464 U.S. 891 (1983) at IV.A. 1.
31. Richard Whish and David Bailey, *Competition Law, 7th edn (Oxford: Oxford University Press, 2012)*.
32. Herbert J. Hovenkamp, "Unilateral Refusals to Deal, Vertical Integration, and the Essential Facility Doctrine" (*Univ. of Iowa Legal Studies, Research Paper No.08-31, 2008*), p.4, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1144675[March 6, 2014].
33. In certain circumstances, in a secondary market, even when the primary good has substitutes, it can still be indispensable and constitutes an essential facility because of interoperability problems. However, in this situation, it is not rational for competitors to enter such a small market. In fact, there are other solutions for access, which raises the second point.
34. Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice, 3rd edn (West Group, 2005), pp.310–311*.
35. Pamela Samuelson and Suzanne Scotchmer, "The Law and Economics of Reverse Engineering" (2002) 111(7) Yale L.J. 1577, citation omitted. Reverse engineering has a long history as an accepted practice. What it means, broadly speaking, is the process of extracting know-how or knowledge from a human-made artifact. Lawyers and economists have endorsed reverse engineering as an appropriate way to obtain such information, even if the intention is to make a product that will draw customers away from the maker of the reverse-engineered product.
36. Atari Games Corp v Nintendo of America Inc 975 F.2d 832 (Fed.Cir. 1992).
37. Atari Games Corp 975 F.2d 832 (Fed.Cir. 1992) at [24].
38. Sega Enterprises Ltd v Accolade Inc. 977 F.2d 1510 C.A.9 (Cal.)(1992).
39. Sega Enterprises Ltd 977 F.2d 1510 C.A.9 (Cal.)(1992) at 1515.
40. Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs (codified version), OJ L111/16 (May 5, 2009).
41. Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs (codified version), OJ L111/16 (May 5, 2009), art.6 Decompilation 1.
42. Samuelson and Scotchmer, "The Law and Economics of Reverse Engineering" (2002) 111(7) Yale L.J. 1582.
43. Sega Enterprises Ltd v Accolade Inc 977 F.2d 1510 (1993).
44. Sega Enterprises Ltd 785 F.Supp. 1392 N.D.Cal. (1992).
45. Sega Enterprises Ltd 785 F.Supp. 1392 N.D.Cal. (1992).
46. Sega Enterprises Ltd 785 F.Supp. 1392 N.D.Cal. (1992) at A.
47. Sega Enterprises Ltd 785 F.Supp. 1392 N.D.Cal. (1992) at A.
48. SAS Institute Inc v World Programming Ltd (C-406/10) [2012] 3 C.M.L.R. 4 (May 2, 2012), available at: <http://curia.europa.eu/juris/liste.jsf?language=en&num=C-406/10>[Accessed March 6, 2014].
49. Sega Enters Ltd v Accolade Inc 977 F.2d 1510 (9th Cir. 1992), as amended, 1993 U.S. App. LEXIS 78

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(9th Cir. 1993).

50. The author's generalisation is based on the Opinion of Advocate General Bot delivered on November 29, 2011 in *SAS Institute* [2012] 3 C.M.L.R. 4at II - Facts and main proceedings.

51. Opinion of Advocate General Bot delivered on November 29, 2011 in *SAS Institute* [2012] 3 C.M.L.R. 4at III - The questions referred for a preliminary ruling

52. *SAS Institute* [2012] 3 C.M.L.R. 4at [46], [71] ECJ (Grand Chamber).

53. It is noticed there are different kinds of IP goods, most IP goods have competing ones. However, certain kinds of IP goods cannot have competing products and practically can't be duplicated, such as copyrighted databases. Whether his kind of IP goods applies to essential facility doctrine is an academic frontier. Despite of this, some decisions had applied the doctrine. In *BellSouth Adver & Publ'g Corp v Donnelley Info Publ'g Inc* 719 F. Supp. 1551, (S.D. Fla. 1988), the decision formulates: Although the doctrine of essential facilities has been applied predominantly to tangible assets, there is no reason why it could not apply, as in this case, to information wrongfully withheld. The effect in both situations is the same: a party is prevented from sharing in something essential to compete (at 1566). Similar situations also appeared in *Rural Tel Serv Co Inc v. Feist Publ'ns Inc* 737 F. Supp. 610, 617-20 (D. Kan. 1990)

54. Herbert Hovenkamp, Mark D. Janis and Mark A. Lemley, "Unilateral Refusals to License" (2006) 2 J. Competition L. & Econ. 42.

55. *Radio Telefils Eireann (RTE) v Commission* (C-241/91 P & C-242/91 P) [1995] E.C.R. I-743.

56. *Radio Telefils Eireann* [1995] E.C.R. I-743at [56]; citation omitted.

57. A.B. Lipsky and G. Sidak, "Essential facilities" (1999) 51 *Stan.L. Rev.* 1187, 1219; F. L  veque, "Innovation, leveraging and essential facilities: Interoperability licensing in the EU Microsoft case" (2005) 28 *W. Comp.* 71, 82; H. Hovenkamp, "IP ties and Microsoft's rule of reason" (2002) 47 *Antitrust Bulletin* 272-273; T.F. Cotter, "Intellectual property and the essential facilities doctrine" (1999) 44 *Antitrust Bulletin* 214; I. Govaere, "In Pursuit of an Innovation Policy Rationate: Stakes and Limits under Article 82 TEC" (2008) 31(4) *W. Comp.* 548; Sergio Baches Opi, "The Application of the Essential Facilities Doctrine to Intellectual Property Licensing in the European Union and the United States: Are Intellectual Property Rights Still Sacrosanct?" (2001) 11 *Fordham Intell.Prop.Media & Ent L.J.* 409; Valentine Korah, "The Interface between Intellectual Property and Antitrust: the European Experience" (2002) 69(3) *Antitrust L.J.* 801-839.

58. *IMS Health GmbH & Co OHG v NDC Health GmbH & Co KG* (C-418/01) [2004] E.C.R. I-5039.

59. *IMS v NDC* [2004] E.C.R. I-5039at [37].

60. *IMS v NDC* [2004] E.C.R. I-5039at [34]-[52].

61. *Data General Corp. v Grumman Systems Support Corp.* 36 F.3d 1147 C.A.1 (Mass.), (1994).

62. *Data General Corp. v Grumman Systems Support Corp.* 36 F.3d 1147 C.A.1 (Mass.), (1994)at I. Background.

63. *Computer Systems Support Corporation*, one of the defendants.

64. *Data General Corp. v Grumman Systems Support Corp.* 36 F.3d 1147 C.A.1 (Mass.), (1994)at III.B. *Grumman's Antitrust Counterclaims.*

65. *Aspen Skiing Co. v Aspen Highlands Skiing Corp.* 472 U.S. 585, 105 S.Ct. 2847 U.S.Colo., (June 19, 1985).

66. *Miller Insituform, Inc. v Insituform of North America, Inc.* 830 F.2d 606 C.A.6 (Tenn.), (1987).

67. *Aspen Skiing Co. v Aspen Highlands Skiing Corp.* 472 U.S. 585, 105 S.Ct. 2847 U.S.Colo., (June 19, 1985).

68. *Miller Insituform, Inc. v Insituform of North America, Inc.* 830 F.2d 606 C.A.6 (Tenn.), (1987).

69. *Miller Insituform, Inc. v Insituform of North America, Inc.* 830 F.2d 606 C.A.6 (Tenn.), (1987)at 609-610.

70. *Miller Insituform, Inc. v Insituform of North America, Inc.* 830 F.2d 606 C.A.6 (Tenn.), (1987)at III[1], [2], [3].

71. *Image Technical Services, Inc. v Eastman Kodak Co.* 125 F.3d 1195 C.A.9 (Cal.), (1997).

72. *U.S. v Microsoft Corp.* 87 F.Supp.2d 30 D.D.C., (2000).

(Cite as:)

73. *Image Technical Services, Inc. v. Eastman Kodak Co.* 125 F.3d 1195 C.A.9 (Cal.), (1997)at I.
74. *Image Technical Services, Inc. v. Eastman Kodak Co.* 125 F.3d 1195 C.A.9 (Cal.), (1997), at VI [39] & [40].
75. *U.S. v Microsoft Corp.* 87 F.Supp.2d 30 D.D.C., (2000).
76. *U.S. v Microsoft Corp.* 87 F.Supp.2d 30 D.D.C., (2000).
77. *U.S. v Microsoft Corp.* 87 F.Supp.2d 30 D.D.C., (2000)at 29–30.
78. E.C.Kubie, "Recollections of the first software company" (1994) 16(2) IEEE Annals of the History of Computing 65."Computer Usage Company (CUC), the world's first computer software company, was founded by John W. Sheldon and me in March 1955."
79. US legislation: Copyright Act of 1976, Pub.L. No. 94-553, 90 Stat. 2541.Sec. 117. // 17 USC 117. // Scope of exclusive rights: Use in conjunction with computers and similar information systems Notwithstanding the provisions of sections 106 through 116 and 118, this title does not afford to the owner of copyright in a work any greater or lesser rights with respect to the use of the work in conjunction with automatic systems capable of storing, processing, retrieving, or transferring information, or in conjunction with any similar device, machine, or process, than those afforded to works under the law, whether title 17 or the common law or statutes of a State, in effect on December 31, 1977, as held applicable and construed by a court in an action brought under this title.
80. *Apple Computer, Inc. v Franklin Computer Corp.* 714 F.2d 1240 C.A.Pa., (1983).
81. *Apple Computer, Inc. v Franklin Computer Corp.* 714 F.2d 1240 C.A.Pa., (1983)at II.
82. *Apple Computer, Inc. v Franklin Computer Corp.* 714 F.2d 1240 C.A.Pa., (1983). at [1], [2], [9].
83. *Whelan Associates, Inc. v Jaslow Dental Laboratory, Inc.* 797 F.2d 1222 C.A.3 (Pa.), (1986).
84. *Whelan Associates, Inc. v Jaslow Dental Laboratory, Inc.* 797 F.2d 1222 C.A.3 (Pa.), (1986).
85. Proposal for a Council Directive on the Legal Protection of Computer Programs, [1989] OJ C91/4 (citing Alan K. Palmer and Thomas C. Vinje, "The EC Directive on the Legal Protection of Computer Software: New law governing software development" (1992) 2 Duke J. Comp. & Int'l L. 65.
86. Palmer and Vinje, "The EC Directive on the Legal Protection of Computer Software: New law governing software development" (1992) 2 Duke J. Comp. & Int'l L. 65, 68.
87. Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs.It is replaced byDirective 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs.
88. Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs, art.1, Object of protection.
89. Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs, art.6, De-compilation 1.(c).
90. *Microsoft Corp v Commission of the European Communities (T-201/04)* [2007] E.C.R. II-3601; Belgian Competition Council (Raad voor de Mededinging), February 14, 2007, Decision 2007-V/M-07,NV Computer Resource Management - DEV - NV Computer Resource Management - TEC / CVBA Portima, Case MEDE-V/M-03/0060; French Competition Council (Conseil de la concurrence), February 25, 2008, Decision n° 08-D-04 regarding conduct of Nouvelles Messageries de la Presse Parisienne.
91. Order of the President of the Court of First Instance of July 26, 2004.*Microsoft Corp v Commission of the European Communities (T-201/04 R 1)* [2004] E.C.R. II-2977.
92. European Court of First Instance in*Microsoft v Commission (T-201/04)* [2007] E.C.R. II-3601, at findings of the court.
93. Belgian Competition Council (Raad voor de Mededinging), February 14, 2007, Decision 2007-V/M-07,NV Computer Resource Management - DEV - NV Computer Resource Management - TEC / CVBA Portima, Case MEDE-V/M-03/0060.
94. For a similar decision please see: French Competition Council (Conseil de la concurrence), February 25, 2008, Decision n° 08-D-04 regarding conduct of Nouvelles Messageries de la Presse Parisienne.
95. *Computer Associates Intern., Inc. v Altai, Inc.* 775 F. Supp. 544 E.D.N.Y. (1991).

(Cite as:)

96. Decision on copyright protection does not extend to interface was reaffirmed in appeal decision. *Computer Associates Intern., Inc. v Altai, Inc.* 982 F.2d 693 C.A.2 (N.Y.), 1992. December 17, 1992. The Court of Appeals, Walker, Circuit Judge, held that: (1) non-literal elements of compatibility component of rewritten computer program were not substantially similar to copyrighted work; (2) use of expert evidence in determining substantial similarity between computer programs was not an error.

97. *Sega Enterprises Ltd* 785 F.Supp. 1392 N.D.Cal. (1992).

98. Decision on reverse engineering of computer program code a fair and non-infringing use was reaffirmed in appeal decision. *Sega Enterprises Ltd. v Accolade, Inc.* 977 F.2d 1510 C.A.9 (Cal.), 1992. October 20, 1992. The Court of Appeals, Reinhardt, Circuit Judge, held that use of copyrighted computer work to gain understanding of unprotected functional elements was fair use of copyrighted work.

99. See *U.S. v Microsoft Corp.* 87 F.Supp.2d 30 D.D.C., (2000)(conclusion of law) at ii.

100. *U.S. v Microsoft Corp.* 87 F.Supp.2d 30 D.D.C., (2000).

101. Ulla-Maija Mylly, "An evolutionary economics perspective on computer program interoperability and copyright", at 284–315, 41 IIC (3) (2010). As interoperability information holds a key position in the software industry, these rules are of paramount importance. From the perspective of evolutionary economics, there should not be strong monopoly rights for bottleneck technologies, rather possible intellectual property rights should only provide narrow protection for such elements in a system technology. The reason for this is that one actor should not alone decide a direction for future innovations in system or cumulative technologies. Due to bounded rationality, one actor is unable to fully see all the possibilities of innovation. If intellectual property protection, and the protection of the interfaces in particular, are strong, the legal rules are inefficient since all technological possibilities will not be utilized. The legal rules need to enable a broader scope of the trial-error-correction procedure. Access to interoperability information lowers the barriers for new firms to enter into software markets. From the perspective of evolutionary economics, the existence of new firms is of paramount importance for radical innovations to take place. It is the new entrant firms with a sufficient amount of new technology users that provide a competitive pressure for technological paradigms to change; Pamela Samuelson, "The past, present and future of software copyright: interoperability rules in the European Union and United States" [2012] 34(4) E.I.P.R. 229. Adoption of the Software Directive in 1991 brought considerable stability to the legal protections for computer programs in the European Union, just as *Altai* and *Sega* brought similar stability to US software copyright law. The pro-interoperability rules of both jurisdictions have contributed to the phenomenal growth of this industry, allowing new entrants to the market for complementary and competing products. Consumers have benefited considerably from the availability of a wide range of interoperable information technologies. For more related literature please see: *Urs Gasser and John Palfrey, "Breaking down Digital Barriers: When and How ICT Interoperability Drives Innovation" (2007)* <http://cyber.law.harvard.edu/interop/pdfs/interop-breaking-barriers.pdf> [Accessed March 11, 2014].

102. W.R. Cornish proposed going further and requiring that all interoperability information be put into the public domain (*Kevin Coates, Competition Law and Regulation of Technology Markets (Oxford University Press, 2011), p.238*). European Commissioner for the Digital agenda (and former Competition Commissioner) Neelie Kroes conveys in order to facilitate interoperability between different products and services turn all standard into public is efficient and suggests legislation: "More transparency in formal standard-setting can lead to more efficient outcomes ... I am still a big fan of open standards. I believe in openness, and I believe in practicing what one preaches. Some observers think 'open standards' is a tainted term that should not to be used in the absence of a generally recognised definition. Others act as if a policy document that does not mention 'open standards' would automatically lack merit. My position is in between ... Some standard-setting bodies already have ex-ante disclosure rules, so why not all of them? This is a matter of efficiency in my opinion. And surely, as a matter of effectiveness, when the Commission mandates standards bodies to draw up a standard it should have the right to be more demanding on the standardization process, to ensure that standards are less demanding when it comes to their adoption. We could also think about enticing other standards bodies to adopt such rules, for example by giving their outputs preferential treatment when approving them as European standards. Finally, why not tie the public financing of standards bodies to the ex-

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istence of good ex-ante rules?"

103. Dermot Nolan, "Bottlenecks in Pay Television, Impact on Market Developments in Europe" (1997) 21 *Telecomm.Pol'y.* 597; Robert P. Merges, "Intellectual Property Rights and New Institutional Economics" (2000) 53 *Vand.L. Rev.* 1857, 1863–1684; Donna Patterson, Robert Pitofsky and Jonathan Hooks, "The Essential Facilities Doctrine Under United States Antitrust Law" (2002) 70 *Antitrust L.J.* 443–462; Ulla-Maija Mylly, "An evolutionary economics perspective on computer program interoperability and copyright" (2010) 41(3) *IIC* 284–315; Eliza Varney, "Winners and Losers in the Communications Sector: An Examination of Digital Television in the United Kingdom Minnesota" (2005) 6 *Minn.J.L.Sci.&Tech.* 645; Jay Pil Choi, "Compulsory licensing as an antitrust remedy" (2010) 2(1) *W.I.P.O.J.* 74–81; For case study please see: *Otter Tail Power Co. v United States*, 410 U.S. 366 (1973); *United States v Terminal R.R. Ass'n*, 224 U.S. 383 (1912); *MCI Communications Corp. v AT&T*, 708 F.2d 1081, 1132 (7th Cir. 1982).

104. Torsten J. Gerpott, Sandra E. Thomas and Alexander P. Hoffmann, "Intangible asset disclosure in the telecommunications industry" (2008) 9(1) *Journal of Intellectual Capital* 48. The possibility to use material already produced for other purposes, coupled with public social responsibility pressures on large TNOs, could be major reasons to explain the relatively high disclosure quality concerning human capital. The low innovation capital disclosure qualities in both annual reports and on websites may be an outcome of the low R&D intensity of TNOs "delegating" most of their technical development work to their network vendors (cf. Gerpott, 2006) and the high degree of network standardization across TNOs due to interoperability reasons. Similar literature please see: *D. Remenyi (ed.) Proceedings of the 5th European Conference on e-Government (ECEG 2005) at 2.2.2 Voluntary supplier-led standards 580-583; Ioannis Kokkoris and Ioannis Lianos (eds), The Reform of EC Competition Law: New Challenges (Kluwer Law International, 2010), p.337*.

105. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601.

106. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601 at [149].

107. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601 at [355].

108. Microsoft's monopoly practices and dominant position abuse were recognised by US courts in the last decade of the 20th century, now Microsoft is still recognised to be the dominant firm in many software markets. Here are two cases that confirms Microsoft's dominance in different periods: 1. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601 at [30]. In the contested decision, the Commission finds that Microsoft has had a dominant position on the client PC operating systems market since at least 1996; 2. *MiniFrame Ltd. v Microsoft Corp.* Slip Copy, 2013 WL 1385704 S.D.N.Y., (2013). MiniFrame finally asserts that Microsoft's pricing of its MPS multi-user software was predatory within the meaning of the antitrust laws. However, this claim too falls short. Predatory pricing occurs when "a single firm, having a dominant share of the relevant market, cuts its prices in order to force competitors out of the market, or perhaps to deter potential entrants from coming in."

109. Mindy J. Weichselbaum, "The EEC Directive on the Legal Protection of Computer Programs and U.S. Copyright Law: Should Copyright Law Permit Reverse Engineering of Computer Programs?" (1990) 14 *Fordham Int'l L.J.* 4. The fear that larger software manufacturers will monopolize their strong market position is unwarranted. Prominent software manufacturers already publicly distribute the information needed to create interoperable programs. Additionally, the third party author has numerous alternatives to decompiling that provide the information needed to create an interoperable program.

110. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601.

111. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601 at [30], [31]. Similar situation also appear in: French Competition Council (Conseil de la concurrence), February 25, 2008, Decision n° 08-D-04 regarding conduct of *Nouvelles Messageries de la Presse Parisienne*; Belgian Competition Council (Raad voor de Mededinging), February 14, 2007, Decision 2007-V/M-07, *NV Computer Resource Management - DEV - NV Computer Resource Management - TEC / CVBA Portima*, Case MEDE-V/M-03/0060

112. Commission decision 2000/74/EC of 14 July 1999, *Virgin/British Airways*, [2000] OJ L30.

113. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999) (Findings of Fact).

(Cite as:)

114. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999)(Findings of Fact).at [35].
115. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601.
116. Commission Decision of 24 May 2004 relating to a proceeding pursuant to Article 82 of the EC Treaty and Article 54 of the EEA Agreement against Microsoft Corporation (Case COMP/C-3/37.792 — Microsoft).Available at:<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:032:0024:0024:EN:PDF>[Accessed March 11, 2014].
117. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601at [4].
118. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601at [6].The court explained the three elements:in the first place, the refusal relates to a product or service indispensable to the exercise of a particular activity on a neighbouring market; in the second place, the refusal is of such a kind as to exclude any effective competition on that neighbouring market; in the third place, the refusal prevents the appearance of a new product for which there is potential consumer demand.
119. *United States v Microsoft Corp.* 87 F.Supp.2d 30.(D.D.C., 2000).
120. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999)at 92.
121. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999)at 250–306.
122. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999)and*United States v Microsoft Corp.*, 87 F. Supp. 2d 30 (D.D.C. 2000)at ii.
123. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999).
124. *United States v Microsoft Corp.*, 84 F.Supp.2d 9 (D.D.C.1999).
125. *United States v Microsoft Corp.*, 97 F.Supp.2d 59 (D.D.C. 2000), at iii.b "in mid-August, a Microsoft representative informed Netscape that senior executives at Microsoft had decided to link the grant of the license to the resolution of all open issues between the companies".
126. *United States v Microsoft Corp.*, 97 F.Supp.2d 59 (D.D.C. 2000).
127. In January,*New York v Microsoft Corp.*, 531 F. Supp. 2d 141, 144 (D.D.C. 2008)(D.D.C. Decree Extension 2008).In April 2009, the parties agreed to extend the "Surviving Provisions" of the final judgments, including §III.E, at least until May 12, 2011.*Joint Motion to Modify Final Judgment and Supporting Memorandum of Points and Authorities*,*United States v Microsoft Corp.*, No. 98-1232 (D.D.C. Apr. 16, 2009), available at<http://www.usdoj.gov/atr/cases/f244900/244921.pdf>[Accessed March 11, 2014].Judge Kollar-Kotelly agreed to the extension.Second Modified Final Judgment,*United States v Microsoft Corp.*, No. 98-1232, § V.A (D.D.C.Apr. 22, 2009), available at<http://www.usdoj.gov/atr/cases/f245100/245110.pdf>[Accessed March 11, 2014].(citing fn.2 of article: William H. Page and Seldon J. Childers, "Measuring Compliance with Compulsory Licensing Remedies in the American Microsoft Case" (2009) 76 *Antitrust L.J.* at 239.
128. Commission imposes €899 million penalty on Microsoft for non-compliance with March 2004 Decision, February 27, 2008.http://europa.eu/rapid/press-release_IP-08-318_en.htm[Accessed March 11, 2014].The European Commission has imposed a €561 million fine on Microsoft for failing to comply with its commitments to offer users a browser choice screen enabling them to easily choose their preferred web browser.Event Date: March 6, 2013.http://europa.eu/rapid/press-release_IP-13-196_en.htm[Accessed March 11, 2014].
129. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601at [337]–[436].
130. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601at [437]–[620].
131. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601at [621]–[665].
132. *Microsoft v Commission* (T-201/04) [2007] E.C.R. II-3601at [666]–[712].
133. *AB Volvo v Erik Veng (UK) Ltd* (C-238/87) [1988] E.C.R. 6211; [1989] 4 C.M.L.R. 122.A refusal to supply case on IP law protected products, the compulsory supply order was made based on the foreclosure of secondary market.
134. *Radio Telefis Eireann v Commission of the European Communities* (C-241/91 P) [1995] E.C.R. I-743.Emphasis exceptional circumstances refusal to license is abusive if: (a) the requested product is indis-

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pensable in the market competition; (b) refuse to license is likely to prevent the emerge of new products and potential consumer welfare is likely be undermined; (c) the refusal lead to eliminating competition; and (d) the refusal is not objectively justified.

135. IMS Health GmbH & Co OHG v NDC Health GmbH & Co KG (C-418/01) [2004] E.C.R. I-5039at [38].The decision notes for elements in finding an abuse in refusal to license circumstances: (i) The product or service protected by copyright must be indispensable for carrying on a particular business.(ii) The refusal prevents the emergence of a new product for which there is potential consumer demand. (iii) The refusal is not objectively justified.(iv) The refusal is such as to exclude any competition on the secondary market.

136. Décision n° 04-D-54 du 9 novembre 2004 relative à des pratiques mises en œuvre par la société Apple Computer, Inc. dans les secteurs du téléchargement de musique sur Internet et des baladeurs numériques<http://www.autoritedelaconcurrence.fr/pdf/avis/04d54.pdf>[Accessed March 11, 2014].

137. This proprietary information allowing Virgin Mega to make music downloads compatible with and accessible to Apple's portable player.

138. Giuseppe Mazziotti: "Did Apple's refusal to license proprietary information enabling interoperability with its iPod music player constitute an abuse under Article 82 of the EC Treaty?"(2005) 28 W. Comp. 253–275.

139. FCA's decision, paras 96–102: (i) available data showed that only a small percentage (around the 15%) of music downloaded from the internet was currently transferred and used on portable players; (ii) music downloads from platforms other than Apple's could be made compatible with iPod by means of a simple operation (the co-called ripping) which consists in converting, for instance, the format of Virgin Mega's downloads into Apple's; (iii) vigorous competition between several suppliers characterized the French market for portable players, most of which were compatible with Virgin Mega's Downloads.(Mazziotti: "Did Apple's refusal to license proprietary information enabling interoperability with its iPod music player constitute an abuse under Article 82 of the EC Treaty?"(2005) 28 W. Comp. 253–275.

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