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Competition law and interoperability in cloud computing

Sylvia Song *

Lawyers on Demand, Brisbane, Australia

A B S T R A C T

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The cloud computing industry is a swiftly growing sector, with many providers hailing it as a “digital revolution” that will render traditional IT business models obsolete within ten years. Although still under development, the range of circumstances to engage in monopolistic and anti-competitive behaviour in the cloud services market are numerous. Suppliers can engage in tying, exclusive dealing, and refusing to share vital information to allow the creation of technically compatible products. Monopolistic behaviour and pricing strategies can also restrict innovation and result in a lessening of competition.

This paper reviews the European laws that have a direct effect on competition in the cloud computing industry. In addition to competition law, other areas of law have an impact on competition in cloud services. Merger regulations for example have a direct effect by controlling market concentrations in the cloud and technology industry.

Interoperability has emerged as a key policy and legal consideration in cases concerning competition and merger laws. The concept of interoperability has arisen in cloud computing cases, as well as other areas of law that indirectly impact upon openness and competition. These areas include intellectual property and standardisation.

As new areas of interest arise that raise enforcement challenges for regulators, the author maintains that current laws are adequate to meet the competition concerns in the diverse cloud services market.

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1. Cloud services and competition generally

1.1. What is cloud computing?

The National Institute of Standards and Technology’s (NIST) definition of cloud services is widely adopted, being rapidly available and scalable services provided on-demand from a shared pool of resources.¹ Thus it is a model “enabling ubiquitous,

convenient, on-demand network access to a shared pool of configurable computing resources. . . that can be rapidly provisioned and released with minimal management effort or service provider interaction”.

The three main recognised uses include Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). SaaS is the most visible of cloud services – encompassing ‘free’ online email and social media services, as well as sharing of content stored “in the cloud”

* Senior Legal Counsel, Lawyers on Demand, 10 Market Street, Brisbane Q 4000, Australia.

E-mail address: sylvia_d_song@hotmail.com.

¹ Mell, P and Grance, T, “The NIST Definition of Cloud Computing: Recommendations of the National Institute of Standards and Technology” (National Institute of Standards and Technology (NIST) January 2011, Special Publications 2. <http://dx.doi.org/10.1016/j.clsr.2017.05.005>

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without download or installation required. The provision of platforms (PaaS) such as Google App Engine is useful to developers and those wishing to avoid the need for initial investment in software and hardware, but still requiring server management.

Finally, infrastructure can be provided via IaaS directly to the wholesale user and more recently end-user. Data storage, network capability, and remote computing can be purchased alone or invisibly “layered” into platform and software service provision, and includes Amazon Web Services and its competitors.

Trends powering development include the increasing demand for “bring your own device” (BYOD) as a workplace solution, public clouds and the rising demand for hybrid and ‘industry-specific clouds’. Additionally, the growth of big data and the Internet of Things (IoT) will increase the use of cloud by machine-to-machine data exchanges.

IT industries are generally considered prone to network effects. Network effects refer to the possibility that continued uptake of one product or service may lead to it becoming the accepted market standard. The cloud computing sector is particularly prone to network effects, and at various different levels. This is evident in the SaaS market, where Google+ has been unsuccessful in establishing a rival social media business to the dominant Facebook.

The European Commission’s former VP of competition policy, Joaquin Almunia, raised the complexity of the IT sector, describing it as:

... highly complex sectors, characterised by the need for interoperability and by potentially strong network effects or risks of lock-in. Often, these are markets where single companies dominate and it is therefore essential to ensure competition on the merits, notably through innovation.²

This is especially true of the cloud industry, especially given that many SaaS and PaaS services are layered on other infrastructure cloud providers. This would exacerbate the potential for dominant participants to extend their market power into secondary or ‘after-markets’. Platform providers even market their collaboration with large cloud providers with products ‘powered by’ well-known infrastructure³.

Regulators may therefore need to review market dominance at several layers of service provision and monitor upcoming trends in order to provide effective enforcement.

In light of both the immaturity of the cloud computing market as well as the Commission’s recognised need for innovation, the question is whether available laws are sufficient to adapt to this industry. Some argue that competition law is an ill-fitting suit for “advanced online services, mainly due to

problems involved with market definition of the cloud sector.”⁴ This claim will be analysed below.

2. EU competition law

The two main laws available to regulators are the prohibition on anti-competitive conduct and the abuse of market dominance, found in Article 101 and 102 (respectively) of the Treaty on the Functioning of the European Union (TFEU). Other areas of law can also directly and indirectly affect competition in this industry.

Despite being intended to prevent competitive wrongdoing, European competition law more often operates *ex post facto*. Hence, there are a number of cases involving cloud providers that have highlighted the continued applicability of these laws to services over the Internet.

2.1. Anti-competitive conduct (Article 101, TFEU)

Article 101(1) prohibits agreements, practices or decisions that can affect trade between Member States and which have the objective or effect of restraining or distorting competition.⁵ Anti-competitive practices will capture price-fixing and tying, market sharing, and discriminatory conduct.

Discriminatory conduct includes applying “dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage”, and will include price discrimination (Article 101(c)). Requiring customers to agree ancillary obligations with no connection to the contracted service would be a type of extortionate or unfair conduct (Article 101(1)(e)).

These types of conduct can be found in the cloud services market. Licensing conditions can also be anti-competitive. Major cloud providers are able for example to mandate the use of certain programming interfaces (such as Java), which will affect technical compatibility with other (non-Java based) devices.

2.1.1. Apple and iPhone applications

The Apple iPhone investigation is an example of anti-competitive behaviour. Although by no means dominant in the market for smartphone operating systems (Android having

⁴ Sluijs, Jasper P. and Larouche, Pierre and Sauter, Wolf, “Cloud Computing in the EU Policy Sphere” (August 15, 2011). *Journal of Intellectual Property, Information Technology and e-Commerce Law* 3(1) 2012; TILEC Discussion Paper No. 2011-036.

⁵ Article 101(1), TFEU: all agreements between undertakings, decisions by associations or undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market, and in particular those which: (a) directly or indirectly fix purchase or selling prices or any other trading conditions; (b) limit or control production, markets, technical development, or investment; (c) share markets or sources of supply; (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; (e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or accordance to commercial usage, have no connection with the subject of such contracts.”

² “EUROPA – Press Releases – New Transatlantic Trends in Competition Policy Friends of Europe” 10 June 2010, by Joaquin Almunia, VP of EC responsible for competition policy.

³ For example, API management platform Apigee Corporation announced many of its enterprise cloud customers are powered by AWS (see: <https://apigee.com/about/press-release/dozens-new-apigee-customers-running-api-powered-digital-programs-amazon-web-services>) (last visited 24 May 2017).

the leading market share⁶), Apple controls a range of cloud-based applications through its iOS operating system, such as iCloud storage and iTunes music services.

In 2010, Apple came under the European Commission's investigation into its restrictive licensing conditions. Its conditions required developers of independent applications ("apps") to use only Apple's development tools.

The use of third party tools for development are critical to maintaining portability of applications, as programs would otherwise be 'tied' to the user's iPhone. Apple voluntarily relaxed these restrictive conditions later that year, allowing developers to use alternative programming tools to develop compatible apps.

The Commission described its focus for the investigation, being:

*... the rationale underlying Apple's requirement to use only Apple's native programming tools and approved languages when writing iPhone apps, to the detriment of third-party layers, which could have ultimately resulted in shutting out competition from devices running platforms other than Apple's.*⁷

The power to investigate such anti-competitive behaviour can thus be seen to be 'technology neutral' in the sense that it can be applied to new technologies such as the cloud industry.

2.1.2. Exemptions for technical/economic progress

Conduct that would otherwise be anti-competitive may however be exempted under Article 101(3), where such activity will promote technical or economic progress.⁸ There must be a benefit to consumers, and there must not be a complete elimination of competition for a product, amongst other conditions.

The EU Guidelines on Horizontal Co-operation Agreements⁹ assist in the analysis of the more common agreements between operators on the same level of the production chain. The guidelines require economic and legal criteria to be applied in order to balance potential pro-competitive effects against their anti-competitive effect.

The Guidelines apply to technology products given the Commission's recognition that the non-licensing of technology may act as a constraint on the existing market (para 118). They contained detailed guidance on subcontracting agreements, commercialisation, and standardisation contracts, the latter being relevant to the cloud industry. The discussion on research and development (R&D) agreements are of particular

⁶ With an 86.8% market share in Q3 2016: IDC Research, 2017 (see <http://www.idc.com/promo/smartphone-market-share/vendor>) (last visited 24 May 2017).

⁷ "EUROPA – Press Releases – Antitrust: Statement on Apple's iPhone policy changes", 25 September 2010.

⁸ Article 101(3) exempts those agreements/practices that: "contribute to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit, and which does not: (a) impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives; (b) afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question."

⁹ Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements, 2011/C 11/01.

interest to the technology industry, with an analysis recommended to determine whether the resulting product will create a new market.

On the other hand, the EU Guidelines on Vertical Agreements¹⁰ detail how the exemption will also apply to undertakings at different levels of the production or distribution chain. Limited competition restrictions are permitted in vertical agreements provided the undertakings are not competitors, and the respective market shares of buyer and seller parties do not exceed 30% of the relevant market.

The Guidelines prohibit a number of 'hard core restrictions'¹¹ from any agreement. These include non-compete clauses in excess of 5 years, restrictions on manufacture, distribution, and sale of services (Article 5). It is possible that activity between cloud providers and their vendors/suppliers could encompass such restrictions, given the Apple development tools investigation of 2010.

2.1.3. Licensing and technology transfer agreements

The Technology Transfer Block Exemption Regulation¹² is also relevant to cloud service markets. Provided market concentrations are met, a licensor can allow a licensee to use its technology in providing or producing goods or services. This will include rights licensing or assignment agreements for the production of products.

Where parties that are not competitors have a combined market share of less than 30% of a relevant market, then the exemption will be generally available. Certain licensing practices are prohibited on the 'hard core list' and will require individual assessment, similar to practices proscribed under Article 101 (limiting output or market sharing, and restrictions on price setting).

Intellectual property rights continue to be relevant to cloud industry competition, as will be further discussed.

2.2. Abuse of market dominance (Article 102, TFEU)

Undoubtedly, the bulk of cases involving competition in cloud services have been instigated under the law preventing the abusive behaviour of a dominant market participant under Article 102 TFEU. This provides that:

Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States.

An abuse of market position can take the form of practices that are discriminatory, exclusionary or extortionate. Article 102(b) prohibits exclusionary conduct by specifically prohibiting practices "limiting production, markets or technical development to the prejudice of consumers". This will capture practices in the

¹⁰ Commission Regulation (EU) No 330/2010 of 20 April 2010 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of vertical agreements and concerted practices.

¹¹ Above, No. 10, Guidelines on vertical agreements, Article 4.

¹² Technology Transfer Block Exemption Regulation (effective 1 May 2014).

cloud industry such as tying or bundling of products, exclusive agreements or the refusal to licence intellectual property rights (IPRs).

Article 102(a) relating to conduct “directly or indirectly imposing unfair selling prices or other unfair conditions” also prohibits unfair or ‘exploitative’ behaviour. Requiring customers to agree ancillary obligations with no connection to the contracted service are a type of extortionate or unfair conduct. Such practices often termed “exploitative” are considered harmful as they often exploit consumers directly.

2.2.1. Dominance and relevant markets

The law requires the fulfilment of certain threshold questions to establish a contravention. The first step is establishing dominance, which requires an economic as well as a legal analysis. To establish such dominance, the Guidance on the Commission’s Enforcement Priorities requires a market share of at least 40%¹³.

On this point, the actions of more than one cloud provider may be relevant in establishing dominance rather than those of any single participant. Technology itself can give two previously non-dominant undertakings the ability to behave independently of competitors and customers¹⁴.

Article 102 also requires an initial analysis of defining the ‘relevant market’. For cloud services, defining the market is less straightforward than in the traditional ‘bricks and mortar’ economy, given the potential integration of various services, and in difficulties in establishing substitutes.¹⁵ Content-sharing and social media services for example combine software and storage services layered on infrastructure.

Conversely, substitutability may not be present given strong network effects. The Commission in its guidance on defining the relevant market highlighted the importance of demand substitutability:

... for the definition of the relevant market, demand substitution constitutes the most immediate and effective disciplinary force on the suppliers of a given product, in particular in relation to their pricing decisions. . . Basically, the exercise of market definition consists in identifying the effective alternative sources of supply for the customers of the undertakings involved, in terms both of products/services and of geographic location of suppliers.¹⁶

It can be difficult to apply a demand substitutability analysis to cloud services, given that the service itself must first be defined. There may be blurred distinctions where customers can add-on and integrate further cloud services they require.

Businesses may prefer basic infrastructure services in the form of additional data storage, but consider that a vendor providing the same basic services along with add-on options such as software licences or maintenance are a comparable substitute.

Furthermore, products are often sold that already provide cloud software and applications (Apple devices are sold with digital music service iTunes for example). Cloud products are becoming increasingly complex, and geographic markets are often international.¹⁷

Whereas dominance in the ‘bricks and mortar’ economy focussed on patterns and volumes of production or consumption,¹⁸ this analysis is less easily applied to the nature of online services on demand. Additionally, an abuse will not be established simply because a dominant competitor has a competitive advantage.¹⁹

Given the cloud market is highly reliant on infrastructure, it is possible that one supplier could become dominant and control related and aftermarket. Where IaaS cloud providers are dominant in more than one market, they may be able to control and lock-in their customers (resellers and smaller SaaS providers themselves).

Despite this, there are a number of cases that show where abusive conduct will directly impact the market for cloud services.

2.2.2. Communications and access cases

Cloud computing being the ‘ubiquitous delivery of online services on demand’ will by definition require some access to the Internet. The abuse of market dominance has been prevalent in the telecommunications markets for provision of broadband services and can manifest itself as margin squeeze or predatory pricing. Predatory pricing is the practice of lowering prices below average variable cost in order to drive out a competitor. There are a number of cases concerning network access, which will be discussed below.

2.2.2.1. Margin squeeze. Margin squeeze refers to the conduct of increasing the price for the supply of an input for a product (e.g. network access) whilst reducing your own price for a competing product at the same time. This practice of differential pricing to differing segments reduces profit margins of competitors that require the input supply to compete in markets for the same product.

In the TeliaSonera case²⁰ involving margin squeeze in the telecommunications market, the efficient competitor test was used. This case was a referral from the Swedish court regarding certain questions under the predecessor to Article 102

¹³ Guidance on the Commission’s Enforcement Priorities in Applying Article 82 EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings (OJ C 45/7, 24.2.2009), para 14.

¹⁴ Italian Flat Glass case (joined cases T-68/89), at para 358: “... where two or more independent undertakings jointly have, through agreements or licences, a technological lead affording them the power to behave to an appreciable extent independently of their competitors, their customers and ultimately their consumers”.

¹⁵ Walden, Ian and Luciano, Laise Da Correggio, “Ensuring Competition in the Clouds: The Role of Competition Law?” (April 7, 2011).

¹⁶ Commission notice on the definition of the relevant market for the purposes of Community competition law (OJ 372, 09/12/1997), para 14.

¹⁷ Above no.15, at p. 11.

¹⁸ See for example Joined cases 40–48, 50, 54–56, 111, 113–114/73, Suiker Unie: “For the purposes of determining whether a specific territory is large enough to amount to ‘a substantial part of the common market’ within the meaning of [Article 102] of the Treaty, the pattern and volume of the production and consumption of the said product as well as the habits and economic opportunities of vendors and purchasers must be considered.”

¹⁹ *Getmapping v Ordnance Survey*, High Court, England, H.G. 02C 00521, [2002] EWHC 1089 (Ch), citing Laddie J.

²⁰ *TeliaSonera v Konkurrensverket* (case C-52/09). Judgement of the Court (First Chamber), 17 February 2011.

(Article 82 EC). TeliaSonera, as the incumbent network provider, sold ADSL services to retail end-users as well as wholesale customers. Wholesale providers required these services to provide their own retail broadband products.

The Commission found that it would be an abuse of dominant position where a dominant supplier adopted a pricing policy designed to drive out competitors that were as efficient but were unable to withstand competition due to their smaller financial size (at para 40). The efficient competitor test involved an economic analysis in comparing the margins of competing suppliers with the costs of their inputs.

If the margin was lower than the costs of production, this could indicate abuse. The judgment of the Court (First Chamber) held that absent any objective justification, such pricing practices by a dominant undertaking would constitute an abuse within Article 102.

TeliaSonera's pricing policy amounted to margin squeeze, as its pricing policy meant it was unable to cover its own costs for provision of services to end users. It was not relevant that there could be a lack of any regulatory obligation to supply those services for which it held a dominant market position.

In similar circumstances, Germany's communications incumbent Deutsche Telekom (DT) was found liable in 2010 for having abused its dominant position.²¹ This case also involved a complaint under the predecessor to Article 102 (Article 82 EC), alleging abuse of dominant position.

This was an appeal case against an earlier judgment²² against DT for margin squeeze. The Court reaffirmed the earlier decision that margin squeeze had occurred. This was because DT had charged less for retail user access to broadband internet services than for wholesale customers.

The Court applied the "as efficient" test, finding that competitors would never be able to make a profit. This is because competitors would still need to pay other costs such as marketing, and invoicing, on top of its wholesale charges for access.²³

The DT case and TeliaSonera were decided in 2010 and 2011 respectively, and were of broad significance to other telecommunications providers that may have also been cloud infrastructure providers.

As applied to the cloud computing, it is possible though unlikely that margin squeeze at the infrastructure level could occur. Given the presence of many providers of basic computing and storage services (and the possibility that a permutation including platform services could be considered a substitute), this is more likely to only arise in the market for network access.

2.2.2.2. Predatory pricing. Predatory pricing is a practice that is similar to margin squeeze. Often a two-step process of lowering prices in order to price out competitors or prevent market entry, the dominant participant then increases prices to recoup losses.

In the case of *France Telecom v Commission*,²⁴ the Court confirmed a line of previous judgments²⁵ finding that pricing below average variable costs were to be regarded as abusive. The European Court of Justice found that it was not necessary to establish that a competitor be able to recoup its losses.

The court reiterated that dominant undertakings have particular obligations, which may mean they were not at liberty to pursue certain conduct where it may be permissible for other non-dominant businesses.

Looking back at these cases of exclusionary practices, the Commission has placed network access high on its list for intervention and enforcement. Thus, it announced that ensuring competition in the access market would be a priority for enforcement:

*... the social and economic benefits of faster internet access are large, and the risks of exclusion too great, to leave this to market forces alone. Public authorities will have to step in when and where operators are not willing to invest.*²⁶

As regards predatory pricing, it is possible that such a practice could be applied to the cloud market at several levels. If a dominant competitor with an over 40% market share exercised below average cost pricing to related or after-markets (such as provision of the dominant company's software without additional cost), this could affect software, platform or other infrastructure markets.

2.2.3. Infrastructure and dominance in the hardware markets

The June 2014 case of *Intel*²⁷ illustrates the abuse of market dominance in hardware markets that are used by cloud infrastructure providers. Intel manufactured central processing units (CPU) and was a dominant supplier with a 70% market share. In this case, the General Court upheld a penalty of €1.06bn against the hardware manufacturer. Intel was found to have abused its dominant position by giving rebates to computer manufacturers on the condition these customers did not purchase from a competing supplier (AMD).

These 'exclusivity rebates' were found to have a tying effect, which restricted the choice of customers. Relevantly:

*... exclusivity rebates granted by an undertaking in a dominant position are by their very nature capable of foreclosing competitors. ... A financial incentive granted by an undertaking in a dominant position in order to induce a customer not to obtain. ... supplies from its competitors is by its very nature capable of making access to the market more difficult for those competitors.*²⁸

This example is relevant for the cloud industry, given that infrastructure is provided by such equipment suppliers. Cloud customers are several steps removed from the equipment and

²¹ *Deutsche Telekom AG v European Commission*, Judgment of the Court (Second Chamber) 14 October 2010 ECLI:EU:C:2010:603.

²² *Case T-271/03 Deutsche Telekom v Commission* [2008] ECR II-477 (Decision of Court of First Instance of the European Communities) of 10 April 2008).

²³ Above, no.21, *Deutsche Telekom* case 2010.

²⁴ *Case C-202/07, Appeal case France Telecom SA v Commission*, Judgment of the Court (First Chamber), 2 April 2009.

²⁵ *AKZO v Commission* (Case C-62/86).

²⁶ Above, no.2. "New Transatlantic Trends in Competition Policy Friends of Europe."

²⁷ *Case T-286/09 Intel Corp v European Commission* [2014] GC, 12 June 2014.

²⁸ Above, No. 27, *Intel* case, at para 87–88.

will not have visibility over what server equipment is used to provide their storage or computing services. Dominance in this market would thus be indirectly compounded as the growth of cloud industries leads to a reduction in enterprise purchasing of PCs and servers.

The IBM Maintenance Services case²⁹ is another example of dominance in an after-market that is relevant to cloud markets. In the Commission's IBM investigation, the hardware supplier was investigated for abusing its dominant position in maintenance services by requiring the use of its proprietary software for hardware and operating systems.

As IBM was itself a supplier of maintenance services to its mainframe computers (large servers used for enterprises and public authorities), IBM's behaviour could have amounted to a 'constructive refusal to supply'. Third party competitors in the maintenance market were at a competitive disadvantage given that IBM was in a position to require the use of its licensed inputs.

The case was resolved by IBM agreeing a set of binding commitments with the Commission in 2011. Amongst them, IBM agreed to contract with third party maintenance providers on reasonable and non-discriminatory terms. It also agreed to make its machine code upgrades available for other maintainers to access, and agreed to a set of standard contract clauses.

2.2.4. Digital music and early SaaS/PaaS cases

Cases in the SaaS and PaaS industry have ranged from digital rights management (DRM) to browser development. One of the earlier cases was the French Competition Council investigation into Apple in *Virgin Media v Apple*.³⁰

This case concerned a claim brought by Virgin Media (France), which alleged that Apple's Fairplay digital rights management system prevented other suppliers from supplying content (music) to its iPod and iTunes systems. The claim was brought that Apple had abused its dominant market position.

Apple was found not liable. This was because content could be converted in other ways (e.g. CD could be 'ripped' into the system and provided in other mp3 formats). The French Competition Council dismissed VirginMega.fr's complaint on the alleged abuse of market dominance. This was because the Council was not sufficiently convinced that access to Fairplay would restrict development in the music download industry.

Council members decided that "access to the FairPlay DRM isn't indispensable to the development of legal platforms for the downloading of online music." There were substitutes available in the form of Microsoft's DRM, which Virgin chose to partner with. Virgin's choice meant its services would never be compatible with Apple's iPod device.

Although the Council acknowledged that the lack of interoperability between the music player industry vis-à-vis the download sites was a drawback for consumers, there

was no causation established. Relevantly, there was no causation between the market for music downloads and Apple's position in the hard-disc music playing market (which was potentially not dominant).

This analysis did not review whether online radio stations such as lastfm.com or Pandora could be substitutes to traditional music services that use DRM to protect content. These stations are cloud services providing streamed music, and have gained popularity as an alternative to paid content. Music is streamed based on a system of automated user preference ('thumbs up'), whereby software generates music similar to the user's choice.

Although the Apple case failed for lack of causation (and possibly dominance), such online music services raise the difficulty of defining a relevant market, as they challenge current models of SaaS content provision services.

2.2.4.1. *Platform dominance.* There are also cases in the provision of cloud platforms involving abuse of market dominance.

The Commission's decision against Microsoft in 2009³¹ was such a landmark case involving tying and other anti-competitive behaviour. Microsoft was investigated for tying its Media Player program to its operating system, as well as failing to provide an effective choice of internet browsers.

The case initiated by a Norwegian company's complaint was that Microsoft's actions in pre-installing Internet Explorer (IE) foreclosed rival browsers such as Netscape Navigator. Due to the strength of its distribution channel in pre-installing the browser, the US software giant was found to have enjoyed a distribution advantage that would force other browsers out of the web browser market. It took advantage of its dominant position in the operating system market, resulting in a 'platform monopoly'.

There were resulting network effects in favour of IE. IE's dominance "created artificial incentives for web developers and software designers to optimise their products primarily for Internet Explorer".³²

Microsoft entered into binding commitments to display a browser choice screen in 2009. However in 2013, it was found to have breached the commitments and was fined the substantial penalty of €561million.³³

Relevantly, in light of its considerable experience in competition law, there was no excusable error:

Microsoft's conduct does not constitute an excusable error, in view of (i) its significant resources; (ii) its extensive technical experience with the development, distribution and maintenance of software products and operating systems for PCs; (iii) its considerable competition law expertise; (iv) the fact that it ought to have been aware that its failure to display the Choice Screen to

²⁹ Summary of Commission Decision of 13 December 2011 relating to a proceeding under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the EEA Agreement (Case COMP/36.692 – IBM Maintenance Services).

³⁰ 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. (French Competition Council – Conseil de la concurrence).

³¹ Commission Decision of 16 December 2009 relating to a proceeding under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the EEA Agreement (Case COMP/C-3/39.530 – Microsoft (tying)).

³² Summary of Commission Decision of 16 December 2009 relating to a proceeding under Article 102 of the TFEU and Article 54 of the EEA Agreement (Case COMP/39.530 — Microsoft (Tying)).

³³ Case AT.39530 (Microsoft – Tying), Article 23(2)(c) Regulation (EC) 1/2003, 6 March 2013, para 69.

the affected users would constitute a breach of Section 2 of the Commitments; and (v) its reporting obligations on compliance with the Commitments. (para 69)

The two competition laws of abuse of market dominance and anti-competitive conduct thus continue to be directly applicable to cloud and technology markets. Another area of law directly impacting upon market competition is mergers and takeovers law.

3. Merger regulations

Mergers and joint ventures must be notified to the European Commission for clearance under the EU Merger Regulation (Merger Regulation).³⁴ Under the Merger Regulation, concentrations that “significantly impede effective competition” will be deemed incompatible with the common market (Article 2(3)). Mergers will be reviewed for whether undertakings retain any activities in a relevant market, and whether there is a possibility of eliminating competition for the services in question (Article 2(5)).

An examination of these merger laws is relevant in the context of cloud computing, with many cloud providers able to become dominant by merging with or acquiring competing businesses. Software services are becoming increasingly integrated, with Facebook having acquired WhatsApp in 2014 to add to its Messenger application as a communication tool. In addition, Google recently completed its acquisition of API provider Apigee Corporation in November 2016.

In December 2016, the Commission approved Microsoft’s acquisition of the LinkedIn professional social network under the Merger Regulation. It commented in its announcement that Microsoft was still a relatively small competitor in the market for customer relationship management, the strongest competitors being Salesforce, Oracle and SAP.³⁵ Microsoft was required to agree binding commitments, one condition of which was ensuring interoperability, which will be discussed further.

The Merger Regulation directly impacts upon the cloud services market, as can be illustrated in a number of cases.

3.1. Microsoft/Skype acquisition

The Microsoft/Skype decision of December 2013³⁶ was a cleared acquisition under the Merger Regulations. In this case, the General Court cleared Microsoft’s acquisition of Skype (a provider of instant messaging and voice/video communications services). Skype for business now constitutes a core service offering in Microsoft’s Office enterprise software.

Cisco, a rival to Microsoft for enterprise communication tools, alleged that the Commission did not properly consider network

effects for consumer communications in its earlier 2011 decision on the merger. Cisco alleged that through its dominance in operating systems (via Windows), browsers (IE), and application software (Office), Microsoft would gain a conglomerate position for cloud communications services.

The General Court found no evidence that greater market concentration would lead to an increase in video communications services offered by Windows Live Messenger and Skype. In doing so, it upheld the EC’s earlier findings in 2011³⁷ that the merger would not degrade the communications services market.

In the earlier case, the Commission considered three alleged ‘foreclosure strategies’ of degrading interoperability, tying, and bundling services. The Commission concluded that the “foreseeable effects. . . would be non-existent or at most limited.”³⁸ In part, this was because consumers used multiple messaging tools available on multiple platforms.

The decision is relevant as it is clear that the competition effects on new technologies can and will be assessed. The relevant market was analysed in this case, with potential disruptive effects on consumers and competition in other service markets considered to be minimal.

Microsoft was found to lack any incentive to degrade Skype’s interoperability for other platforms, and there was no incentive for Microsoft to bundle its products, as this would lead consumers to switch to other free messaging and communications options. Thus the acquisition of a popular cloud communications provider was considered as not amounting to a significant impediment on competition.

3.2. Cisco/Tandberg merger

In 2010, the EC reviewed the proposed merger between Cisco and Tandberg,³⁹ a Norwegian based video conferencing provider. The general lack of interoperability by Cisco products was identified, given that it had implemented a protocol that was not technically compatible with other suppliers.

The EC reviewed the proposed acquisition under the procedures for prior notification of merging undertakings.⁴⁰ The market investigation revealed substantial barriers to entry, caused in part by a lack of interoperability for some products. The investigation found that it was possible a merged entity would use its intellectual property rights over certain protocols to restrict interoperability.

In contrast to the Microsoft/Skype acquisition, this merger was considered as potentially enabling Cisco to foreclose its competitors. Interoperability ‘based on common standards’ was considered essential to enable data to be transferred over networks (para 142). Cisco could foreclose its rivals by limiting their ability to function on Cisco’s infrastructure.

This case illustrates the power to make a technology market arguably more competitive. As a condition of merger

³⁴ Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings (the EC Merger Regulation) Official Journal L 24, 29.01.2004.

³⁵ European Commission – Press release “Mergers: Commission approves acquisition of LinkedIn by Microsoft, subject to conditions”, 6 December 2016.

³⁶ Case T79/12, Judgment of the General Court, 11 December 2013 (Microsoft/Skype decision).

³⁷ Case No COMP/M.6281 – Microsoft/Skype, 7 October 2011, European Commission.

³⁸ Above, no.36, Microsoft/Skype decision 2013, at para 166.

³⁹ Case No COMP/M.5669 – Cisco/Tandberg Notification of 8 February 2010 pursuant to Article 4 of Council Regulation No 139/2004.

⁴⁰ Above, No. 34, EU Merger Regulation, Article 4.

approval, Cisco was required to agree to an interoperability strategy. It agreed to licence its TIP protocol to interested 3rd parties and divest its copyright to the protocol and assign this to a third party. In addition, it was required to place source code for the TIP in a source code library with open source licence granted for access.

Importantly, the Commission highlighted the importance of interoperability, which could be used to increase barriers to entry. The Cisco decision provides that:

Yet, the market investigation clearly confirmed that there is a strong case for interoperability, in particular as interoperability is key for consumers and network effects are important in this industry. (para 81)

From the above cases, it is clear that interoperability is a key driver for competition in the market and thus requires further examination.

4. Interoperability and technical compatibility

Interoperability is a type of functional interaction that can be understood as “the ability to exchange information and mutually to use the information which has been exchanged” (Recitals 10–12 of the Software Directive⁴¹).

The Commission has recognised interoperability as a key policy priority in “Towards interoperability for European Public Services” paper of 2010. Furthermore in his 2010 speech, the EC’s former VP for competition found that restricting the availability of interoperability information could be used as a technical method for stifling competition, and the Commission would “continue to carefully scrutinise companies’ actions in this area”.⁴²

One such example is the ability (or inability) to transfer certain applications and data between Android and non-Android (i.e. iOS) operating systems. Smartphone manufacturers as Apple or Samsung could gain control of a platform for example if they were able to exclude competitors from creating compatible products.

4.1. Microsoft/LinkedIn

The Commission in the LinkedIn merger decision required Microsoft to agree to a set of five-year commitments that involved maintaining interoperability. Microsoft as the acquiring party was required to allow competing social networks to retain their interoperability with its Office suite of products and APIs.

Beyond these commitments was an implicit recognition by the Commission that competing applications should remain technically compatible. Competition concerns were allayed by Microsoft’s commitment to grant equal access to competing social network businesses to its software development ‘gateway’, Microsoft Graph. This platform is a cloud service that could be described as follows:

It is used to build applications and services that can, subject to user consent, access data stored in the Microsoft cloud, such as contact information, calendar information, emails, etc. Software developers can potentially use this data to drive subscribers and usage to their professional social networks.

4.2. Microsoft interoperability case

The 2007 Microsoft case on interoperability⁴³ highlighted the importance of interoperability in the cloud services market. The Court of First Instance decided that Microsoft’s refusal to disclose interoperability information to competitors was an abuse of its dominant position. This abuse essentially prevented the development of technically compatible programs that could run concurrently with (and even in competition to) Microsoft’s operating system and software.

Sun Microsystems alleged that Microsoft had abused its market power by failing to provide requested interoperability information that would allow Sun’s technology to work with the Windows PC operating system and work group server systems. Additionally, Microsoft was also alleged to have tied its products (Windows Media Player) to its operating system.

Following an investigation, the court concluded that Microsoft had engaged in abusive conduct in two markets in which it had a dominant position. In fact, it went further to describe Windows’ dominance as an operating system as having become the “de facto standard”. The importance of such dominance was that many providers would be unable to stay in business unless their products could work compatibly with Windows.

The court recognised one of Microsoft’s arguments being that interoperability was a question of degree, and that “some interoperability” was in fact possible. However, the decision found that compatibility was not achievable to the level required by customers “in an economically viable manner”. Thus it was not possible for competitors to remain in the market.

This judgment found that both the refusal to supply interoperability information as well as the tying of Windows Media Player to the operating system were abusive under the predecessor to Article 102 (Article 82 EC). Moreover, such refusal to supply interoperability information was part of a ‘pattern of conduct’.

By refusing to supply information that would enable competitors to develop interoperable products to its work group server operating system, Microsoft’s conduct was abusive. The court concluded that:

⁴¹ Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs. Recitals 10–12.

⁴² Alumunia, Joaquin. Vice President of the European Commission responsible for Competition Policy. “Competition policy for an open and fair digital economy”. Second NEREC Research Conference on Electronic Communications. Madrid, 29 October 2010.

⁴³ Case No T-201/04 *Microsoft Corp v Commission of the European Communities*, Judgment of the Court of First Instance (Grand Chamber) of 17 September 2007.

... it cannot be inferred from the degree of interoperability thus required by the Commission that the Commission intends in reality that non-Microsoft server operating systems must function in every respect like a Windows server operating system and, accordingly, that Microsoft's competitors must be in a position to 'clone' or 'reproduce' its products or certain features of those products.

The judgment is important in the cloud context given that Microsoft's dominant global position providing PC operating systems, which could extend into its secondary markets such as its cloud products. The Windows operating system and Office suite of products currently include a number of cloud-based services such as Outlook Exchange (online email and content storage product) and Microsoft Azure (infrastructure services). The latter is an integrated cloud platform and infrastructure and is a rival to Amazon Web Services.

Some commentators argue from an economics perspective that interoperability is the only real solution to competition concerns. The problem of "two-level entry" is an economic analysis relevant to barriers to entry and interoperability that can be explained as follows:

It means that without access to interoperability information, a firm wishing to provide application software would also need to provide a platform and attract a sufficiently large customer base to use both the competing platform and the application. This may be too high a requirement for viable competition to take place.⁴⁴

There is an argument that legal rules should provide for broader 'trial and error procedures'. This is because technology is dependent upon innovation to a higher degree than traditional products. From an evolutionary economic theory perspective:

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.⁴⁵

This begs the question whether there are other bodies of law outside of competition law that can influence the interoperability essential for promoting a competitive market characterised by technical compatibility.

The next section reviews the potential for standardisation and intellectual property laws to influence technical compatibility that has been acknowledged as important in promoting a competitive market. The promotion of open interoperable technical standards may also affect cloud computing, especially at the infrastructure level where there is less transparency to end-users.

5. Standardisation

Standardisation is of particular importance in promoting compatibility between technology providers. The Commission has recognised that in the absence of any anti-competitive intentions or results, standardization will often promote market efficiency.

Standards which establish technical operability and compatibility often encourage competition on the merits between technologies from different companies to help prevent lock-in to one particular supplier. . . Standards also play an important role for innovation. They can reduce the time it takes to bring a new technology to the market and facilitate innovation by allowing companies to build on top of agreed solutions.⁴⁶

Data portability can be encouraged through the increasing insistence of standards. For example, competition could be increased by embracing the portability of data or applications as a standard contractual condition. Another demand-side initiative would be to require independent certification to assist in enabling such portability.

However, participation in any standards should be open and without any obligatory compliance. When analysing a standardisation agreement, regard may be had to whether the participants are at liberty to develop alternative services or standards that are not in compliance. This appears in the Guidelines on Horizontal Co-operation Agreements⁴⁷ as well as in case law.

5.1. Standardisation X/Open Group and standard setting

In the 1986 case of X/Open Group,⁴⁸ the members wished to promote standardisation of the UNIX operating system – which enabled portability in itself as it would enable standardising select interfaces (and not create new ones). The Commission reviewed the membership agreement whereby the group would allow functionality by group users to enable open standards to evolve a "common application environment" based on AT&T's system interface definition.

The membership agreement was reviewed in light of the previous Article 85(1) that prohibited all agreements "which have as their object or effect the prevention, restriction or distortion of competition within the common market". The Commission weighed the overall advantages and disadvantages of the creation of an open industry standard. It found that the advantages of greater flexibility to change providers of hardware and software solutions would outweigh any potential market distortions.

The Unix operating system was considered as itself offering a degree of technical compatibility. One of the system's features was a "high degree of portability and machine independence" that would allow programs written on one machine to

⁴⁶ Above, no.9, Guidelines on Horizontal Co-operation Agreements, at para 308.

⁴⁷ Above, no.9, at para 280.

⁴⁸ 87/69/EEC: Commission Decision of 15 December 1986 relating to a proceeding under Article 85 of the EEC Treaty (IV/31.458 – X/Open Group).

⁴⁴ Ulla-Maija Mylly, "An Evolutionary Economics Perspective on Computer Program Interoperability and Copyright". 41(3) IIC 284 (2010) at 299.

⁴⁵ Above, no. 44 "An Evolutionary Economics Perspective. . ." at 315.

be moved to another of a different make and capacity (para 4).

In this case, the Article 101(3) exemption from anti-competitive conduct was established by the factual finding that the group would contribute to technical progress, benefit consumers, and the fact that competition would not be eliminated.

5.2. “Network effects” and barriers to entry

On the other hand, it should be noted that promotion of specific standards could also have the effect of creating a barrier to entry. If adoption of a standard results in a “network effect”, whereby something becomes the de facto standard, then this may have an anti-competitive effect. The insistence on certain application languages and common interfaces may eventually have this effect.

Network effects are not always insurmountable however. In its recommendations on the e-commerce sector,⁴⁹ the EC stated network effects could be less of an obstacle in the innovation sector, which was characterised by “ongoing technical progress”.

5.3. Contracting on standard terms

Standardisation has also been promoted in terms of development of standard terms and conditions. Relevant areas for negotiation are the right to access and retrieve data upon termination of the contract, as well as rights of termination by the customer.

Standard terms could be useful for example, where they assist consumers to compare the services of different companies. In the Guidelines on Horizontal Co-Operation Agreements, an ability to switch providers “as well as market entry by competitors, constitutes an advantage for consumers” (at para 335).

Standard terms could assist competition if cloud providers were required to enable data transfers through longer and more open periods for data retention, for example. A cloud legal study of 31 service providers by Queen Mary University of London found that although paid services generally allowed for a period in which to retrieve data, ‘free services’ were not often so generous.

In the study’s analysis:

*‘Free’ services may often not provide such retention; if coupled with termination clauses that allow the provider to terminate the relationship at its own discretion with little or no notice, this may result in the risk of the customer losing access to all data.*⁵⁰

The development of standardized SLAs for cloud contracts has become more prevalent, with many allowing customers rights of data access following termination or expiry. Pressure in the form of increasing standardization in the

industry may lead to customers benefiting from a common understanding that providers need to assist with the access and retrieval of information following contract termination.

The difficulty is that cloud provider terms are generally not negotiable, other than for large customers such as enterprises and government agencies. This may be even more prevalent where services are provided “free” of charge to users, such as Dropbox and Gmail. Applications are often not portable, given they are developed for platforms running on different operating systems (Android vs iOS platform, for example).

Perhaps the answer is to involve intellectual property rights (IPR) in standard setting. In relation to standardisation and IPR, the Commission has recognised that IPR offers a route to innovation:

*IPR promote dynamic competition by encouraging undertakings to invest in developing new or improved products and processes. IPR are therefore in general pro-competitive. However, by virtue of its IPR, a participant holding IPR essential for implementing the standard, could, in the specific context of standard-setting, also acquire control over the use of a standard.*⁵¹

A discussion on the impact of intellectual property laws on interoperability and standardisation is therefore useful.

6. Intellectual property laws

Competition law and intellectual property law are accepted as having many of the same objectives of promoting consumer choice and technological innovation. It is for this reason that intellectual property rights are generally considered to be pro-competitive.

Although intellectual property rights give their owner a monopoly over that particular IP (subject to exceptions), their ownership does not necessarily create dominance in a market. An economic analysis is relevant in examining whether any substitutes are available, “because a technology, which is protected by IPR, despite novel and valuable, may have a corresponding substitute.”⁵²

Patents for example do not necessarily confer exhaustive protection in a relevant product market, and it may be possible to “invent around” the patent. It should also be noted that dominance in and of itself is not punishable conduct – rather it is the abuse of a dominant position that is considered illegal or prohibited under Article 102.

6.1. Intellectual property and interoperability

As a starting point, IP laws acknowledge that interoperability should be an express exemption from a copyright monopoly in the case of computer programs. De-compilation (or ‘reverse

⁴⁹ Commission recommendation 2003/311 of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21 [2003] OJL 114/45, at 10.

⁵⁰ Millard, Christopher. 2013 ed. *Cloud Computing Law*. Oxford University Press: p. 69.

⁵¹ Above, no.9, Guidelines on Horizontal Co-operation Agreements, para 269.

⁵² Zhang, L. 2010. “Refusal to License Intellectual Property Rights under Article 82 EC in light of Standardization Context”. *European Intellectual Property Review*, Vol. 8, p. 402 (p404).

engineering') is a limited exception to the copyright protection afforded for computer programs protected by copyright as literary works.

Both the Software Directive and the *Copyright Designs and Patents Act 1988* (UK) (section 50B) allow de-compilation where necessary to create independent programs. Thus, a copyright owner's authorisation is not required to reproduce code to achieve "interoperability of an independently created computer program with other programs" (Article 6, Software Directive).

Given the competition policy advantages of protecting compatibility, it is therefore important that IP rights are not given too wide an interpretation by the courts. On this point, there have been a number of judgments on the ability of certain elements of software to be protected by copyright. These are particularly relevant in the platform services market.

6.2. Microsoft interoperability judgment

In the 2007 Microsoft interoperability case,⁵³ Microsoft argued that its communication protocols were protected under intellectual property laws or trade secrets. The EC found it unnecessary to decide the question, as the relevant test was whether conditions were satisfied that would require a dominant undertaking to licence its intellectual property rights.

The court in that case considered that in exceptional circumstances, the exercise of exclusive IPRs could constitute an abuse of market position. If such circumstances were present, then refusal to grant such rights could infringe competition law in the absence of any objective justification. Thus it found that:

... As the Windows operating system is thus present on virtually all client PCs installed within organisations, non-Windows work group server operating systems cannot continue to be marketed if they are incapable of achieving a high degree of interoperability with Windows. (at para 388)

The court confirmed that the copyright IP claim hindered technological development, and that reverse engineering was not economically feasible. The ability of IP laws to impact upon interoperability and innovation in the cloud sector is evident in this judgment.

6.3. Protection of interfaces and APIs

The protection of interfaces has also become legally contested. Interfaces are defined in the Software Directive as components of a program that provide for "interconnection and interaction between elements of software and hardware" (Recital 9).

If interfaces or functional elements of computer programs were a protected IPR, the development of new applications and programs could be restricted to the extent they are based on the same functional code. Thus it would create an opportunity for platform monopoly. Such a monopoly would have the same effect as the Apple iPhone licensing restrictions case, where the creation of compatible applications would have been restricted to one operating system.

The 'smartphone wars' cases in the US are an example of how intellectual property laws are able to affect competition in a platform market. In the 2014 case of *Oracle v Google*,⁵⁴ certain elements of a computer program's functionality were found copyrightable. In particular, a number of application program interfaces (APIs) were challenged as having copied a competitor's functionality.

APIs are a system of protocols, definitions and building blocks for applications and are critical to independent software development. The Federal Circuit Court confirmed that the structure, sequence and organisation (SSO) of a number of Java APIs were protectable expression.

This judgment was considered a major blow to ensuring interoperability of Android smartphone applications, given that APIs are a specification allowing different software to communicate with each other. The Court's decision in *Oracle* has been criticised as going against the weight of precedent case law over the last 25 years. In addition, leading commentators argue that structural elements of software are inherently functional and should not be treated as protectable expression under copyright laws.⁵⁵

Fortunately for interoperability and open competition in Europe, this is not the case. The position was settled in the European Court of Justice (ECJ) judgment in *SAS Institute Inc. v World Programming Ltd.*⁵⁶ The ECJ decided in 2012 that certain functionality of computer programs was not capable of copyright protection. Protecting interfaces and file format or structure was recognised as placing a restriction on innovation that could "seriously deprive markets of the general advantages of competition".⁵⁷

This case follows other European judgments confirming that computer interfaces such as its graphics user interface are also not subject to copyright protection.⁵⁸

7. Big data and new playing fields

Big data and the Internet of Things (IoT) have raised new challenges for competition regulators. Data is a key asset in itself to certain cloud businesses, such as social networking businesses and search engines.

Data has become recognised as a new "business" in itself. EU Competition Commissioner Margrethe Vestager acknowledged, "both knowledge and data are another kind of currency, another asset than just the turnover of the company."⁵⁹ The rise of big data

⁵⁴ *Oracle America, Inc. v Google Inc.* (9 May 2014) US Court of Appeals for the Federal Circuit Court 2013-102,-1022.

⁵⁵ Samuelson, P. 2015. "Three Fundamental Flaws in CAFC's *Oracle v Google* Decision". *European Intellectual Property Review*. p.2.

⁵⁶ *SAS Institute Inc v World Programming Ltd*, ECJ 2 May 2012.

⁵⁷ Samuelson, P., Vinje, T. and Cornish, W. 2012. "Does Copyright Protection Under the EU Software Directive extend to Computer Program Behaviour, Languages and Interfaces?" *European Intellectual Property Journal*: Feb 2012, at p.166.

⁵⁸ *Security Software Association v Minister of Culture (Bezpečnostní softwarová asociace – Svaz softwarové ochrany v Ministerstvo kultury)*. Judgment of the Court (Third Chamber) of 22 December 2010.

⁵⁹ White, Aoife and Lacqua, Francine. "Facebook probe is in anti-trust grey zone". *Bloomberg Technology*: 16 September 2014.

⁵³ Above, no.43, *Microsoft v European Commission* (2007).

has required regulators to investigate the ability of data to be harmful to competition.

In early 2016, the German Federal Cartel Office announced its investigation into Facebook's privacy terms. The terms were seen as a potential misuse of dominant position, given users may not be "sufficiently informed" as to the nature and extent of data collected.

Indeed when the second largest social networking provider (China's Tencent) has half as many as Facebook's ~1.6 billion users per month, data portability would not assist. The obvious lack of substitutes was highlighted in the context of this case, with one consumer spokesman saying:

User data is often the currency which consumers pay for supposedly free services. Consumers have no adequate alternative. They can't just transfer their user data to other portals. (Klaus Mueller, chairman of the Federation of German Consumer Organisations)⁶⁰

In September 2015, the Belgian competition authority determined that the country's national lottery had abused its position in using its database of contact details to launch a new gaming product. The database of information was a unique asset being as it was, compiled uniquely from the lottery's position as a monopoly provider. Its competitors were not able to replicate such an asset, and the lottery was fined €1.2million.

It will be interesting to see how data protection laws will impact upon data portability. The General Data Protection Regulation⁶¹ will require personal data of natural persons to be subject to a right of portability. Although this remains a right of natural persons, it will affect SaaS content and social media providers who currently do not offer portability of personal data (cf. Google initiatives).

8. Conclusions

Despite the law lagging behind technological progress, competition law still plays an effective role in ensuring that dominant players do not abuse their position. The continued utility of competition laws is evident in the range and number of investigations into potential platform monopolies and on in-built restrictions on software choices. Additionally, the issue of aftermarkets arising from infrastructure dominance has been recognised and will be a useful analogy for investigations into cloud after-markets. Although competitors will need to prove a relevant market, this may become an easier hurdle to clear as the take-up of cloud computing becomes more mainstream.

The Merger Regulations also operate to provide visibility over all notified mergers that could result in an impediment to competition in a market. The Cisco/Tandberg acquisition is an example of the Commission's power to investigate the

competition effects on cloud communication services, and power to require commitments involving interoperability and licensing of intellectual property.

Decisions such as the 2007 Microsoft interoperability judgment have identified that technical compatibility is essential to continued competition in technology markets. Intellectual property laws, as well as standardisation, affect technical interoperability (and thus competition in cloud services) indirectly. Regulators are able to indirectly promote competition by raising interoperability, through promoting technical and legal standards for example.

Although Big Data raises new challenges for regulators, competition and other laws indirectly affecting competition will continue to be effective and 'technology neutral' in their application to the cloud computing industry.

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⁶⁰ Auchard, E. "Germany takes on Facebook in competition probe". Reuters' Technology news: 2 March 2016.

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Author Information

Sylvia Song is currently studying a Masters of Law (LLM) in Computer and Communications, Centre for Commercial Law Studies, Queen Mary University of London. The author is currently working in-house in Australia, and has published a number of other articles in the field of intellectual property and computer law.